UNIVERSIDAD COMPLUTENSE DE MADRID
FACULTAD DE FILOLOGÍA

TESIS DOCTORAL

La fonología de la interlengua de los estudiantes españoles de inglés

(The phonology of the interlanguage of Spanish learners of English)

MEMORIA PARA OPTAR AL GRADO DE DOCTOR

PRESENTADA POR

Alicia Lasso Liceras

Director

Juan Rafael Zamorano Mansilla

Madrid

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Finally, I would like to dedicate this thesis to my husband Éanna. We are who we are thanks to those who are by our side.

Ba mhaith liom buíochas ó chroí a ghabháil le mo mhuintir, Anne O'Broin agus Fiach O'Broin, as a gcuid moltaí agus as a gcuid tacaíochta. Is fada an bóthar atá siúlta againn le chéile.
Ar deireadh thiar, tiomnaím an tráchtas seo do m'fhear céile, Éanna. Is é an lucht tionlacain a shnoíonn an duine

Madrid, September 2020

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ABSTRACT.

Este trabajo se centra en el estudio de la pronunciación de un grupo de sonidos del inglés que pueden ser problemáticos para los hablantes nativos de español que estudian el inglés como segunda lengua. Los sujetos de la investigación fueron elegidos en base a tres criterios: 1. Todos son hablantes nativos de español; 2.Su nivel de estudio es homogéneo; 3. No utilizan el inglés como herramienta de estudio o de trabajo diariamente.

Se establecen las siguientes hipótesis de investigación: Hipótesis 1. Los 12 sonidos /m/, /ŋ/, /r/, /t//d/, /ʃ/, /tʃ/, /z/, /v/, /s/, el pasado y el plural son igualmente problemáticos para los estudiantes españoles de inglés de nivel B1.Hipótesis 2. El dominio de uno de los 12 sonidos seleccionados no permite predecir con seguridad cuál de los otros 11 sonidos será también dominado.

Para ello se realiza un análisis contrastado de ambos idiomas (Corder, 1967; Lado, 1957). En este caso, centrándose en los sistemas fonológicos inglés y español, en lo que respecta a este grupo de sonidos, se realizan pruebas empíricas para tratar de averiguar la causa de los errores y la naturaleza de los mismos y, finalmente, se aplican las nociones de "transferencia" e "interlengua" (Selinker, 1972) para analizar si los estudiantes generan su propio lenguaje que es la causa del resultado final de los sonidos estudiados.

ABSTRACT.

This work focuses on the study of the pronunciation of a group of English sounds that can be problematic to perform correctly for native Spanish speakers studying English as a second language. It focuses on some problematic English phonemes. The students for the research were chosen based on three criteria: 1. All are native Spanish speakers; 2. Their level of study is homogeneous; 3. They do not use English either as a study or work tool daily.

The following research hypotheses are established: Hypothesis 1. The 12 sound /m/, /ŋ/, /r/, /t//d/, /ʃ/, /tʃ/, /z/, /v/, /s/, the past and the plural are equally problematic for B1 Spanish learners of English. Hypothesis 2. Mastering one of the 12 sounds selected does not allow us to confidently predict which of the other 11 sounds will also be mastered.

For this purpose, a contrastive analysis of both languages is carried out (Corder, 1967; Lado, 1957). In this case, focusing on the English and Spanish phonological systems, in regard to this group of sounds, empirical tests are carried out to try to find out the cause of the errors and the nature of them, and finally, the notions of "transfer" and "interlanguage" are applied (Selinker, 1972) to analyse whether the students generate their own language which is the cause of the final result of the sounds studied.

(SEGÚN LO DISPUESTO POR EL ARTÍCULO 4.3 DE LA NORMATIVA DEL REAL DECRETO (1393/2007) Y EL ARTICULO 10.2 DE NORMATIVA UCM DE DESARROLLO DEL R.D. 99/2011).

ENGLISH SUMMARY OF THE DOCTORAL THESIS ENTITLED:

THE PHONOLOGY OF THE INTERLANGUAGE OF SPANISH LEARNERS OF ENGLISH.

(LA FONOLOGIA DE LA INTERLENGUA DE LOS ESTUDIANTES ESPAÑOLES DE LENGUA INGLESA).

Doctoranda: Alicia Lasso Liceras.

This thesis focuses on the problems of the pronunciation of English sounds by native Spanish speakers studying English as a second language. The chosen phonemes are: /m/, /ŋ/, /r/, /t//d/, /ʃ/, /tʃ/, /z/, /v/, /s/, past, and plural. Other problematic sounds for Spanish students of English such as /w/, /ð/ or /ʒ/, and vowel sounds, diphthongs, and triphthongs have not been considered because of the need to limit the corpus to several sounds that were manageable and could be studied in depth. On the other hand, vowel sounds, diphthongs, and triphthongs have a greater variety of pronunciations due to the varieties of English.

The study group is made up of university students who do not use English as a study tool in subjects other than English, nor do they use it regularly in the workplace. The level required is B1 according to the Common European Framework, although there is a great disparity in levels among students.

The research hypotheses are: To verify if, in the pronunciation of the English sounds by a native Spanish-speaking student, the interlanguage is a determining factor in the result. And if we can consider that, in the interlanguage of the students, there are different stages of learning. Also, if mastering one of the 12 sounds selected allows us to confidently predict which of the other 11 sounds will also be mastered.

For this purpose, a contrastive analysis of both languages is carried out (Corder,1967; Lado, 1957). In this case, focusing on the English and Spanish phonological systems, as far as this group of sounds is concerned, the results obtained are in turn analysed to detect the cause of the errors, their nature and, finally, the concept of "interlanguage" are applied (Selinker, 1972) to observe how the students use their interlanguage.

To achieve the purposes of the research and test the proposed hypotheses, the author of the thesis made a selection of students, material, methodology and analysis of the results with the criteria set out below.

At the beginning of the study, all students shared three basic characteristics. On the one hand, all of them are native Spanish speakers. Students, whose mother tongue is not Spanish, were not considered to avoid interfering with the results, and because it was considered that the data extracted could not be extrapolated given that the number of students with this background was very much a minority. On the other hand, the level of studies was an important factor; students with the same homogeneous educational level were required. And finally, it was important that the students did not use English professionally, neither in their field of studies nor in their field of work. Age, as a selection factor, was not taken into account. The group is mostly made up of young students in the age range 20-35, with only two students over 50.

In relation to the material, two different texts were selected. The first is a journalistic text entitled "Trump makes final effort to rile his base using fear, division and racial anxiety" (The Guardian) and the second is an advertising text from a fast-food company "McDonald's Restaurants: advertising & marketing profile". The journalistic text has some vocabulary that, although accessible in general, included words that were not so common or familiar to the students, and therefore they were not used to hearing them. On the other hand, the advertising text had a more common vocabulary and therefore was known by the students who had heard it and used it on occasions.

The premise was that students should have the greatest possible autonomy to develop the reading of both texts and should not be conditioned by environmental elements (Nemser, 1971) that could distort the results. Therefore, they were asked to record an audio version

of each text within two weeks so they could control the environment in which they did so, as would not have been the case in the language laboratory. And in turn, they chose when they could do it; they were not obliged to do it at a certain time with a certain schedule.

Once the two tests had been carried out, the author of this work began the selection of the audios, some of which were rejected for different reasons. All the audios whose recording was deficient or unintelligible for different reasons were rejected, as were the audios of the candidates who had only performed one of them. Finally, 30 audios were selected for this research.

From this final selection of audios, cuts were made to isolate the sounds to be able to analyse them, both in isolation and in the context of the concomitant sounds as these could influence the sound being studied. Each sound of each student was compared with its pronunciation by a native English speaker and, from that point onwards, it was assessed how the native Spanish speaker had made it. There were three cases in which the sounds were considered invalid. This occurred when, due to the recording, it was not possible to discern with certainty whether the sound had been performed correctly. It was also not considered when the student changed the word and did not pronounce the word in the text, as that word was not the sound to be studied. If the student changed one word for another and this word contained the sound that was being studied then it was considered as valid regardless of its result when it was pronounced. And finally, and most obviously, when the subject directly omitted the word.

With the results obtained 48 tables were drawn up. The classification criterion for the students was as follows: any result between 0.67 and 1.00 was considered to be near to the native model of pronunciation; any result below 0.33 was far from the native model.

The first step was to create 11 tables, one for each sound analysed (these tables are in Appendix I). Each table contains the individual score of the 30 students on each sound. Other tables were made (tables 1 to 33) from the analysis of the data extracted from these tables. They were organised in blocks of three for each sound. The first table contained the results of the 30 students on the sound studied. I placed the students in decreasing order according to the percentage of valid pronunciation of the sound under study. The second

table organises the 30 students into three groups. It shows the percentages of the extreme groups, plus those of the intermediate group. This intermediate group comprises those students whose results are between 0.34 and 0.66. I included in the first column the number of students in each group and, in the second column, the percentage they represented of the whole group. The third table shows the results of the two extreme groups, those far from the native model and those near to the native model, making a comparison of each sound in each group. The aim was to analyse the differences and similarities between the groups and to make deductions about the hypotheses I have proposed. Table 37 shows the unexpected results presented by the far and near the native model groups to some of the sounds studied.

Through the analysis of the tables, several conclusions could be drawn:

1. The hypothesis put forward is corroborated. In general, it is not possible to predict the behaviour of a student when pronouncing a sound from how he or she pronounces another sound in most cases. But data show that /r/ could predict the performance of /t//d/ and the plural. And although the difference between the groups is 0.32, a tenth less than the reference value of 0.33 established, we might consider that /ʧ/ could be considered to predict the performance of the plural sound.

2. Even though there is no strong relation between the sounds, except in the above-mentioned ones (/r/ and /ʧ/), a weak relation between them can be established when we set a difference between the extreme groups of 0.20 or more. It helps us to observe the trend in related sounds.

3. A linguistic transfer from the mother tongue to the target language can be considered when pronouncing some English sounds.

    a. It has been noted that in some sounds, such as /v/, there is a transfer of the mother tongue on the target language which in this case is English. In the above example the pupils tend to pronounce /v/ English which is labiodental fricative like /b/ Spanish which is bilabial occlusive. The most plausible reason is that the /v/ English sound does not exist in Spanish and that Spanish unifies both graphemes

<v> and <b> into a single phoneme /b/ where the student tends to use the Spanish sound, thus replacing the English.

b. Final word sounds, whose position at the end of the word is not possible in Spanish, tend to be simplified. This is the case of <-nag> whose phoneme is /ŋ/ which tends to be simplified into a /n/ and of the word endings <-nt>, <-st> and <-nd>.

c. Words ending in <-m> presented a certain difficulty in their realisation although it could have been expected that this sound would not present problems since in Spanish there are words with this ending, such as modem or totem. Half of the students obtained results far from the native pronunciation model and the other half of the subjects were divided between the intermediate group and the group close to the native model.

d. The English phoneme /r/ was assimilated to the Spanish phoneme because the students did not identify the phonological differences between them.

e. The sound /ʃ/ corresponding to the graph <sh> that does not exist in Spanish was made by 90% of the students far from the native model. A high percentage of the students pronounced Spanish sounds /s/ or /ʧ/ instead.

f. The English /z/ sound posed another great difficulty for this group of students as it was completely assimilated to the Spanish voiceless consonant /s/.

g. It was observed that when a word began with <s->a prothesis occurred as the students pronounced /e/ before /s/ at the beginning of the word. It can be thought that since there are no words in Spanish that begin with /s/ the student applies the Spanish syllabic structure where before <s-> there is a vowel.

h. The /id/ or /d/ sound of past whose graph is <-ed> also obtained low results. Generally, students tended to have two solutions. The first was to pronounce the same endings by assimilating /id/ to /d/ generating a phonological process of elision; and the second was to pronounce /id/ as /ed/, that is, they changed the vowel, in addition to a weakening in the pronunciation of /d/.

i. The English sound /ʧ/ corresponding to the graph <ch> obtained the best results. This is not surprising as its pronunciation is very close to the Spanish <ch>.

It should be noted that some of the results in these sounds are not transferable to other groups due to the low number of individuals in the extreme groups.

On the other hand, Table 35, Chapter 6, gives information to determine whether these 12 selected sounds are mastered in a particular order in the development of the interlanguage or if each individual progresses through idiosyncratic stages. The last chapter sets out the conclusions of the analyses and verifies the second hypothesis proposed. Here there are two tables with new data. Table 36 shows the difficulty of sounds in percentages, and Table 37 provides information about the sounds where two reference groups behave in the same range.

To conclude, to facilitate the reading of this thesis, it is useful to detail its structure. The study is divided into seven chapters. The first chapter presents an introductory overview of the objectives, methodology, and materials of this work as well as a description of the characteristics of the subjects selected for the study. The second, third, and fourth chapters are dedicated to the revision of the theory and practical work related to phonetics, contrastive analysis, and error and interlanguage analysis. The fifth chapter focuses on the description of the research method, the participants in this study, the material, and the corpus used to prepare this thesis. The sixth chapter presents the results of the practical analysis of the thesis and its interpretation.The seventh presents the conclusions of the research. References section includes the literature consulted in this thesis, and Appendix I the 11 matrix tables of this research.

(SEGÚN LO DISPUESTO POR EL ARTÍCULO 4.3 DE LA NORMATIVA DEL REAL DECRETO (1393/2007) Y EL ARTICULO 10.2 DE NORMATIVA UCM DE DESARROLLO DEL R.D. 99/2011).

RESUMEN EN ESPAÑOL DE LA TESIS DOCTORAL TITULADA:

LA FONOLOGIA DE LA INTERLENGUA DE LOS ESTUDIANTES ESPAÑOLES DE LENGUA INGLESA.

(THE PHONOLOGY OF THE INTERLANGUAGE OS SPANISH LEARNERS OF ENGLISH).

Doctoranda: Alicia Lasso Liceras.

Esta tesis se centra en los problemas de pronunciación de sonidos ingleses por hablantes cuya lengua materna es español que estudian inglés como segunda lengua. Los fonemas escogidos son: /m/, /ŋ/, /r/, /t//d/, /ʃ/, /tʃ/, /z/, /v/, /s/, pasado y plural. Otros sonidos problemáticos para el estudiante español de inglés como /w/, /ð/ o /ʒ/, y los sonidos vocálicos, diptongos y triptongos no han sido considerados debido a la necesidad de limitar el corpus a un grupo de sonidos que fueran manejables y pudieran ser estudiados en profundidad. Por otro lado, los sonidos vocálicos, diptongos y triptongos tienen una mayor diversidad de pronunciaciones debido a las variedades del inglés.

El grupo de estudio está compuesto por estudiantes universitarios que no utilizan el inglés como herramienta de estudio en otras asignaturas que no sea la de inglés, ni tampoco en el ámbito laboral de forma regular. El nivel requerido es B1 según el Marco Común Europeo aunque entre los alumnos hay una gran disparidad de niveles.

Las hipótesis de investigación son: Verificar si, en la pronunciación de los sonidos del inglés por un estudiante nativo de habla hispana, la interlengua es un factor determinante en el resultado, si podemos considerar que en la interlengua de los estudiantes, hay diferentes etapas de aprendizaje. Y también si el dominio en la pronunciación de uno de los 12 sonidos seleccionados nos permite predecir con certeza cuál de los otros 11 sonidos también será dominado.

Para ello se realiza un análisis contrastivo de ambos idiomas (Corder, 1967; Lado, 1957). En este caso centrado en los sistemas fonológicos inglés y español, en lo que se refiere a este grupo de sonidos seleccionados, los resultados obtenidos se analizan a su vez para detectar la causa de los errores y la naturaleza de los mismos, y por último se aplica la noción de "interlengua" (Selinker, 1972) para observar cómo los alumnos generan una lengua propia que es la causa del resultado final de los sonidos estudiados.

Para alcanzar los propósitos de la investigación y comprobar las hipótesis propuestas, la autora de la tesis realizó una selección de alumnos, material, metodología y análisis de los resultados con los criterios que se exponen a continuación.

Al comienzo del estudio todos los alumnos compartían tres características básicas. Por una parte todos ellos son hablantes nativos de español, no se consideró a estudiantes cuyo idioma materno no fuera el español para evitar que éste interfiriera en los resultados y porque se considero que los datos extraídos no se podrían extrapolar dado que el número de alumnos con este rasgo es muy minoritario. Por otra parte el nivel de estudios fue un factor importante, se requería a estudiantes con el mismo nivel educativo homogéneo. Y por último era importante que los alumnos no realizasen un uso profesional del inglés, ni en el ámbito de los estudios ni el ámbito laboral. No se tuvo en cuenta la edad como factor de selección. Este grupo está mayoritariamente formado por alumnos jóvenes en una franja de edad entre los 20 y 35 años aproximadamente, y sólo dos alumnos superan los 50 años.

Con respecto al material, se seleccionó dos textos con distintos registros. El primero es un texto periodístico titulado "Trump makes final effort to rile his base using fear, division and racial anxiety" (The Guardian). Y el segundo es un texto publicitario de una compañía de comida rápida "McDonald's Restaurants: advertising & marketing profile". El texto periodístico tiene un vocabulario que aunque asequible en general incluía palabras no tan comunes ni familiares para los estudiantes sometidos a esta prueba y que por lo tanto no estaban habituados a escucharlas. Por otro lado el texto publicitario tenía un vocabulario más común, y por ello conocido por los estudiantes que lo habían escuchado y utilizado en más ocasiones.

Se partía de la premisa de que los estudiantes tuviesen la mayor autonomía posible para desarrollar la lectura de ambos textos y no se viesen condicionados por elementos medioambientales (Nemser, 1971) que pudiesen distorsionar los resultados. Por ello se les pidió que en el plazo de dos semanas grabasen un audio de cada texto, de esta manera ellos controlaban el entorno donde lo hacían para que fuese lo menos forzado posible como hubiese sucedido si se hubiese hecho en el laboratorio de idiomas. Y a su vez escogían cuándo podían realizarlo, no estaban obligados a realizarlo en un momento determinado con un horario determinado.

Una vez realizaron las dos pruebas la autora de este trabajo comenzó la selección de los audios, hubo que rechazar algunos por distintos motivos. Se rechazaron todos los audios cuya grabación era defectuosa o no inteligible por distintas causas. Tampoco se escogieron los audios de los candidatos que sólo habían realizado uno de ellos. Finalmente se escogiendo 30 audios.

De esta selección final de audios se pasó a realizar cortes en los mismos para aislar los sonidos y poder analizarlos, tanto de forma aislada como en el contexto de los sonidos concomitantes ya que éstos podían influir en el resultado final de la pronunciación del sonido que se estudiaba. Se comparó cada sonido de cada estudiante con la pronunciación del mismo por parte de un hablante nativo de lengua inglesa y a partir de ese punto se valoró cómo el hablante nativo español la había realizado. Hubo tres casos en que los sonidos se consideraron no válidos. Esto ocurrió cuando debido a la grabación no era posible discernir de forma segura si la realización del sonido había sido correcta. Tampoco se consideró cuando el estudiante cambiaba la palabra y no pronunciaba la que estaba en el texto, siempre y cuando esa palabra no tuviese el sonido motivo de estudio. Si el estudiante cambiaba una palabra por otra y ésta contenía el sonido que se estaba estudiando entonces sí se consideraba como válido independientemente de su resultado al ser pronunciada. Y por último, y la situación más obvia, cuando la palabra era directamente omitida por el estudiante.

Se generaron un total de 48 tablas con los datos extraídos del análisis de los audios. Se comenzó elaborando 11 tablas, una por cada sonido que se analizaba (se encuentran en el

Appendix I). Cada tabla contiene el resultado individual de los 30 estudiantes en cada sonido. Del análisis de los datos extraídos de cada uno de ellos se crearon otras tablas (tablas 1 a 33) que se organizaron en bloques de tres por cada sonido. La primera tabla contenía los resultados de los 30 alumnos en el sonido que se estudiaba. Ordené a los estudiantes por orden decreciente en función de sus resultados. La segunda tabla organiza los 30 estudiantes en tres grupos. Muestra los porcentajes de los grupos extremos, más los del grupo intermedio que está compuesto por aquellos estudiantes cuyos resultados están entre 0,34 y 0,66. Incluí en la primera columna el número de estudiantes en cada grupo y en la segunda columna el porcentaje que representaban en el conjunto del grupo. La tercera tabla muestra los resultados de los dos grupos extremos, lejos del modelo nativo y cerca del modelo nativo, haciendo una comparativa de cada sonido en cada grupo. De esta forma se pretendía analizar las diferencias y similitudes entre los grupos y hacer deducciones con respecto a las hipótesis que he planteado. La Tabla 37agrupa los sonidos según el promedio que obtenían en el cómputo total y analiza los resultados no previsibles que presentan los datos.

A través del análisis de las tablas (1-33) se pudieron establecer una serie de conclusiones:

1. Se pudo corroborar la hipótesis planteada aunque con reservas. El comportamiento de un estudiante al pronunciar los sonidos controlados a partir de un determinado sonido no puede predecirse en la mayoría de los casos, pero los datos muestran que la /r/ puede predecir la ejecución de la /t//d/ y el plural. Y aunque la diferencia entre los grupos es de 0.32, una décima menos que el valor de referencia de 0,33 establecido, podemos considerar que /ʧ/ puede predecir la ejecución del sonido plural.

2. Aunque no haya una relación fuerte entre los sonidos, salvo en los arriba mencionados (/r/ y /ʧ/) sí se pueden establecer relaciones débiles entre los sonidos cuando establecemos una diferencia entre los grupos extremos de 0.20 o superior. Nos sirve para observar la tendencia en los sonidos relacionados.

3. Se puede considerar que hay una transferencia lingüística de la lengua materna en la lengua meta a la hora de pronunciar ciertos sonidos ingleses.

a. Se ha apreciado que en algunos sonidos como /v/ hay una influencia directa de la lengua materna en la lengua meta que en este caso es el inglés. En el ejemplo anterior los alumnos tienden a pronunciar la /v/ inglesa que es labiodental fricativa como la /b/ española que es bilabial oclusiva. La razón más plausible es que el sonido /v/ inglés no existe en español, y que el español unifica ambos grafemas <v> y <b> en un único fonema /b/ con lo cual es el estudiante tiende a utilizar el sonido español sustituyendo al inglés.

b. Los sonidos finales de palabra cuya disposición no existe en español tienden a simplificarse. Este es el caso de <-ng> cuyo fonema es /ŋ/ que tiende a simplificarse en una /n/ y de las terminaciones de palabra <-nt>, <-st> y <-nd>.

c. Las palabras que terminan en <-m> presentaron una cierta dificultad en su realización aunque cabría haber esperado que este sonido no presentase problemas ya que en español hay palabras con esta terminación como: módem o tótem. La mitad de los estudiantes obtuvieron unos resultados alejados del modelo nativo de pronunciación y la otra mitad de los estudiantes se repartieron entre el grupo intermedio y el cercano al modelo nativo.

d. El fonema /r/ inglés quedó asimilado al fonema /r/ español. Ambos idiomas tienen la grafía <r> pero con características fonológicas distintas. Posiblemente el estudiante la asimile al sonido español por desconocimiento de este rasgo.

e. El sonido /ʃ/ correspondiente a la grafía <sh> que en español no existe fue realizado por los alumnos en un 90% alejado del modelo nativo. En un gran porcentaje se asimiló al sonido español /s/.

f. El sonido inglés /z/ supuso otra gran dificultad para este grupo de estudiantes ya que en su totalidad lo asimilaron a consonante sorda y no sonora.

g. Se observó que cuando una palabra empezaba por <s-> se producía una epéntesis ya que los alumnos pronunciaban una /e/ antes del sonido /s/. Cabe

pensar que al no haber en español palabras que empiecen por s líquida el alumno aplica la estructura silábica española en donde antes de <s-> hay vocal.

h. El sonido /id/ o /d/ de pasado cuya grafía es <-ed> también obtuvo unos bajos resultados. Por lo general los alumnos tendían a dos soluciones. La primera era pronunciar las terminaciones iguales asimilando /id/ a /d/ generando un proceso fonológico de elisión; y la segunda era pronunciar /id/ como /ed/, es decir añadían un cambio vocálico. Además de un debilitamiento en la pronunciación de /d/.

i. El sonido inglés /ʧ/ correspondiente a la grafía <ch> obtuvo los mejores resultados. Esto no sorprende porque su pronunciación es muy similar a la <ch> española.

Hay que señalar que algunos de los resultados en estos sonidos no son extrapolables debido al bajo número de individuos en los grupos extremos.

También se elaboró la tabla 35, cuyo valor de referencia es 0.20, que analiza la información para determinar si estos 12 sonidos seleccionados se aprenden en un orden determinado en el desarrollo de la interlengua, o si cada individuo progresa a través de etapas idiosincrásicas. En el último capítulo se exponen las conclusiones de los análisis y se verifica la segunda hipótesis propuesta. Se incluye la Tabla 36 que muestra la dificultad de los sonidos en porcentajes, y la Tabla 37 que analiza los sonidos en los que ambos grupos de referencia presentan resultados en el mismo rango.

Para terminar y con el objetivo de agilizar la lectura de la presente tesis, cabe detallar la estructura de la misma. El estudio se divide en siete capítulos. El primer capítulo presenta a modo introductorio una visión general de los objetivos, metodología y materiales de este trabajo así como una descripción de las características de los estudiantes seleccionados para el mismo. Los capítulos segundo, tercero y cuarto están dedicado a la revisión de la teoría y de los trabajos prácticos relativos a la fonética, el análisis contrastivo y el análisis del error y la interlengua. El capítulo quinto se centra en la descripción del método de investigación, los participantes de este estudio, el material y el corpus empleado para la

elaboración de esta tesis. El capítulo sexto expone los resultados del análisis práctico de la tesis y la interpretación de los mismos. El capítulo 7 muestra las conclusiones del estudio y verificación de las tesis junto con las limitaciones del estudio. La bibliografía consultada está incluida en el apartado References y las 11 tablas matrices del estudio lo están en el apartado Appendix I.

CHAPTER 1. INTRODUCTION.

1.1. SCOPE AND PURPOSE OF THE STUDY.

This thesis focuses on the framework of Second Language Acquisition (SLA). This is a very fertile ground for studies, some of them interdisciplinary since it covers different disciplines besides linguistics such as sociology and education. The field of study of this thesis is Phonology.

The theories that have been developed in SLA, Contrastive Hypothesis Analysis, Interlanguage Hypothesis, and Error Hypothesis Analysis, are the basis of the studies carried out in this knowledge domain. The interest aroused by SLA was largely focused on the morphological and syntactic areas, leaving it somewhat relegated to the ambit of interlanguage phonology. The term "interlanguage" was coined by Selinker (1972) and refers to the personal and structured system that every student builds at any stage of their learning. Schumann (1976) does not find any studies on the phonology of interlanguage and Tarone (1976) states that not many studies collect phonological data from second language learners in what she calls "reasonably natural speech situations". For this linguist, one of the reasons for this scarcity of studies in interlinguistic phonology is that it is commonly accepted that phonological errors are due to the transfer from L1 to L2. To Tarone (1978) it is necessary to extend the research to this field since focusing only on the morphological and syntactic aspects is not enough. The student must learn grammar, vocabulary and also the phonological rules of L2.

Spanish and English phonological systems have some differences that present difficulties for people who study them as a second language. This study focuses in these three areas:

1. The phonemes

2. The allophones of these phonemes.

3. The groupings of phonemes in each language and the rules by which they are governed.

Since second language learners do not reproduce the sounds in their target language homogeneously, it can be seen that there is a great deal of phonetic variability in their

speech. When analysing the phonetic production that the students makes, we find two situations, on the one hand, a correct production that happens when their performance is close to the native model. On the other hand, an incorrect production that occurs when their performance moves away from the native model (Sato and Fukuhara, 1985).

This research has three main objectives. The first is to consider the degree of success of the native Spanish student when he or she wants to reproduce sounds that present difficulties. The second is to establish the importance of the student´s interlanguage in the learning process and the stages of this interlanguage (Selinker, 1972; Tarone, 2018); the third is to analyse the process of transfer and how the student´s mother language can affect the phonological system of the L2 (Selinker, 1972; Olsen, 2012). This follows the theory of Blurt and Dulay (1970s), which does not exclude any possibility as the cause of the error and does not prioritise the transfer phoneme over any other.

As well as these two main objectives, this work tries to analyse the possible strategies that the student employs to avoid the error (Selinker, 1972; Corder, 1983). Likewise, an attempt will be made to study the variability of the error to find out if they can be grouped into systemic and non-systemic (Ellis, 1985). And the final objective is to analyse if there are different stages in the student´s performance of these sounds (Corder 1971; Brown 2004).

The criteria applied for the selection of the sounds has been to consider if they may be problematic to reproduce correctly for native Spanish speakers studying English as a second language (Lado 1956; Whitley, 2002). With this criteria, the following English sounds have been chosen: /m/, /ŋ/, /r/, /t//d/, /ʃ/, /tʃ/, /z/, /v/, /s/, in the past and the plural. There are other sounds such as /w/, /ð/ or /ʒ/, as well as the vowel sounds, diphthongs and triphthongs which, although they are also problematic for the Spanish student of English, have not been chosen to delimit the corpus of study and adapt it to the spatial-temporal conditions of this thesis. On the other hand, vowel sounds, diphthongs, and triphthongs have a greater variety of pronunciations due to the varieties of English. For example, if we compare the pronunciation of these features in British English and American English, we note that there are some differences as in /ɒ/ where most Americans do not use this phoneme. English words with the vowel /ɒ/ change it to /ɑː/ and /ɔː/.

cot - UK:[*]/ˈkɒt/ US:/kɑt/
dog - UK:[*]/ˈdɒg/ US:/dɔg, dɑg/

Or the diphthongs that end up in /ə/ such as /ɪə/, /eə/, /ʊə/ tend to eliminate the sound /ə/ in American English.

beer - UK: /ˈbɪə^r/   US: /bɪr/
hair - UK: /ˈhɛə^r/   US: /hɛr/
sure - UK: /ˈʃʊə^r/   US: /ʃʊr/

Four basic groups of difficulty have been established for the Spanish student (Whitley 2002):

1. The first group of sounds do not exist in Spanish and the student has to apply strategies to avoid the error (Corder, 1967; Strevens, 1969). Example /ʃ/.

2. The second group of sounds are not in English in the same placement as in Spanish. Example /ŋ/ in the final word position.

3. The third group of sounds are those that share graphemes in both languages but not the same phonic characteristics. Example <r>.

4. The fourth group is composed of the sounds that exist in Spanish and English in the same final position but in Spanish there are few words with that ending. Example /m/.

Thus, the final purpose of this work is to find out what difficulties Spanish students of English as a second language have in the phonological field and the sources of errors; the importance of student's interlanguage and the stages it has, and the transfer from native language to the target language.

1.2. THEORETICAL PERSPECTIVES AND RESEARCHES THAT INSPIRE THE STUDY.

The acquisition of a second language (SLA) took on great importance after the Second World War. In the 1960s, a trend of research began that has led to the teaching and learning of a second language. At first, studies were focused on specific areas and were not

interconnected with other areas. Later, researchers (Duncker, 2001) saw the need to promote interdisciplinary studies in the field of second language acquisition.

The complexity of the process of learning a language has been covered from different perspectives that are now considered to be interconnected: linguistic, social, psychological, and so on. This is why specialists in these fields have collaborated in the study of the teaching and learning of a second language (L2). The result of this interest is the production of a large amount of literature that raises hypotheses and produces strategies for the improvement of the results obtained in this field. Often the starting point is the explorations in the first language (L1).

The interlanguage hypothesis is based on the existence of an autonomous and systematic system specific to each student; this system is between the native language and the target language systems. It is created by the student unconsciously and is governed by his patterns. The goal of all language learning is for the student to be as close as possible to native-like performance. This is a process in which the student will develop and improve his knowledge of the target language until he or she achieves a mastery of it, and interlanguage is an important aspect. (Corder, 1967; Nemser, 1971).

As for teaching and learning English as a second language, there have been two different positions. The first does not admit varieties in the English language; for its defenders only the standard English, World Standard English (WSE), is the model to be followed by the community of speakers (Quirk, 1985). The opposite position defends social and personal factors, such as age and education, that generate varieties of the language to be used. For this reason, student's interlanguage (IL) cannot be considered a "dialect" of English but rather represents a language of its own (Prator, 1968). And as a language it shows that IL is a "dynamic system" resulting from the interaction of the language systems of the native language (NL) and the target language (TL).

This is where the theory of error comes in. It has also had different views on what is considered an error and whether it is positive (Corder, 1967; Norrish, 1983; Edge, 1989) or negative (Quirk, 1985) in the learning process. The major opinion today is that it should be considered as a positive factor in learning because it is an inevitable factor in the process

of acquiring a second language (Strevens, 1969), among other reasons. Although it is inevitable, it should be borne in mind that it is not useful to predict what type of communicative strategy the student will employ to avoid the error (Corder, 1974).

Another point of controversy is whether or not the error is systematic and at what stage of learning it occurs (Brown, 2004). This leads linguists to try to create taxonomies that help recognise what is the cause of the error and its possible solution. (Richards, 1970; Richards and Jain, 1974; Corder, 1974).

The teaching and learning of languages have been aided by modern linguistics that provides new techniques for this field of study. Contrast Analysis (CA), which consists of the linguistic analysis of two languages, native language (NL) and target language (TL), has been one of these study and analysis techniques that has both defenders and detractors. Contrastive Analysis Hypothesis (CAH), whose basis compares between mother language and target language, shows that where there is a difference between the mother and the target language the student will have difficulty learning. But, if a similarity is established between both languages the difficulty will not exist (Eckman, 1985).

Lado (1957) suggests the three objectives of the CA are to provide an insight into the similarities and differences between languages; then to explain and predict problems in L2 learning; and, finally, to develop course material for language teaching. The pedagogical aspect of CA is observed in the last point exposed by Lado since, through the observation of the differences between L1 and L2, the teachers will be able to know the needs of their students and thus design a teaching proposal that overcomes the difficulties that the students may have in the acquisition of L2.

Very few of the phonological studies that have been carried out have presented empirical evidence to prove the validity of the predictions that are made (Tarone, 1976). And any prediction made by CA needs to be verifiable through systematic data collection and analysis. Today this is a premise commonly accepted by linguists, the need to perform empirical tests to make a fully valid analysis.

The detractors of CA (Whitman and Jackson, 1972) based their argument on this point to reject the validity of the studies carried out and also on the fact that there are a series of problems in the learning of L2 that do not come from the theory of the transfer from L1 to L2. But Broselow (1983) explains that, from his point of view, students tend to alter the syllabic structures of L2 due to the rules of mother tongue restrictions, and this would show that phonological transfer from L1 to L2 is an important factor to consider.

There is much research in Spanish/English Contrast Analysis where the phonological aspect is the focus of it. In the acquisition of the phonological system of a second language (L2) there are two important considerations; the first is how distinctive acoustic material is organised into different abstract representations, and the second how the student´s native language phonetic repertoire and phonology affect the phonological system of the L2 (Olsen: 2012).

One of the most important works is "A comparison of the sound systems of English and Spanish" (1956) by Lado. It analyses the difficulties of the Native American students of Spanish and concludes that, in the face of these difficulties, these students apply phonic rules from their mother tongue (English) to the target language (Spanish). Lado believes it is very difficult to avoid a transfer from the mother language to the target language, thus leading to the conclusion that more research is needed in this field to analyse possible solutions.

On the other hand, Stockwell and Bowen's work, "The Sounds of English and Spanish" (1965) takes three aspects into consideration: phonemic contrast, conditioned variation allophone and the environment. The psycholinguistic aspect is analysed by Judith Becker and Sylvia K. Fisher in their work "Comparison of associations to vowel speech sounds by English and Spanish speakers" (1988). Within linguistic studies, the importance of bilingualism and the linguistic implications has led to numerous studies, particularly with children (Barbara Davis and Elizabeth Peña, 2008). And, finally, in this brief introduction, we mention Whitley's work, "Spanish/English contrasts: A course in Spanish linguistics" (2002) which, using an applied linguistics approach, describes the difference between Spanish and English. One of the conclusions reached is that the influence of the mother

tongue on the target language is evident. Whitley's work is practice-oriented, and his approach is pedagogical in order to improve language teaching.

1.3. HYPOTHESIS AND METHODOLOGY OF THE STUDY.

This research raised two hypotheses in this paper Hypothesis 1. The 12 sound /m/, /ŋ/, /r/, /t//d/, /ʃ/, /tʃ/, /z/, /v/, /s/, the past and the plural are equally problematic for B1 Spanish learners of English. Hypothesis 2. Mastering one of the 12 sounds selected does not allow us to confidently predict which of the other 11 sounds will also be mastered.

To investigate this question, 30 students have been chosen (15 men and 15 women), all native speakers of Spanish. Two texts were selected in which the sounds of interest for the study were chosen: /m/, /ŋ/, /r/, /t//d/, /ʃ/, /tʃ/, /z/, /v/, /s/, in the past and the plural. The students were from the Faculty of Geography and History of the Universidad Complutense de Madrid. Their level of English ranged from A1 to B1 according to the Common European Framework. None used English regularly either in their studies or in their daily lives.

The students were provided with two texts in English; one journalistic and one advertisement from a well-known fast-food chain, and they were asked to read and record the texts at home. After the recording was made, it was uploaded to the UCM Virtual Campus and the data was analysed from the listening.

1.4. OVERVIEW OF THE THESIS.

This thesis consists of an Abstract that briefly explains the reason and objective of this research. An abstract in Spanish and another in English, which sets out the most important points of this work. And six chapters that I will go on to detail.

Chapter 1 is the introduction and presentation of this paper. It presents the theoretical background in the field of SLA, what is the working hypotheses, the characteristics of the students taking the test as well as including a summary of the methodology applied.

Chapter 2 reviews the phonological and phonetic aspects. First there is a brief general introduction and then this chapter is developed in to six sections. The first section focuses on the field of phonology and the areas in which it is developed. This is followed by an explanation of how this topic has developed through the different periods, mentioning some of the linguists and their most outstanding works. The second section focuses on Phonetics and reviews its evolution through the different authors and studies carried out. The third and fourth sections are the two most extensive in this chapter. The third section describes the phonic system of Spanish and describes the consonant and vowel system. The fourth section makes the same analysis of the English phonic system. Section five establishes some of the basic phonological differences between English and Spanish by focusing on the sounds included in this study. And, finally, section six focuses on how sounds are represented, reviews the different computer programmes to represent them phonetically and explains what are the tools used for this study and the use of the spectrogram and the waveforms.

Chapter 3 focuses on Contrastive Analysis. The first section explains what CA is and the different theories and stages it has gone through in its evolution. Also, it points out some of the most important linguists and their research in this field. The basic concepts used in this field are also reviewed. The second section is dedicated to the theory of the Contrastive Analysis Hypothesis; here it is explained what this theory consists of and the studies and works that have been carried out on it. The third section includes some works on CA between English and Spanish, fundamentally in the phonological field but also includes examples of CA in other linguistic fields. The fourth section sets out the criticism and limitations of this theory. And the final section reviews some computer software in the field of CA.

Chapter 4 is focused on the field of Interlanguage (IL) and Error Analysis (EA). It is structured in four sections. The first section introduces the concepts of Error Analysis and Interlanguage and reviews the terminology used in both fields. The second section focuses on EA, reviewing its evolution, and some of the studies that have been carried out in this field. It includes an explanation of the taxonomies of EA that have been described by different authors. And it analyses the concept of "error", the different evaluations it has

had in different periods since it went from being considered a negative fact to being admitted as a valuable learning tool. The importance of Error Analysis in this pedagogical context is explained below as well as how an error is assessed through AE. The third subsection focuses on Interlanguage. It defines what interlanguage and interlanguage hypothesis is. And, finally, the fourth section introduces the concepts of syllable structure and universal structure since the syllabic structure is different in each language, although while some structures coincide, there are others that are exclusive to a particular language and this influences the pronunciation of L2.

Chapter 5 sets out the working hypotheses that rely on the validity of the students' interlanguage to predict how they will pronounce the sounds selected for this study. It will also analyse whether there is a transfer from the mother language to the target language when the students pronounce the sounds. This chapter also explains the characteristics of the students and the reasons why they have been chosen, as well as the process that was used to obtain the data and the description of the material used.

Chapter 6 contains the 35tables with data and their analysis. Here the individual results of the students are organised in decreasing order by the score obtained. The Tables 1-33 are organised into three sub-sections. In the first section, the data extracted from the analysis of each sound are presented in three tables. The first table shows the results of each student of the sound being analysed. In the second table, the students are arranged into three groups (far, mid, and near) according to their score, the number of students in each group is indicated and the percentage that corresponds to it of the total of the analysis group and an explanation of the data is added. The third table focuses on the comparison of the results of the two extreme groups in each sound and an explanation of the data obtained. And finally, the second section contains Table 34 informs about the correlation between the sounds and analyses if the sounds could, or could not, be predicted in their performance near to the native model. And Table 35 that provides data about the predictability of the learning acquisition progress.

Chapter 7 presents the conclusions drawn from the study and data interpretation. Table 36 shows the difficulty of sounds in percentages. Table 37 gives information of those sounds

where the groups far and near the native model behave the same and their results are in the same range. And the limitations of the research and recommendations for future studies.

Finally, the work includes the References consulted and an Appendix I with the 11 tables each for each sound.

CHAPTER 2: PHONOLOGY AND PHONETIC.

Pronunciation is the way a person enunciates words. These words are made up of basic units of sound, which are phonemes, the study of which corresponds to phonology. Pronunciation is the fundamental element of communication since it is the materialisation of oral language in two aspects, production and perception. The success of the communication will be based on the skill of the pronunciation of the foreign language (FL).

Linguists such as Brown, *Approaches to Pronunciation* (1992), and Dieling and Hirschfeld, *Phonetik lehren und lernen,* (2000) believe that pronunciation is the perception of speech sounds as well as the production of them. Later Seidhofer, *Pronunciation* (2001), expanded this idea by adding that perception includes accent and intonation. For him, pronunciation is also the production of meaningful sound in two senses. First, the sound is part of the language code and therefore has meaning, thus making it easier for us to understand that there are sounds particular to each language that only appear in it and not in others, and they cause the greatest difficulty when learning a foreign language (FL). Secondly, the sound is significant because it uses the contexts where it creates its meaning (Bartoli Rigol 2005: 4).

Pronunciation was a part of structural linguistics, phonetics and phonology until the late 1960s. Since that time discursive linguistics and cognitivism perspectives took relevance and affected the way of teaching a foreign language. Also, in the 20th century, a new branch of study of Linguistics started, Applied Linguistics. It is the science that studies pronunciation in the field of FL teaching, and is focused in three basic areas: language acquisition, language teaching and communication problems.

These areas of linguistics are studied by Phonology and Phonetics. In general terms, we can define Phonology as a level of linguistic analysis that deals with codified linguistic units that are transmitted on sound waves and that are invariable. Phonemes are its working material and, depending on the contrast between them, a difference in meaning will occur. In other words, Phonology is considered the science that studies the linguistic organisation of sounds. And we can describe Phonetics as the science that studies the sounds of speech and is based primarily on how the articulatory and acoustic variations of those sounds are

perceived. For example, in words like *cat* [kat] and *pat* [pat] we observe that they are two different words that establish their difference in a single sound, in this case the initial sound of each one, for which [k] and [p] are linguistically meaningful units of sound, that is, a phoneme.

Phonology and phonetics have their own characteristics that differentiate them. Both are related to and complement each other. Catford highlights the differences between them in the following quote:

> The study of the physiological, aerodynamic, and acoustic characteristics of speech-sounds is the central concern of phonetics. The study of how sounds are organized into systems and utilized in languages is the central concern of phonology. Neither of these two linguistic disciplines is independent o the other (Penington [Catford 2001] 2007).

Most linguists agree that the two disciplines are interrelated; however, they also consider their importance to be different since they believe that the focus of linguistics is phonology and not phonetics. This is because phonology is considered to be more relevant, the effect of which is that in the studies of phonologists, phonetics has very little if any emphasis. For Clark and Yallop, while seeing this division of labour as logical, phonology works with the true mental reality of speech and phonetic works with the concrete outworking of this reality; they think it is controversial because it is done in the discursive framework of what the real nature of speech is. From Pennington´s point of view this discussion, generated by the division of phonology and phonetics, is a reflection of what is happening with the linguistic currents of the 20th century (Pennington, 2007: 2-3).

Some linguists, such as Ohala and those framed in the Theory of Optimism, think it is not correct to make such a strict division of the study of the structure of sound into phonology and phonetics. The reason is that from their point of view, there is no clear boundary between them. Many phonological aspects need the support of phonetics to be explained, and many phonetic aspects require phonology for full understanding (Cyran & Szpyra-Kozłowska, 2014).

There are several clear differences between the aspects covered by phonetics and those covered by phonology. Phonetics studies the substance of the expression domain, linguistic sounds, the tangible side of the sounds of the language, specific aspects of the sounds, productions, acoustic constitutions and their perception, ways of realising linguistic possibilities and goes into the linguistics of parole (speech) and works with allophones. On the other hand, Phonology studies the sound system of a language that includes systemic relations, pays attention to the invariants "that is the `phonetic essence´ of a word, which is practically undeletable" (Baroni 2014), links phonic differences with semantics, goes into the linguistics of langue (language) and works with phonemes.

To illustrate the differences between what phonetics and phonology study we can use the examples of the nasal consonant <n> and the bilabial consonant <b>. This nasal consonant can have different variations of pronunciation called allophones:

-[n̪] - dental by assimilation before a dental fricative, e.g. amaranth, jacinth.

-[n:] - lengthened before a voiced obstruent in the same syllable such as [d], [z], or [dʒ], e.g. battleground, tons, fringe.

-[n] - normal quality elsewhere, e.g. aunt, pen, ant.

The speaker generally does not distinguish them basically because they all have several common features and are opposed to the nasal consonant <m> (tons/mother). When we talk about <n> as a set of possible realisations of it we are talking about the phoneme /n/ and it goes into the field of study of Phonology, however when it comes to studying the different realisations of the phoneme <n>, that is its allophones, we go into the field of Phonetics.

We have another example with the bilabial consonant <b>; this consonant can be pronounced differently depending on the context in which it is placed. We can observe two possible allophones:

- The fully voiced variant [b], e.g. boy.

- The de-voiced variant [b̥], e.g. lab.

Here again, when we speak of <b> as a whole of the different realisations of it, we speak of the phoneme /b/, while when we deal with the different realizations of <b> we move into the field of Phonetics. Regardless of the allophone used, a comparison will be made by the opposition with the bilabial consonant <p> as in *bet/pet; ban/pan*, and then some pertinent differences will be made, which are those that allow us to distinguish two phonemes /b/ and /p/, and therefore they are included in the field of Phonology. While Phonetics will deal with all the characteristics of sounds, no matter if they are phonologically relevant or not.

In the following sections of this chapter, I will cover the areas of Phonology and Phonetics in more detail.

2.1. PHONOLOGY.

Phonology studies phonemes. All languages do not use the same phonemes but there is a variation from one to another, which leads to the creation of an exclusive phonology system for each language. The phonemes of a language are organised in units with lexical or grammatical meaning called morphemes, it is the minimal unit of the language able to transmit a meaning and it joins the lexeme of a word to modify it and complete its meaning, e.g. *actor/actress* where *act* is the lexeme and *or/ress* are the gender morphemes.

Following the work of John T Jensen, we can say that Phonology is concerned with the sound patterns of language and therefore if we refer to both the theory of phonology and the analysis of the sound patterns of languages we can use the term General Phonology (1993: 1).

A sound or phono is any of the realisations of a phoneme and is therefore characterised by certain phonetic and articulatory features, features that phonetic science will study. The different realisations of a phoneme are called allophones; their number is not limited due to the phonetic context in which it is found and the articulatory characteristics of each person. On the contrary, the number of phonemes in a language is limited; phonemes are part of the phonological system, which, as stated above, is exclusive.

There are many definitions of a phoneme, and all of them agree in defining it as a mental construct and not as a sound, in the same way that all agree it is the minimum divisible unit of speech. As this is the smallest unit of a sound, it can make lexical distinctions that can be used to differentiate one word from another.

The American structuralist school and the generative school do not share the same concept of phoneme. For the structuralists, a phoneme is defined considering its allophones and the environments, while for the generativists a phoneme is a set of distinctive features.

Perea Siller (2017) provides a review of the definitions of phonemes by Trubetzkoy and Jacobson. Jacobson's concept of phoneme directly influences Trubetzkoy´s definition in *Grundzüge der Phonologie* [*Principles of Phonology*] (1939), in which he says that the phonological units which cannot be broken down into smaller and successive units will be called phonemes, as we said he bases it on Jacobson´s definition written in "*Remarks on the Phonological Evolution of Russian*" (1929), where he speaks of phonemes as those elements of phonological opposition that cannot be divided into more simple sub-oppositions. After Trubetzkoy refines his definition of phoneme saying "the phoneme is a set of phonologically relevant features of a phonic image" (1973[1939]: 34) giving importance to distinctive features, Jacobson rethinks his own definition. In 1932 Jacobson gives a new definition of phoneme: "By this term we designate a set of those concurrent sound properties which are used in a given language to distinguish words of unlike meaning" (1971 [1932]: 231). What differentiates Trubetzkoy and Jacobson when they define a phoneme is the word "successive" that was already used in 1931 in "*Projet de terminologie phonologique standarisée*" ["Standardized Phonological Terminology Project"].

The fact of considering distinctive features as increasingly important elements will lead Jacobson in *Phoneme and Phonology* (1932) to redefine his 1929 definition of phoneme, which he will say is a set of concurrent sound properties that distinguish words with different meanings in a given language. He will borrow the expression `distinctive features´ from Bloomfield and Sapir. Likewise, in the same line as Jacobson, Trubetzkoy in *Principles of Phonology* (1939) speaks of the phoneme as a set of phonological features

that are part of a phonic image. On this last point, Anderson, *Phonology in the 20th century* (1990) clarifies that the characteristics referred to by Trubetzkoy are framed within the theory of phoneme systems, which refers to ideal segmental constructs reduced to their minimum of distinctiveness and identified only by their opposition to other elements of the same system.

The one who really studied and gave importance to the distinguishing features was Jacobson who, already in 1949, explained that the phoneme itself is not an element of opposition but that the distinguishing features are, since they are exclusive, thus following Saussure's line that gives as an example that the presence of the nasal resonance feature is a function of its absence.

In structuralism, the term `phoneme´ is used to refer to a fundamental abstract linguistic unit that depends on the context in which it develops and the allophonic variants that may occur. It has the power to change meaning but this does not imply that it has its own semantic properties (Watt: 156).

Jones in *The Phoneme: Its Nature and Use* (1957) defines phoneme as:

> small families of sounds, each family consisting of an important sound of the language together with other related sounds which, so to speak, "represent" it in particular sequences or under particular conditions of length or stress or intonation (Watt [Jones 1957]: 156-157).

Philip Carr (2008) explains three points of view by which the phonemes are defined and analysed. The first is from a phonetic point of view, it is rather concrete, and in this the phoneme is a distinctive sound in a specific language and is governed by a contrastive function. This contrastive function is what makes the differences of sounds in the semantic field if a sound is changed, a new word appears, an example of this is the substitution of the sound /k/ in *comb* for the sound /b/ in *bomb* results in the change of meaning of the word. There is a variant on this, which is more abstract; it considers the phoneme a set of distinct speech sound types, which count as the same thing. The second point of view is more mentalistic, considering phonemes to be mental categories. Both the phonetic and mentalistic viewpoints are based on realism. The third point of view is based on

instrumentalism; it considers phonemes as theoretical constructs that are created by linguists to represent an image of the sound patterns in a specific language.

Two sets of rules govern the use of phonemes: distributional and sequential rules. The first set describes how sounds are distributed in different word positions, e.g. in English /s/ in an initial word position is allowed, as in the word *spent*. The second set of rules, the sequential rules, specify the combination rules of phonemes, e.g., /r/ and /v/ sequence is not allowed in English (Padakannaya and Chengappa, 2013).

Clark and Yallop in their work *An Introduction to Phonetics and Phonology* (1995) state that Phonology is a system and patterns of sound specific to each language, and conform the phonological system. Besides, they think the system has to be analysed with empirical analysis where the linguistic knowledge of the native speaker is not relevant for this because it does not affect the data. And they believe that the study of the phonological system is facilitated because its components, such as the syllables, the phonological word or the tonal group, are organised according to a hierarchy.

Phonemes are organised under the Phonemic Principle. The concept of distribution of a sound is the basis of the Phonemic Principle, it rules at which environments and positions sounds can be located. There are three environments: at the beginning of a word, the onset of a syllable, or intervocalic position, e.g. the sound [l] in Received Pronunciation can occur in onsets as in [lip] *lip* but the sound [ɫ], `dark l´, occurs only in rhymes [pʰ i :ɫ] *peel*. There are two types of distributions: complementary distribution, when two sounds appear in non-overlapping distribution, as in the previous examples; and parallel distribution which occurs when one sound excludes another in the same position, e.g. [v] in [ˈvɛt] and [b] in [ˈbɛt]. In parallel distribution it is possible to establish two points, the first, what contrastive functions are there, and the second, the minimal pairs, as in *vet* and *bet,* which differ from each other in a sound (Carr, 2008).

As we could see a phoneme is a minimal phonological unit that can be opposed to another unit in contrast of meaning, and depending on its position in the word gives rise to distinctive features that allophones create. These phonemes are therefore basic theoretical

units used to study the phonic-phonological level of a language. Besides, they are required to have a distinct function that allows for the differentiation of sounds that will mark the distinction of some words from others in a language.

In the context of speech sounds, segments are considered to be the individual speech sound that has its own transcription in the IPA. Also, each speech segment is made up of smaller units called features, and each feature is an independent element of a sound. Some of the important phonetic features to distinguish phonemes are: Consonanctity; Syllabicity; Sonorantity. Consonanctity indicates that there is a consonant feature in the word as well as syllabicity indicates that a segment is the nucleus of a syllable or not. Sonorantity has to do with sonority. As an example of features:

Features of segment [b]:	Features of segment [p]:
[+ consonant]	[+ consonant]
[- sonorant]	[- sonorant]
[- syllabic]	[- syllabic]
[- continuant]	[- continuant]
[- nasal]	[- nasal]
[+ voice]	[- voice]
[LABIAL]	[LABIAL]

Fig.1. Features of segments [b] and [p]

Therefore, each sound can be analysed through a series of independent phonetic features. The above example describes the segments [b] and [p] pointing to their features. Because [b] is a consonant, to indicate this feature [b] gets the feature consonant with a plus sign [+ consonant]. As it is a stop it has very low sonority because the vocal tract is completely closed for stops. Then this feature gets a minus sign, meaning [b] is not sonorant. Likewise, stops cannot be the nucleus of a syllable so [b] is marked again with a minus sign. Also, it is a stop and by its nature [b] is a very short sound so it gets a minus sign for continuant. As it is neither nasal since the air does not pass through the nasal cavity it gets a minus sign in nasal. However, [b] is made with vocal folds vibrating and then it is a voiced sound. For this reason, it is marked with a plus sign. And finally, it is [LABIAL]

because the lips intervene in its pronunciation. All these features are called "feature matrix" and they describe the segment [b].

Following this example, we can observe that to describe segment [p] only the sign of one feature changes. So [b] and [p] share these features: [+consonant], [-sonorant], [-syllabic], [-continuant], [-nasal], and [LABIAL]. But they do not share the voice feature because segment [p] is defined as [-voiced]. Therefore, we describe the "feature matrix" of [p] as [+consonant], [-sonorant], [-syllabic], [-continuant], [-nasal], [-voiced] and [LABIAL]. Another example to describe the features of segment [k] and segment [g] is that we can say that both segments share the same features less the voice characteristic. Then the "feature matrix" of [k] is [+stop], [+consonant], [-voice], [+back] and [+high], and the "feature matrix" of [g] is [+stop], [+consonant], [+voice], [+back] and [+high].

Finally, related with sonority and aspiration when a sound produces a certain vibration in the vocal cords, this sound is voiced; however, when this vibration is not produced, the resulting sound is voiceless. The Mode of articulation divides consonant sounds into occlusive, fricative, approximant and affricates. And the point or place of articulation provides information about whether a consonant is a labial consonant, coronal, palatal, velar, uvular, pharyngeal or glottal. Each of these primary points distinguishes several secondary unions, particularly the first three categories.

Phonological studies have embraced studies of phonological aspects of a language. The most relevant approaches are structuralist and generativist. Structuralist phonology focused its study exclusively on the phonological field, thus excluding other aspects of language. And generative phonology, on the other hand, integrated it with other aspects of language. The task of the generative phonologists was the formulation of phonological rules that systematised the language and helped to predict features in certain contexts. Finally, another point of their theory was based on the union of grammar and phonology.

2.1.1. AREAS WITHIN PHONOLOGY.

Phonology develops three areas: Phonemes, Phonotactics and Prosody. We understand by Phonemes the basic units of phonology. Phonotactics is the intuitive knowledge that every speaker has about the sequences of sounds that are valid or not in a language. For example, a Spanish native speaker knows that at the end of a word <nd> is not possible; he or she knows this naturally because he or she has internalised it. Prosody is understood as a part of Grammar and studies accent, tone and quantity.

Structuralist phonology works on establishing and defining the phonemes of languages. This is developed fundamentally in the Circle of Prague, following the principles established by Saussure in 1916 in the *Cours de linguistique generale* [*General Linguistics Course*]. In 1939 Trubetzkoy published *Principles of Phonology* and Jacobson *Phonologycal Studies*, both works are of great importance in the phonological studies of the 20th century. Hjelmslev and Martinet were other prominent European structuralist linguists that made relevant contributions in this field.

In 1943 Hjelmslev released his theory, which was based on linguistic notions to which a strict methodology was applied. Like Saussure, he gives particular importance to considering that language (langue) is form, not substance. He establishes two planes: expression plane and content plane, both of which are analysed in smaller units which are limited in number and which Hjelmslev calls figurae. He establishes, therefore, in the expression plane the existence of an expression figurae and in the content plane the existence of a content figurae. In the expression plane the phonemes are located, and according to the phonemic inventories of each language the sounds have a certain form of articulation, e.g. English has three nasal phonemes [m], [n], [ŋ] but lacks the Spanish sound /ɲ/. There is also the content figure where the semantic units are located. The latter are combined to form larger semantic units, e.g. *man* is the result of the content figurae: *human, male, adult* (Barber and Stainton, 2010).

Martinet worked with the 'double articulation' of the linguistic message, divided into smaller units that he calls "monemes" instead of morphemes, and distinctive units that are

the phonemes. He does not agree with Jacobson's idea of binarism as a descriptive device; he is closer to Trubetzkoy´s theory (Spa, 2010).The studies carried out by Martinet in the 1950s and 1960s, shown in *Economy of Phonetic Changes* (1955) are considered the basis of the studies of diachronic phonetics, and American linguistics with Sapir and Bloomfield broaden and deepen this field of study (Barber and Stainton, 2010).

Jacobson's studies covered many fields in his extensive career such as phonological systems and relations, distinctive features and child language, acoustic definitions of the features and the sound shape as a whole. In the 1920s he developed his theory of phonological systems together with Trubetzkoy, both of which were based on the previous studies of Baudouin de Courtenay, Kruszewski, Ščerba as well as those of Saussure. Jacobson and Trubetzkoy defined the terms phoneme and phonological system as basic concepts in linguistics. As mentioned above, Trubetzkoy refines his definition of phoneme by saying: "the phoneme is the set of phonologically relevant features of a phonic image" (1973 [1939]: 34). And this idea of distinctive features is of great importance in Jacobson's approach, which considers them to be at the heart of the phonological system since such features need to be opposed to other distinctive systems.

Jacobson and Trubetzkoy first pointed out that phonological systems should be considered as a structured set of elements, and that sound should be treated as a functional element in language. Therefore, the linguist's mission was to study the functions of sound. It is important to point out that the differences in phonemes make the difference in the meaning of words, as we can see in the contrast between the phonemes /v/ and /b/ in words like *vet* opposed to *bet*. They believe that what characterises a phoneme is its distinctive functional value, so those sounds that lacked this value were excluded from its definition of phonemes, e.g. the difference between the aspirated [pʰ] of *pin*, and the non-aspirated [p] of *spin*.

Phonemes are invariant and other phonemes belonging to the same system determine their nature. If we take the vowels as an example, we can see that they can be represented in two different models, one triangular, based on high-low relations, and the other quadrangular, based on front-back. Looking at them we can see that the nature of /a/ in the triangular

system is seen to be different from that of /a/ in the quadrangular one (Jacobson [1962-1985] 2002).
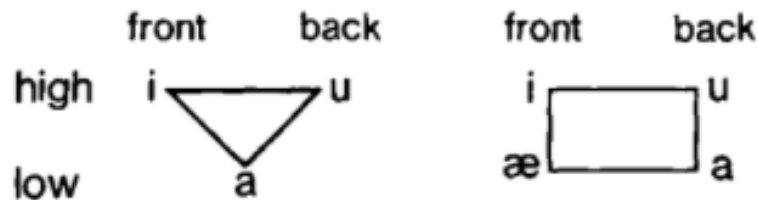
Fig. 2. Triangular and quadrangular vowel systems. (Jacobson, 1985).

Sapir is one of the first linguists to suggest that it is important to observe the possibilities of combining some phonemes with others in the speech chain, while Bloomfield contributes that, from his point of view, classification by distinctive features is irrelevant since they have a physical bias as they are physiological descriptions. However, both classifications from a structural point of view are relevant and can be combined and therefore phonemes can be classified from two points of view. The first attending to their constituent parts which are the distinctive features; and the second attending to their possibilities of combination and distribution or relations in the speech chain. Bloomfield´s key book, *Language* published in 1933, opened a path of study for many American linguists in the field of phonology, especially in terms of making the difference between phonemes and speech-sounds (Fischer-Jørgensen, 1952).

For the generativists the phoneme has a distinctive feature. Chomsky and Halle published in 1968 *The Sound Pattern of English* that has had a decisive influence on subsequent studies of both phonology and the analysis of the English language. They describe phonology as rules that operate on features and have nothing to do with grammar because it is an independent linguistic subsystem where the underlying and surface segments of representations are defined by those features.

This theory is based on the fact that deep structures by means of transformations form surface structures. However, several problems are created, for example, there are elements present in the deep structures that do not appear in the surface structure. So we have for

example `*morning*´ in the deep structure but in the surface structure is /mɔːniŋ/. It is less practical than the taxonomic phonology.

Aside from this disadvantage, it has to be pointed out that there are other positive factors, especially the concept of distinctive features, it is better to analyse a set of phonological `components´ rather than an isolated phoneme. This allows an easier analysis with the same valid result. And, according to the Universalist of distinctive features, if we contrast sets of features we arrive at more valid generic results.

The second area covered by phonology is phonotactics, Robert Stockwell in 1954 coined the term `phonotactics´ and defined it as the knowledge that every speaker of a language has intuitively about the sequences of sounds that are possible or impossible in that language. For example, in English the phoneme sequence <st- >in the initial position is possible, e.g. *stay* /stei/ but in Spanish it is not, so native Spanish speakers will tend to pronounce a non-existent sound /e/ in front of it in such a way that they will pronounce /estei/. There are phonotactic restrictions that define which syllabic structures, consonantal groups and vowel sequence are valid in a given language (Nordquist, 2020).

In every language there are phonotactic constraints that delimit the structure of a syllable, for example while English admits, the phoneme sequence <-sts> as in *costs, masts*; <-sks> as in *masks, asks*, other languages do not. The constraints refer to different aspects: length, usually only four consonants are given in a row in the cluster, e.g. *twelfths* /twɛlfθs/; viability of the sequence and where the syllable can be given, e.g. the sequence <–nt> has a final position but not an initial one as it happens in *bank* /bæŋk/. However, the phonotactic constrains in Spanish restrict these possibilities as they are not possible in this position.

Just as there are phonotactic constraints on syllable structure that are exclusive to one language so there are those that are universal, e.g. all languages have syllables formed by the sequence syllable + vowel. Many phonotactic limitations are arbitrary in the sense that they are not related to the articulation of the language but depend on reasons that are peculiar to each language, for example an "oral stop", also known as occlusive, cannot be followed by a nasal consonant in some languages. Sometimes these arbitrary limitations give rise to spelling problems as with /k-/ in initial position, in English it is not

pronounced, e.g. *knight* /naɪt/. However, in other languages, such as German, pronouncing this phoneme in initial position is allowed by the phonotactic constrains, e.g. *knapp* /knap/.

Elisabeth Zsiga (2013), distinguishes between phonotactics, which are possible sound sequences, and alternations, which are positionally-conditioned changes. She shares Smolensky and Legendre's idea that phonotactics is related to the social habits of speech sounds, in other words, what sounds can be combined with others and in what positions they can do so. Each language has its phonotactics constraints and they are not arbitrary. On the other hand, alternations are related to mating habits, which refers to what happens when sounds get together and new sequences are created.

She discusses in her work how native speakers of a language know which word is possible or not in their language, which sounds can be combined, in what order and in what position within the word. She gives, as an example, the word *dog* in Swahili is *mbwa*, it is a valid sequence in this language but in English is not, so she believes that every native speaker, whether Swahili or English knows instinctively that there are a series of phonotactic constraints that allow or do not allow these sequences.

Arto Antilla in his paper *"Gradient phonotactics and the Complexity Hypothesis" (*2008) raises the relationship between these two concepts. The gradient phonotactics has to do with the correct or incorrect formation of words through the combination of their phonemes. Some lexical items will be more represented than others and this is due to their phonotactic structure. Antilla notes that the more similar consonants are less likely to occur in the same word. Also, in the formation of new words, it is concluded that they will show gradient acceptability depending on their phonotactic structure; the more similar it is to a language structure the more acceptable it will be. He gives the example of the neologism *stin*, which does not make any sense but will be accepted by the speaker more easily than the neologism *smy* or *bzarshk*.

Antilla explains that there is a grammatical explanation and a lexical explanation to answer the existence of gradient phonotactic generalisations. The former states that phonological grammars can predict which segment combinations may be more grammatically correct and which are ungrammatical. The second explanation is based on the fact that new words

usually come from existing words in the language. He believes that the combination of both is the one that gives the most satisfactory answer to the question posed.

He describes the Complexity Hypotheses in these terms:

> The hypothesis is that the relative well-formedness of a phonotactic structure depends on its grammatical complexity in the following sense: the more ranking information a phonotactic structure requires in order to surface faithfully, the less well-formed it is (Antilla, 2008)

This implies that a hierarchy is established in language structures depending on their complexity and their well-formedness. Then phonotactics is a tool used in Taxonomic Phonology, phoneme by phoneme is analysed with a double benefit of, on the one hand, identifying the phonic asymmetries of two languages and, on the other, identifying the allophonic differences. It is a type of contrastive analysis but this model is not always useful when it comes to detecting errors due to the degree of difficulty of a sound in both languages and also because it does not identify whether the difficulty/error comes from the sender or the receiver.

Early Generative Phonology studied the distributional relations in favour of morphophonemics, however in the second half of the 20th century linguists have come up with the idea that morphophonemics can be understood as accommodation to phonotactic requirements Kisseberth, *On the Functional Unity of Phonological Rules* (1970), explains that in every language there are rules that allow or forbid phonological structures. He goes one step further by stating two relevant points; the first, that these structures are an explicit part of the phonological system of the language; and the second that grammars that use multiple rules in the process of allowing or forbidding certain structures, and those that use fewer means are to be considered equal in their complexity. Both points are far from the idea of generative phonology in the sense that it considers that all important linguistic generalisations are expressed in a system of simplified rules and representations. Researchers conducted by Sommerstein in *Modern Phonology* (1977) where he studies the rules of phonographic motivation; Kiparsky´s *Lexical phonology and morphology* (1980) and Goldsmith´s *The Last Phonological Rule* (1993) among others go in the same direction.

Prosody is the third area in the study of phonology. It is made up of suprasegmental features such as intonation, stress, rhythm, pause, speed of speech, among others, all of which are properties of speech units broader than an individual segment, even though occasionally a segment may constitute a syllable and even be a complete statement, e.g. "Uf".

Therefore, prosody works with features of words and sentences above the level of individual sounds, For example, stress is one of these, it has contrastive value in English since depending on where the word is placed it will be a noun *import* /'impɔ:t/ or a verb *import* /im'pɔ:t/. Prosody covers two different aspects. On the one hand, from a linguistic point of view, it describes suprasegmental elements such as syllables, stress groups, intonation units, and phenomena such as stress, rhythm and intonation. On the other hand, from a phonetic point of view, it addresses the description of different phonetic correlates such as length or loudness.

From a phonological point of view, we can talk about two types of prosodic items, the first is a set of prosodic units, larger than a segment, and the second is a set of prosodic phenomena that are superimposed on these units. The prosodic units vary according to the field of study: paragraphs, sentences, intonation groups, intermediate groups, stress groups, feet, syllables and arrears. Most of them are used in phonological analysis.

The sound patterns in prosody of language can be both phonetic and phonological, as John J. Ohala, Alexandra Dunn and Ronald Sprouse (2004) report, and it is not easy to differentiate one from the other, especially because of the influence of the context, as for example in the case of nasal + oral obstruent. There is often an emergent (or 'epenthetic') stop between a nasal and a following oral obstruent: *warmth* [wɔɹmpθ], *youngster* [ˈjʌŋkstə]. Anticipatory assimilation in the latter portion of the nasal of the velic levation required of the following obstruent appears for phonetic reasons [Ohala [Ohala 1997] 2004], and this phenomenon may create confusion to the listener because he may think it is premeditated.

The variation in speech prosody may be due to two factors that are important to differentiate in order to understand the process of speech production. Phonetic factors are

more related to the limitations of the phonation apparatus and phonological factors are more related to the mental representation that controls speech performance.

In this field of prosody, the works of Firth *Sounds and Prosodies* (1948), Crystal and Quirk *Systems of Prosodic and Paralinguistic Features in English* (1964), Halliday *Intonation and grammar in British English* (1967) stand out. Firth is the one that calls 'Prosody' a phonological unit that establishes syntagmatic relations. Therefore, for this author, prosodies are phonological units with a structural domain defined from a syntagmatic point of view and which do not correspond to aspects of the speech that are considered prosodic in modern phonology, such as pitch, voice quality or tempo, and which are furthermore limited to the utterances of a determined speaker. Firth's view about prosody is quite strict in Richard Ogden's opinion as it restricts it to an individual; Ogden however believes that the concept should be extended because, from his point of view, they are units that are present in a conversation with different interlocutors (Oliver Niebuhr: 201-202).

At the level of context, function and communication Firth establishes three relevant aspects:

1. Language is a social tool that serves to interact with people.

2. The context helps in the understanding of the message, which will include, in addition to the linguistic and social setting, sequential and interactional context of talks.

3. Polysystematicity is present in language as it is formed by a group of interacting systems that have to do with analytic domains such as the lexicon, syntax and morphology.

A reference work on the hierarchization of prosodic domains is that of Nespor & Vogel *Prosodic phonology* (1986), where the following constituents are described: clitic group, phonological phrase, intonational phrase and utterance. Also, some researchers found that some phenomena could not be explained from only a phonological or morphological point of view. For this reason, morphophonology was created to solve some phenomena between

phonology and morphology. It studies the interaction between morphological and phonological/phonetic processes and it analyses the sound changes that happen in morphemes when they are combined for word-formation. Through a series of formal rules, it tries to predict the sound changes of morphemes. It establishes two levels, an underlying one where the morphemes are located, and a superficial one where the phonemes are. Morphophonology is useful to analyse different aspects of the language, for example, the different pronunciations of the past or the plural. In English, there are two morphemes for plural <-s> and <-es>. Both correspond to the phonetic representation /s/, /z/, /ɪz/, and all morphophonologically can be reduced to the morphophoneme /z/.

In my work, I focus on a group of English sounds that, in my opinion, pose difficulties for Spanish students of English. With extracted data, I would like to check how a student pronounces a sound, whether it is far or close to the native model and therefore it is possible to predict how he or she will pronounce the rest of the sounds. In this process, I will analyse whether there is an influence of Spanish on English and what type it is, I will also analyse the importance of the student's interlanguage in this process. And finally, analyse what strategies, if any, Spanish native speakers of English use to avoid errors.

2.1.2. PHONOLOGICAL STUDIES.

Phonology has had a long history and tradition in linguistic studies. Phonological studies have always interested scholars, as we see in what is perhaps the oldest study made in the third century BC by Panini, who developed a detailed study of Sanskrit grammar covering morphological, syntactic and phonological aspects. Roman and Greek studies are also widely known in this regard.

The appearance of the American structuralist phonology theory, also known as Taxonomic Phonemics, has relevant aspects and others more controversial especially from the point of view of generative phonology. The history of phonology has a turning point that is marked by Chomsky & Halle's *The Sound Pattern of English* (SPE) published in 1968. Chomsky analyses two of the points that present the most difficulties, namely Neutralization and Pseudodifferentiation. Neutralization takes place when several distinct segments of a

language appeared in the same context. John Tillotson in his book *English Phonology* (1993) develops this idea and gives the following example:

> As an example from English, consider the neutralization of *t* and *d* in medial position in words like *writer* and *rider*. In most Norht American varieties of English, the medial stop in these words is pronounced as flap [ɾ]. Because the flap never contrasts with either *t* or *d*, we do not want to analyze the flap as a separate phoneme. Because *t* and *d* do contrast in words like *write* and *ride* or *tie* and *dye*, we set up two phonemes /t/ and /d/. To which of these phonemes does the flap belong? If we say that it belongs to both of them, we have a case of overlapping allophones, which structuralist phonologists tried to avoid because it made it difficult to determine the phonemes purely on the basis of a phonetic record (1993: 4).

On the other hand, pseudodifferentiation occurs when two types of sounds contrast in a single environment. In some varieties of English, the vowels are longer in front of voiced consonants than before voiceless ones. John Tillotson argues that this is especially true of diphthongs, and following the examples above, he explains:

> the diphthong [ɑy] is more like [əy] before voiceless consonants. Thus we have the contrast in (4):
>
> > a. write   [rəyt]
> >
> > b. ride   [rɑyd]
>
> But in pairs like writer and rider, where the medial consonant is neutralized to a flap, the difference in the diphthong becomes the sole phonetic distinction between the two words, as in (5):
>
> > a. writer   [rəyɾər]
> >
> > b. rider   [rɑyər]
>
> We call this pseudodifferentiation because the two types of diphthongs are contrastive only before flap. In all other environments the two types of diphthongs are in complementary distribution (2008: 5).

The appearance of Chomsky and Halle's work gave rise to a new approach, the generative approach: its main contribution is to consider that phonemes are formed by smaller units that combined define the phoneme, and also to admit the involvement of morphology and syntax in phonological representation. The latter point was already in the structuralists Pike

and Bloomfields' work in the first third of the 20th century. SPE states in its Linear Theory that representation is a concatenation of segments and boundaries. It also emphasises the importance of syntax in phonology, calling for the need to interpret the surface syntactic structure phonetically.

Since the second half of the 20th century, five works of great importance have appeared after the SPE: Autosegmental Phonology, Metrical Phonology, Prosodic Phonology, Underspecification Theory, and Lexical Phonology, being the first three models of Nonlinear Phonology. Autosegmental phonology allows phonological processes, such as tonal and vowel harmony, to be autonomous and to extend beyond individual consonants and vowels. Metrical phonology is a phonological theory concerned with organising segments into groups of relative prominence. Segments are organised into syllables, syllables into metrical feet, feet into phonological words, and words into larger units. Lexical phonology is an approach to phonology that accounts for the interactions of morphology and phonology in the word building process.

Prosodic Phonology is a theory of the way in which the flow of speech is organised into a finite set of phonological units. In the opinion of Laurence Ferrer it is also a theory of interactions between phonology and the components of the grammar. Underspecification Theory is a phenomenon in which certain features are omitted in underlying representations. The essence of underspecification theory is to supply such predictable distinctive features or feature specifications by rules (Archangeli, 1988).

Noteworthy are the works of Goldsmith in 1976 and Leben in 1973 in the field of Autosegmental Phonology. Those of Liberman & Prince in 1977 in Metrical Phonology. Nespor & Vogel in 1986 in Prosodic Phonology, Archangeli in 1984, and Harris in 1983 in Underspecification Theory.

In a deeper historical explanation, we can say it was in the 19th century that the term phoneme acquired relevance and became the basis of the phonological theory since it was used to represent the pronunciation of those Indo-European languages and dialects that had not been transcribed before. The distinction between sound and the letter that represents it is a field of study since the Medieval period, with Erasmus's work about the reconstruction

of the pronunciation of ancient Greek and with the works of the English spelling reformers. In the 19th century, the study of sound developed into two traditions. The most widespread was the one dedicated to the study of sound changes, and the other was the one that studied the sounds themselves.

August Wilhelm von Schlegel in 1818 in the framework of the historical comparison of Romance languages established the guidelines of what is the formulation of the phonetic laws. He established what is known as *Stammbautheorie*, which is the relationship that some languages have with others according to the concept of language family. In 1817 Jakob Grimm published *Deutsche Grammatik* [*German Grammar*], which was based on a comparison of Germanic languages with each other. Also, Jakob Grimm's importance to German linguistics derives from having understood and described, in 1822, the nature of the phonetic modifications that the Germanic languages underwent. The result of his work gave rise to what is known as Grimm's Law, which attempts to explain the mutations undergone by these languages. It focuses on the change from voiced to voiceless of Indo-European voiced stop consonants when switching to Germanic. It would explain the correspondence between the Germanic consonants /p, t, k/ and the Indo-European ones /b, d, g/.

Between 1833 and 1852 Bopp published his most important work *Vergleichende Grammatik des Sanskrit, Zend, Griechischen, Lateinischen, Littauischen, Altslawischen, Gothischen, und Deutschen* [Comparative grammar of Sanskrit, Zend, Greek, Latin, Lithuanian, Old Slavic, Gothic, and German] in which he expressed his previous research and the coining of new concepts in the field of phonetics such as bending and phonetic law. Coetaneous to Bopp is August Friedrich Pott who in 1833 published *Etymologische Forschungen auf dem Gebiete der indogermanischen Sprachen mit besonderem Bezug auf die Lautumwandlung im Sanskrit, Griechischen, Lateinischen, Littauischen und Gothischen* [Etymological research in the field of Indo-European languages with special reference to sound conversion in Sanskrit, Greek, Latin, Lithuanian and Gothic] which marks the beginning of scientific phonology by laying the foundations for the scientific study of phonology. This is understood as a common phonology of Indo-European

languages, which makes it easier to approach etymological studies of words from a more rigorous point of view.

Scholars such as Karl Brugmann, who aligned himself with the Neogrammarian School, stressed the importance of studying phonetic laws and seeing how they work. His work *Grundriss der vergleichenden Grundriß der vergleichenden Grammatik der indogermanischen Sprachen* [Outline of the comparative outline of the comparative grammar of the Indo-European languages] published between 1886 and 1916, together with the scholar Delbrück, dealt with phonological and morphological aspects of language, and emphasised the linguistic value in modern languages of the functioning of analogy.

Belonging to the Leipzig circle, embryo of the Neogrammarian School, we have the research of August Leskien who developed what is known as Leskien's doctrine; this is based on the idea that phonetic laws have no exceptions, that is, that phonetic phenomena that appear are due to directly observable conditions and are not the result of arbitrary factors. His work focused on the Slavic languages, especially Lithuanian, where in 1881 he published *"Die Quantitätsverhältnisse im Auslaut des Litauischen"* ["The quantity relations of the final sound of Lithuanian"], which attempted to describe a certain change in the sound of Lithuanian. He created a school and among his disciples are Jan Niecisław Baudouin de Courtenay, Ferdinand de Saussure, Leonard Bloomfield, Nikolai Trubetzkoy, Karl Verner and Adolf Noreen.

The 19th century saw the creation of etymological and encyclopaedic dictionaries that dealt with both languages that had been little studied until now, such as Czech or Polish, and languages of minority groups such as the Gypsies. In this context we have publications such as *A dictionary, Tibetan and English* by Csoma da Körös (1834), *Origen [...] de los jitanos, y diccionario de su dialecto* (1848) [*Origin [...] of the Jitanos, and dictionary of their dialect*] de R. Campuzano, *A Gaelic-English dictionary* (1842) by Evan Maceachen; *An English and Welsh dictionary* by Thomas Edwards y *An English-Welsh pronouncing dictionary* de William Spurrel, *Catálogo de las lenguas de las naciones conocidas y numeración, división y clasificación de éstas según la diversidad de sus idiomas y dialectos* (1800-1805) [*Catalogue of the languages of known nations and their numbering,*

division and classification according to the diversity of their languages and dialects] by Lorenzo Hervás y Panduro and *Litteratur der Grammatiken, Lexika und Wörtersammlungen aller Sprachen der Erde* (1847) [*Literature of grammars, dictionaries and word collections of all languages of the world*] by Humboldt.

The foundations of classical phonological studies date to the late nineteenth and early twentieth century, and gather all the history of phonetic and phonological studies that are documented since the Indian scholars when they study and describe the Sanskrit in a very precise way under the perspective of articulatory phonetics. The scholars realised that phonology and spelling could not be mixed because although all languages can be described phonologically not all have a written tradition, or some of them have begun to have it recently, so it may be the case that written systems do not coincide with the organisation.

Baudouin de Courtenay (1845-1929) has been considered as the creator of the term phoneme, although it is known that Ferdinand de Saussure (1857-1913) already used it in an article published in 1878. For the first the term refers to a mental image or intention of the same one, seeing in the different realisations that a phoneme can be given an `update´ of the sound in question, this tendency had a wide diffusion, especially in America with some scholars like Sapir that wrote about the `psychological reality´ of phonemes.

In Britain, relevant figures of phonological studies, like Henry Sweet (1845-1912) and Daniel Jones (1881-1967), became less interested in the concept of the phoneme itself than by the description and transcription of speech. The latter figure is very important in the linguistic field since he is the creator of what is known as Received Pronunciation (RP). RP is the standard pronunciation taught in UK schools and to students of English as a second language.

The former made a distinction between `broad´ and `narrow´ phonetic transcriptions focusing on the use of symbols that are sufficient to show significant differences; while the latter included phonetic information that is important for dialectology studies. Sweet, who is considered the author of the phonetic concept of the phoneme, also used the terms `broad´ and `narrow´, and further argues that phonology is subsidiary to phonetics. He

studies what is called `minimal pairs´. The importance of this concept is given by its contrast value of phonemes. For example, we have two words with different meanings and that differ in only one phoneme, *serve/surf* or *tax*/*tap*. In this example we can see how phonemes differentiate words, and we can conclude that the absence of a minimal pair means there is no differentiation of phonemes and therefore what we are talking about are allophones of these phonemes, so an important criterion to identify allophones is precisely the absence of a minimal pair.

Throughout history, there have been different grammatical schools, both in Europe and in America, which have proposed different approaches to phonology. The two most notorious and influential of these are the Structuralist School and the Generativist School. Saussure founded the first at the beginning of the 20th century. His work, published in 1916 *Course in General Linguistics,* represents a break with the historicist tradition of linguistics, which focused fundamentally on the evolutionary study of languages. For Structuralists, it is more important to study the reality of the language than its evolution and they propose the fact that every linguistic system is formed by a series of levels: phonic, acoustic, physiological among others, and that these levels have to be studied separately.

The Prague School, where Jacobson and Troubeskoy developed their studies, stands out in its phonological studies in which it establishes the principle of contrast as fundamental elements when studying sounds, and in addition it favours a comparative study between languages, for example analysing the difficulty that Japanese speakers have at the time of differentiating /r/ and /l/ in English since they do not exist in their own language.

There are three structuralist schools inherited from Saussure's legacy, the authors of all of them produced works that provided new perspectives that enriched the linguistic studies.

1. Prague School: with Troubeskoy *Principles of Phonology* (1939), and Jacobson *Essais de linguistique générale* (1963) [General Linguistics Essays].

2. Copenhagen School: with Hjlesmlev *Principes de grammaire générale* 1928) [Principles of general grammar], *La catégorie des cas* (1935/37) [The category of

cases], *Prolegomena to a Theory of Language*, first published (1943), *Résumé of a Theory of Language* (1975).

3. American school: with Bloomfield Language (1933), Hockett *A Manual of Phonology* (1955); *Course in Modern Linguistics*(1958), Sapir *Language* (1921) and Harris *Methods in Structural Linguistics* (1951), also known as distributional descriptivist linguistics.

The origin of Generative Phonology was in Europe in the 40s of the last century, but it is developed fundamentally in America where the studies carried out by Chomsky and Halle were published in *The Sound Pattern of English*(SPE), in 1968. This work is considered the basis of Generative Phonology.

It has previously been said that their theory tries to explain the process of transformation of deep structures into superficial structures, and for this they use phonological rules as tools. The distinguishing features form the sequences of segments that are phonological representations that can have positive and negative binary values. One of the most important contributions of this theory is to define the system of distinguishing features that serves as a reference in this field for later language studies. Chomsky and Halle base their system on a person's phonetic and articulatory abilities. They establish five categories of distinguishing features (Vivanco: 1981).

1.Main class features:

-consonantal / no consonantal.
-vocalic/non-vocalic.
-sonorant/non-sonorant, obstruent.

2. Cavity features:

-coronal / non-coronal.
-anterior / non-anterior.
-high / non-high.
-back /non-back.
-round / non-round.

-distributed / non-distributed.

-nasal / non-nasal.

-lateral / non-lateral.

3. Articulation features:

-continuant / non-continuant, stop.

-delayed release / instantaneous release.

-tense / non-tense, lax.

4. Source or origin features:

-voiced / non-voiced, voiceless.

-strident / non-strident.

5. Prosodic features.

At the beginning of the 21st century authors, such as Juliette Blavins, carried out studies with the aim of integrating the synchronic and diachronic aspects of a language into a phonological theory that would be enunciated as Evolutionary Phonology. Her reference work in this field, entitled *Evolutionary phonology: The emergence of sound patterns*, was published in 2004.

Some phenomena are in an intermediate field between phonology and morphology, thus in helping the analysis and giving an explanation about them a new branch of linguistics was created, called morphophonology (also morphophonemics or morphonology). It studies two aspects, first, the interaction between morphological, and phonological or phonetic processes; second, the sound changes that occur in morphemes when they are combined for word-formation. Through a series of formal rules, it tries to predict the sound changes of morphemes. It establishes two planes, an underlying one where the morphemes are located and a superficial one where the phonemes are located.

Dafydd Gibbon, Roger Moore, Richard Winski in their work *Spoken Language Characterisation* (1998) explain that the morphophonemic level helps to simplify phonological information through the morphological information extracted from words. Morphophonemes will, therefore, combine the characteristics of the morphological and

phonological fields. Dressler whose studies are frameworked in *Natural Morphonology*, gives this definition: "Morphonology belongs neither to morphology nor to phonology". In fact, he believes that it is the result of the interaction of both constituents (Michael Sapiro: 459).

Phonological studies have continued to evolve until today giving different points of view as new theories have been developed, thus giving rise to different types of phonological analysis such as Natural Phonology, Autosegmental and CV Phonology as well as Metrical Phonology, Experimental Phonology, Nonlinear Phonology and Taxonomic Phonology. In 1969 David Stampe proposes the theory of Natural Phonology in his work *A dissertation on Natural Phonology* and other linguists such as Patricia Donegan and Geoffrey Nathan followed this proposal. His idea is based on the existence of universal phonological processes that interact with each other. These phonological processes act on distinctive features within the framework of prosodic groups that can be part of a syllable or a complete sentence. These processes do not act in a specific and simultaneous order.

John Goldsmith in his book, *Autosegmental Phonology* (1976), which is based on previous works by Bernard Bloch, Charles Hockett and J. R. Firth, promoted what is called Autosegmental Phonology. He considers that phonological phenomena operate in a parallel sequence of features that are found at different levels. Phonological representations are a linear sequence that is constituted on levels separated from other linear sequences, and it is through the lines of association that they are interrelated. Goldsmith establishes the relationship between the analysis of the segments in distinctive features and the autosegmental analysis.

D.Kahn in his MIT dissertation develops the concept of CV Phonology, based on two previous works by G.N. Clements and Samuel Jay Keyser: "A Three-tiered Theory of the Syllable"(1981) and "The Hierarchical Nature of the Klamath Syllable" (1980). This theory establishes an additional new tier called "CV-tier", which defines the functional positions within the syllable. The syllable representation states that each syllable has three-tiered properties with autosegmental ones. It establishes that, in the syllabic trees, the three-tiered properties are represented and its composition would be the following; in the

first tier the vocabulary has only one element; in the second tier, or CV-tier, the vocabulary has two elements: Consonants and Vowels; and in the third tier or segmental tier, which is the nucleus-tier, the vocabulary consists of characteristic phonetic matrices that characterise consonants and vowels.

Metrical Phonology brings to the field of phonology the consideration that the relevance of a unit is in relation with other units that continue the phrase in which they are found. This theory states that stress and pitch accent function individually, having phonetic effects that affect intonation, duration, and amplitude. It treats stress as a characteristic of an individual segment. In this field the works of John A. Goldsmith *Autosegmental and Metrical Phonology* (1990), and Michael Hammond, "Metrical Phonology" (1995) stand out for their importance.

Experimental Phonology was not born with the idea of being a branch of phonology but to profile more closely the existing ones. John Ohala was one of the linguists dedicated to this field and his research is collected in "Experimental Phonology" in *The Handbook of Phonological Theory* by John A Goldsmith (1996).It is considered a branch of psycholinguistics that deals with "the formulation and testing of theories of knowledge and linguistic abilities that involve learned or perceived sound structures" (Ohala:1996).

Nonlinear Phonology focuses on how phonological units are organised hierarchically. It also considers how the relationships of language segments (syllables, words and phrases) and the suprasegmental aspects of phonology (intonation, accent and pauses) affect speech production. It establishes a hierarchical organisation between the segmental and suprasegmental elements of sound and speech in tiers. Non-linear Phonology is also Metrical Phonology and Autosegmental Phonology.

Taxonomic phonology works with phonotactics as a tool; and it focuses to analyse phoneme-by-phoneme with the double benefit of identifying the phonic asymmetries of two languages, and the allophonic differences. It should be noted that this model is not always useful when it comes to detecting errors due to the degree of difficulty of a sound in both languages and also because it does not identify whether the difficulty/error comes from the sender or the receiver.

In recent years the study of these aspects has continued; we can highlight studies carried out by Philip Carr in his book *English Phonetics and Phonology, An Introduction* (2013) where a clear differentiation is made between phonetics and phonology although he sees them as a whole, with phonology being the part that has to study not the sounds themselves but what he describes as a kind of mental organisation. It is a way to store representations and generalisations that have to do with those categories and their representations.

This unconscious knowledge about the functioning of their own language is reflected in all the semantic, morphological and, of course, phonological fields that are of interest to us. A native speaker can recognise even without knowing the concept of syllable how many syllables a word such as *umbrella* has in his language. Philip Carr postulates as `the phonology of English´, that the native speaker has access to an unconscious knowledge that allows him to use the language correctly from the phonological point of view. His theory is based on the idea that phonology, from this perspective, differs from phonics in that it takes into account not only sounds but also mental abilities and unconscious states of mind. And so, it is to these latter aspects that the phonologist should pay attention along with the sounds themselves.

Clark and Yallop in their book entitled *An Introduction to Phonetics and Phonology* (1999) made one of the first attempts to integrate phonetics and phonology as they consider both their perspectives and their goals to interact very closely. Therefore, from their point of view, as there is no clear boundary between phonology and phonetic, the studies should cover them together.

In their studies, Clark and Yallop define phonemes as contrastive or distinctive sound within a language, and they are represented with slash lines. The variants of the phonemes are allophones and are generated by phonological situations that affect them. In phonological analysis they defend the value of empirical evidence, and point out that this is achieved not only through instrumental means, such as the use of the spectrograph, but also through the observation of the speaker's intuition. Cark and Yallop understand that the speaker's intuition is the ability to count the number of syllables in a word, to select rhyming, to identify homophones, and so on. Therefore, the phonological system of any

language can be validated empirically, and the speaker's knowledge of phonemic differences must be taken into account.

2.2. PHONETICS.

In a brief review of phonetic studies, the first of which date from the 6th century BC and were carried out by Sanskrit Grammarians, Panini being one of them, and his studies are the basis of modern linguistics. He is the first to report aspects such as voicing and resonance, amongst others. It will not be until the 19th century that this field will be worked on in-depth again although in 1569 John Hart describes pronunciation of words in his work *An Ortographie*.

In the 19th century, great importance and impulse was given to the phonetics within European studies of the time. This was partly due to technological advances that allowed the study of speech. Although at the beginning the studies were focused on the language of the linguist who carried it out, later it was extended to other European languages and those spoken in the colonies of European countries. This situation produced a heyday of historical phonology, responsible for studying the changes produced in languages.

In the early stages of the same century, different types of phonetic alphabets based on the points of attraction were developed, some scholars like Alexander Melville Bell developed one that was used as a teaching tool in the education of deaf children, his method was called `Visible Speech´. He was also able to make the description of vowels by height and backness, resulting in a list of 9 cardinal vowels that help in the realisation of the transcriptions. However, this theory was questioned in 1960 by Peter Ladefoged, as through his studies he concluded that these 9 vowels were auditory and not articulatory. It is also necessary to mention the work of Henry Sweet *A handbook of Phonetics* published in 1877 and the creation of the International Phonetic Alphabet (IPA) in 1888, which will be discussed more extensively later.

There are a number of different definitions of phonetics by different authors such as those by Tobin and Morris. Tobin, in his paper "Phonetics versus Phonology: The Prague School and Beyond" (1988), describes the phonetics as:

> Description of what sounds occur and which features (acoustic and articulatory) they are composed of – i.e., how they are articulated and perceived- the `what´ and `how´ of the realized sound system of (a) language (`what´ and `how´ = description.) (Tobin: 51).

Morris Swadesh defines Phonetics as the science of the study of speech sounds. It offers the student two positive aspects. On the one hand, it helps to discover the phonemes of the foreign language he is studying and, on the other hand, it provides a description of these phonemes thus facilitating their learning (1934: 126-127).

Phonetics is considered a branch of linguistics, its purpose is to study the sounds that the human voice emits, how they are formed and the allophones that they can present. The phonetics unit is the sound, and through articulatory, auditory and acoustic production it tries to describe and classify the sounds types. Phonetics has two branches: general phonetics which deals with the study of sounds emitted by human beings and the general rules that run it, and phonetics of particular languages, also called descriptive, which focuses on describing the peculiarities of a specific language (Obediente: 5).

Bartoli (2005) explains that it is a fundamental part of learning a second language and focuses on the analysis of how a subject can produce the different sounds that will be used in speech. For this reason, phonetics uses a series of universal symbols that are intended to represent each sound that exists. This is of great help to the student of a language since it allows him to identify the nuances of each new sound in the target language. The sounds are represented in square brackets, e.g. [ɯ], [ɣ] and their purpose is to understand how the different parts of the phonation device are involved in the production of sounds so that the student can imitate it as easily as possible, and thus achieve the highest degree of mastery in the production of the sounds of the target language.

Traditionally language teaching focused on phonetics and phonology but did not include phonics as an important element in learning. The first two were extensively studied, and several theories were developed about them, but the last one was barely addressed. Phonics is understood as a system for relating sounds to spelling. In English, there are forty-two 'letter sounds' directly linked to the most common spelling rules, and they also use letter combinations to relate sounds to spelling. Phonics and pronunciation are intrinsically

related, although they are different subjects, since the teaching of pronunciation is not the same as the teaching of phonics. In fact, in the 70s and 80s of the last century, phonics was practically not taught in school, and it was not until the 90s that it gained importance again when trying to teach it together with pronunciation in a communicative approach.

In the last 20 years authors such as Cantero and Llisterri differentiate between pronunciation, phonetics and phonetic correction. For the former, the teaching of pronunciation is the teaching of knowledge that facilitates oral communication, and phonetic correction focuses more on specific sounds than on the whole of speech. Llisterri makes a distinction between phonics, which for him should be taught in philology studies rather than FL studies, and phonics correction, which should be included in classroom activities and corrected if necessary. Both phonics and pronunciation focus primarily on different aspects. Just as phonics is an interdisciplinary science that usually deals with isolated sounds while neglecting speech as a whole, pronunciation is the production and perception of speech.

Phonetics as a science consists of several branches that relate to the different applications and ways in which the use of a language occurs. The study of these branches has been covered by a large number of scholars through the years such as: Martin Joos "Acoustic Phonetics" (1948), Herbert Pilch *Auditory Phonetics* (1978), Kenneth N Stevens, *Acoustic Phonetics* (2000), Peter Ladefoged, *A Course in Phonetics* (2001), Katrina Hayward *Experimental Phonetics: An Introduction* (2004), Diehl, "Acoustic and auditory phonetics: the adaptive design of speech sound systems" (2007).

All these branches have as their aim the study of different fields within phonetics. Experimental Phonetics studies oral sounds from a physical point of view, for which it gathers data on both the emission and reception of sounds and quantifies them in order to reach conclusions. Thus, phonetics depends to a great extent on the precision of the instruments used, such as X-rays and the kymograph.

Articulatory Phonetics is focused on the study of the organs of the phonation apparatus that intervene in the production of sounds and is mainly interested in seeing how the place and form of articulation influence the creation of different sounds. The IPA brings together the

phonetic symbols used by most linguists and, as mentioned above, these symbols are represented in square brackets, e.g. [ð], [ŋ]. In relation to the organs of articulation, they are divided into mobile parts (lips, jaw, tongue and vocal cords) or fixed ones (teeth, alveoli, hard palate and soft palate) and the combination of these produces the sound. The mode of articulation is given by how the organs are placed in the oral cavity and how this position affects the release of air, for example the instantaneous and complete interruption of the passage of air will result in implosives, generating a brief interruption at the beginning of the production of sound to then leave the passage of air free will result in affricates.

Acoustic Phonetics studies the characteristics of the sound wave produced by a subject and uses, amongst other means, the spectrograph to help analyse the frequency spectrum characteristic of a wave motion.

And Auditory Phonetics, which studies sound from the receiver's point of view, is also called perceptive phonetics and focuses on how the receiver's ear reacts to the sound waves it perceives and how it interprets them. Summarising, the four approaches studied how sound is produced, emitted and received.

The above are the main branches of phonetics but more classifications are possible depending on the point of view adopted for their analysis. We will briefly explain some of them (Darden/ Deusto, Apuntes de Fonética):

   1. According to the object of study:

      - General phonetics, it studies the general characteristics of the communicative process.

      - Particular phonetics, it focuses on the study of the sounds of a given language.

   2. According to its pragmatic intention:

      - Theoretical phonetics, it studies and describes the sounds.

      - Applied Phonetics, this focuses on the sounds of a given field, for example, speech therapy.

3. According to the time perspective adopted:

- Diachronic Phonetics, is the study of the evolution of sounds in time.

- Synchronous phonetics, it deals with the description of the sounds in a determined period.

4. According to the scope of the study:

-Descriptive phonetics, it describes the sounds.

-Scientific Phonetics, its goal is to describe the sounds and the elements that surround them from a scientific perspective.

5. According to the scientific method used:

- Subjective phonetics, it applies non-experimental criteria.

- Experimental Phonetics, it uses the experimental method to conduct the study of sounds.

Together with the aforementioned, it is fundamental to explain and define the phonation apparatus that is involved in the production of phonemes. Countless works have been carried out analysing this aspect in its different facets over the years, among which we mention: Barry Heselwood, "Phonetic Notation" in *Phonetic Transcription in Theory and Practice* (2020); Kirsten Malmkjær, *The Linguistics Encyclopaedia*, Routledge (2004); Jana Ondráková *The physiological activity of the speech organs: An analysis of the speech organs* Mouton (1973).

In general, there are three groups of organs involved in phonation.

1. Infraglottic cavities or respiratory organ: lungs, bronchi, and trachea.

2. Laryngeal cavity or vocal organ.

3. Supraglottic cavities.

With regard to the first group, infraglottic cavities, we can say that in their physical aspect the vocal cords are the place of the constitutive properties of sound:

1. Voiced sound: If the vocal cords approach and therefore the vibration occurs. The articulating sounds that are formed are the *vowel sound* and the *consonantal sound*.

2. Voiceless sound. If the vocal cords are approaching but there is no vibration.

The vocal cords are tenser in the production of vowel sounds, besides the stronger vibratory beats and their greater frequency. On the other hand, in relation to the consonant sounds we observe that the vocal cords are less tense, the vibratory blows are less strong and therefore the opening will be smaller and the pitch will be lower.

The place where the sound is physically produced is in the laryngeal cavity or vocal organ. It is important for two reasons, the first is that it allows the entrance and exit of air into the lungs; the second is fundamental to mark the particular characteristics of each person's voice. It is here that the sound acquires nuances such as tone or intensity thanks to the vocal cords. In this area, the amplification, control and modulation of the phonatory blow are produced thanks to the processes that take place in the nasal cavity, oral cavity and pharynx.

With regard to the supraglottic cavities, the position of the soft palate is fundamental. If it has adhered to the pharyngeal wall, the air is going to be expelled through the oral cavity and also into the *oral articulated sounds*, for example, it happens in Spanish with [p, b, s, k]. However, when the soft palate descends, separating itself from the pharyngeal cavity, the air will come out through the nasal passages giving rise to *nasal consonant sounds* such as [m, n, ɲ] in Spanish. It may be the case that both the oral cavity and the nasal cavity are open producing *oronasal* sounds like the [a] of [manco].

When describing a speech sound, we use suprasegmental features: stress, intonation, rhythm, rate, loudness and pitch. They all add meaning to utterances. The difficulty for the second language student is that it is very difficult to reproduce the native model so what usually happens is that they end up applying the prosodic features of their native language to the one they are learning.

In the learning process the student has to become familiar with the suprasegmental features despite the difficulty of some of them. For example, with the stress that can be defined as

emphasis given to a particular syllable or word in speech, typically through a combination of relatively greater loudness, higher pitch, and longer duration. There are two types of stress: primary and secondary. The first is located in the syllables that have the nuclear accent, and the second, which is not as strong as the first, is located in the pre-tonic syllables.

Most probably the student finds intonation in English difficult. The speaker´s voice rises and falls when he communicates and this is because of intonation. Each language has its own intonation. In spoken language, it is an element of sentence structure whose function is to emphasise elements of speech. English and Spanish patterns of intonation are different. Spanish intonation tends to use the raising tone while English intonation tends to be flatter.

Every language has a particular strong, regular repeated pattern of movement or sound. This pattern is the rhythm. For example, English is based on regular patterns of accented syllables. The student has to become familiar with this new regular pattern that sometimes is different in his native language. Another suprasegmental feature that is difficult to learn is the pace. The pace is a measure, quantity or frequency, and it is used to be opposed to another measure.

Learning the syllabic accent presents problems for students. When we learn and describe sounds it is necessary to identify the stress and the unstressed syllables. The first ones are more prominent than the second ones, and loudness is one of the factors contributing to that prominence. The vibration of the vowel folds is directly related to the high or low pitch that a syllable might have.

David Crystal considers suprasegmental elements: loudness, and related with it there is the stress; melody; speed; rhythm and tone of voice where intonation is an important factor since by changing it, we change the tone of voice and we can also change the sense of a sentence, e.g.:

The <u>mother</u> bought a dress for her <u>daughter</u>, and she bought another for <u>Rose</u>.

The <u>mother</u> bought a dress for her <u>daughter</u>, and <u>she</u> bought another for <u>Rose</u>.

In the first example it is the mother who bought her daughter's dress and Rose's dress while in the second example the mother bought her daughter's dress and the daughter bought Rose's dress.

For Crystal[1], stress is directly related to the loudness with which a word or part of it is pronounced. The parts that are pronounced in a stronger way than others are the stressed syllable while those that lack this feature are the unstressed syllables.

<u>Ab</u>stract / Abst<u>ract</u>

<u>In</u>valid / In<u>valid</u>

Segmental and suprasegmental features are the tools to study and describe speech sounds. Arden Thorum (2013) explains that the basic units studied in phonetics are the sounds that are represented with phonetic transcription. Speech sounds can be consonants, vowels and diphthongs. They will be marked by a series of prosodic features that are: stress, intonation, loudness, rate and rhythm, these elements will affect a phoneme and a syllable or words, phrases or sentences.

As has been said before, the extension of the material makes it impossible to cover it completely in this work so I will focus on the aspects that are relevant to it: the phonological system of English and Spanish, the relevant allophones related to my thesis, and the restrictions of placement and combination of some phonemes that exist in Spanish but not in the same position as in English such as the /-*m*/ in the final position, the final sounds /-*nt/, /-sd/, /-nd*/ that do not exist in Spanish in that word position or the /*st-*/ sound in the initial position that does not exist in Spanish either.

For my study the Articulatory phonetics aspect is relevant since the way the body produces the sound is significant in order to analyse if the difficulties that arise at the time of

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[1] http://www.davidcrystal.com/?id=2970

learning L2 have to do with physical reasons or if they have to do with the problem of Interlanguage.

2.3. CONSONANT AND VOWEL SOUNDS IN SPANISH.

In the previous sections, a historical and theoretical explanation of phonetics and phonology has been made, dealing with different aspects and features of them. In this section, the objective is to describe the consonantal and vowel system of Spanish that allows us to know its characteristics.

The traditional classification between consonant and vowel sounds has its defenders and detractors, the latter claims that it is not based on objective criteria that consider the physiological foundations. For them, attention should be paid to the degree of opening and to the three basic elements of friction, sonority, and resonance. As an example of this Quilis and Fernandez put the example of the sound [a] that is voiced, with high resonance and very low friction, and the sound [s] with very high friction, low resonance and voiceless. Therefore, following the theory by Quilis, at the open end of the string will be the vowels, with [a] the first, and at the closed end the voiceless stop consonants:

	e	i		b	p
a			…………..	d	t
	o	u		g	k

Two aspects support the idea of this classification, which has a physiological pattern:

1. The different muscles involved in the formation of sounds:

    a) Depressor muscles> vowels.

    b) Elevating muscles> consonants.

2. The action of the vocal cords differentiates between vowels and consonants.

    a) Vocal sound> greater tension and number of vibrations per unit of time. For this reason the vowel pitch is always higher than the consonant one.

b) Voiced consonantal sound> smallest tension, smallest number of vibrations per unit of time. Result, the vocalic pitch is low.

The soft palate is also available in the classification of sounds:

a) Oral sounds, expelling air only through the oral cavity when the palate is attached to the wall. Example [s, p, b].

b) Nasal sounds, the nasal passage is open when the soft palate is separated from the pharyngeal wall. The situation of the production of oronasal sounds can be given to allow the positioning of the veil of the palate out of the air both by the mouth and by the nose [ē].

Considering the way of articulation we will find:

a) Open sounds> vowels.

b) Half-closed or continuous sounds> some consonants like [s, f. x].

c) Closed or interrupt sounds such as [p, t, k, b].

For this, we can classify the vowels in:

a) high.

b) mid.

c) low.

And the consonants in:

a) Occlusives> complete closure of the articulatory organs [p, t, k].

b) Fricatives> when the sound is formed due to a narrowing of two articulatory organs without touching them [f, θ, s, x].

c) Affricate or semi-occlusive> when at the complete closure of two articulatory organs a small opening occurs through which the contained air is expelled [c].

d) Nasal> closed oral quality and open nasal passage [m, n, ɲ].

e) Liquids:

a. Lateral> expulsion of air through one side of the mouth or both [l].

b. Rhotic> one or more vibrations of the apex of the tongue [r, r̄].

By the place of articulation, we can classify the vowels in:

a) Front.

b) Mid.

c) Back.

And the consonants in:

a) Bilabial: [p, b, m, β].

b) Labiodental: [f, ɱ].

c) Linguodental or dental [t, d, ṇ, ḷ].

d) Linguointerdental or interdental: [ð, θ, n̟, l̟].

e) Linguoalveolar or alveolar: [s, n, r, r̄, l].

f) Linguopalatal or palatal: [ĉ, ɲ, ɟ, ʎ, ĭ].

g) Linguovelar or velar: [k, g, x, ɣ, ŋ].

Hence, when we want to define a consonant, we have to have these four parameters: Articulation mode, Place of articulation, Action of the vocal cords, and Action of the soft palate. The basis of articulation is an important factor when it comes to the production of sounds in any language. By articulation basis we understand the set of articulatory habits that characterise all the articulations of a language. As Quilis and Fernández point out "Estos hábitos de articulación no sólo se reflejan en la pronunciación de idioma, sino que influyen en la dirección que han de tomar los desarrollos diacrónicos del mismo" [In Spanish in the original]. (These articulation habits are not only reflected in the pronunciation of language, but influence the direction that the diachronic developments of it must take) (Quilis and Fernández, III: 34).

Comparing the articulation bases of Spanish and English we can see that they are very different. Spanish has a great degree of tension that is reflected in the purity of the vowels,

lack of affrication in the consonants and the pitch of the unstressed vowels. The central base of Spanish is not as back as that of English due to the relative frequency of alveolar and palatal joints. Regarding the importance of pronunciation, we have the studies of Bertil Malmberg (1962) in which he points out the great importance of the student acquiring mastery of a large number of articulatory habits that are new to him, since this is the way to achieve good pronunciation of a foreign language.

2.3.1. THE SPANISH VOWELS.

From the phonetic point of view they are sounds that present:

1. Greater opening of the articulatory organs.

2. Greater number of vibrations of the vocal cords in a unit of time.

3. Maximum of hypertons or harmonics.

Phonologically speaking the vowels are opposed to the consonants for their ability to form a syllabic nucleus since the consonants form a syllabic margin.

The most important part of the vowel is the formation of its timbre, since it is the most relevant and distinctive feature.

In Spanish there are five phonological vowels: / i, e, a o, u /.

/ e / / o / present somewhat open allophones in the following positions:

1. In contact with the sound [ɾ̄] as in *perro*[pe ɾ̄o].

2. When it precedes the sound [x] as in *teja* [tɛxa].

3. When they are part of decreasing diphthongs as in *peine*[p ɛ i̯ n e].

4. Open allophone of /o/ that occurs in every closed syllable by a consonant.

Open allophone of /e/ appears when it is closed by any consonants except for [d, m, s, n, θ], as in *pelma* [pɛlma].

/ a / a presents three allophones:

1. When it precedes palatal consonants [c, ʎ, ɲ, ǰ] As in *malva* [ma ʎ a] (palatal variety).

2. a + [o, u] as in *ahora* [dora].

   a + [l, x] as in *palma* [pálma] (velarized variant).

3. Not included in the previous groups, (medium variant). As in *caro* [káro] and *sultán* [sultán].

From a physiological point of view, we could classify the Spanish vowels in:

1. High vowels [i, u], mid vowels [e, o] and low vowels [a].

2. Front vowels [i, e], back or velar [u, o] and central [a].

3. Oral vowels [i, e, a, o, u], oronasal vowels (when the vowel is between two nasal sounds or in absolute initial position preceded by a nasal consonant).

4. Labialised [o, u] and delabialised vowels [i, e, a].

5. Stressed vowels and unstressed vowels.

6. Long vowels and short vowels (they are not as long as their English counterparts).

From an acoustic point of view the Spanish vowels could be classified as follows:

1. Acute.

2. Bass.

3. Neutral.

And this leads us to the phonetic definition of a vowel and the phonological definition of it. In order to define a vowel phonetically, five specific aspects must be taken into account:

1.   The mode of articulation: high, medium or low.

2.   The place of articulation: front, central or back.

3.   The action of the veil of the palate: oral or oronasal.

4.   The labial action: labialised or deslabialised.

5.   Intensity: tonic or atonic.

6.   Acoustic characterisation: acute, neutral or bass.

Two elements need to be considered in order to define a vowel phonologically:

1.   The articulation mode.

2.   The place of articulation.

2.3.1.1. SPANISH DIPHTHONGS AND TRIPHTHONGS.

A diphthong is understood as the union of two vowels in the same syllable, the one that has a greater opening and articulatory energy, constituting the centre or syllabic nucleus. The other vowel is known as the pre-nuclear syllable margin or postnuclear syllable margin.

In Spanish there are two types of diphthongs, the so-called increasing diphthongs, where the vowel forming the syllabic nucleus is in a secondary position and the closed vowel is considered as semi-consonant and is in a pre-nuclear situation. There are eight growing diphthongs: [ja], [je], [jo], [ju], [wa], [we], [wi], [wo].

Tithe second type is the decreasing diphthongs, where the syllabic nucleus is located in the first position, the vowel being closed in the postnuclear position and receiving the name of semivowel. There are six decreasing diphthongs:

$$[\text{ ai }], [\text{ e}\underset{\cdot}{\text{i}}], [\text{o}\underset{\cdot}{\text{i}}], [\text{ a}\underset{\cdot}{\text{u}}], [\text{ eua}], [\text{ o}\underset{\cdot}{\text{u}}]$$

The hiatus appears when two vowels, one high and one mid or low, belong to different syllables within the same word. Besides, triphthong in Spanish means the union of three vowels in the same syllable. The most open vowel forms the syllable nucleus, the other two vowels being considered semiconsonant or semivowel in relation to their situation with respect to the syllable nucleus of which they form part.

2.3.2. SPANISH CONSONANTS.

2.3.2.1. OCCLUSIVE.

Occlusive consonants are those sounds characterised by the interruption of the air passage due to the complete closure of the articulatory organs involved in their production. The veil of the palate is attached to the pharyngeal wall and prevents the exit of air through the nostrils.

Phonologically there are six occlusive phonemes:

1.	Voiceless bilabial	/p/
2.	Voiced bilabial	/b/
3.	Voiceless linguodental	/t/
4.	Voiced linguodental	/d/
5.	Voiceless linguovelar	/k/
6.	Voiced linguovelar	/g/

Phonetically attending to the point of articulation and the vibration of the vocal cords we find three different types.

1.	Bilabial	voiceless	[p]
		voiced	[b]
2.	Linguodental	voiceless	[t]
		voiced	[d]
3.	Linguovelar	voiceless	[k]
		voiced	[g]

2.3.2.2. FRICATIVES.

Fricatives are those sounds characterised by a narrowing of the buccal channel without complete closure of the articulatory organs involved in its production.

Phonologically we can distinguish five fricative phonemes:

    1. Voiceless labiodental   /f/

    2. Voiceless linguodental   /θ/

    3. Voiceless linguoalveolar   /s/

    4. Voiced linguopalatal   /ǰ/

    5. Voiced linguovelar   /x/

Phonetically we can classify them into the following six groups:

    1. Bilabial   [β], voiced, allophone of /b/

    2. Labiodental   [f], voiceless, allophone of /f/

    3. Linguointerdental   [ð], voiced, allophone of /d/

                             [θ], voiceless, allophone of /θ/

    4. Linguoalveolar   [s], voiceless, allophone de /s/

                             [ş], voiced, allophone of /s/

    5. Linguopalatal   [ǰ], voiced, allophone of /ǰ/

    6. Linguovelar   [x], voiceless, allophone of /x/

                             [ɣ], voiced, allophone of /g/

2.3.2.3. AFFRICATES.

Affricates are those sounds characterised by an occlusion followed by friction produced in the same articulatory place.

Phonologically there is only one affricate phoneme:

    Voiceless linguopalatal   /c/

Phonetically there are two affricates consonants:

    Linguopalatal   voiceless [c], allophone of/c/

                          voiced [ǰ], allophone of/ǰ/

2.3.2.4. NASALS.

Nasals are those sounds characterised by the passage of air through the nostrils and the fallen position of the soft palate.

Phonologically there are three nasal phonemes:

    1. Bilabial   /m/

    2. Linguoalveolar   /n/

    3. Linguopalatal   /ɲ/

Phonetically, we found three different groups:

    1. Bilabial   [m]

    2. Linguoalveolar   [n]

      Labiodental   [ɱ]

      Linguointerdental [n̪]

      Linguodental   [ṇ]

      Linguovelar   [ŋ]

      Linguopalated   [ŋ]

   3. Linguopalatal   [ɲ]

2.3.2.5. LIQUIDS.

Liquid consonants in Spanish are considered consonant articulatory sounds with vowel features, thus forming an intermediate group between vowels and consonants.We have two large groups within the liquid consonants: the lateral consonants and the vibrant consonants.

2.3.2.5.1. LATERAL CONSONANTS.

Lateral consonants are those in which during their emission the air exits through a narrowing produced by one side or by both sides of the tongue and the corresponding rim or rims of the pre or midpalatal region. The vocal cords vibrate.

Phonologically there are two phonemes:

   1. Linguopalatal   /ʎ/

   2. Linguoalveolar   /l/

Phonetically, they are divided into:

   1. Linguopalatal   [ʎ]

   2. Linguolveolar   [l]

   3. Linguodental   [l̪]

   4. Linguointerdental [l̟]

2.3.2.5.2. VIBRATING CONSONANTS.

Vibrating consonants have one or several momentary interruptions during the exit of the phonator air, this is due to the interaction between the lingual apex and the alveoli. The vocal cords vibrate.

Phonologically we find two phonemes:

    1. Simple   /r/

    2. Multiple   /r̄/

Phonetically there are two sounds:

    1. Simple   [r]

    2. Multiple   [r̄]

2.4. CONSONANT AND VOWEL SOUNDS IN ENGLISH.

As mentioned above the most common norm is to see vowels as sounds where there is no obstruction of the exit of air through the larynx and lips, and consonants as sounds where there is a total or partial obstruction of air in the mouth. However, the difference is not clear in all cases giving rise to doubts about whether to consider a consonant or vowel sound. As Roach (Roach, Chapter 2: 10) points out, in English we can see a clear example in the initial sounds of the words *hay* and *way*, where it can be observed that the obstruction of the exit of the air from the vocal cavity is not greater than in the vowels. Thus, the distinction: consonants/vowels offers doubts and would not be completely valid when there are sounds in intermediate positions.

In English we can find what are called primary cardinal vowels, the most common and known by non-native speakers of European origin, to which we can add the so-called secondary cardinal vowels, less familiar to the non-native European speaker (Roach, 2:13), whose diagram would be as follows:
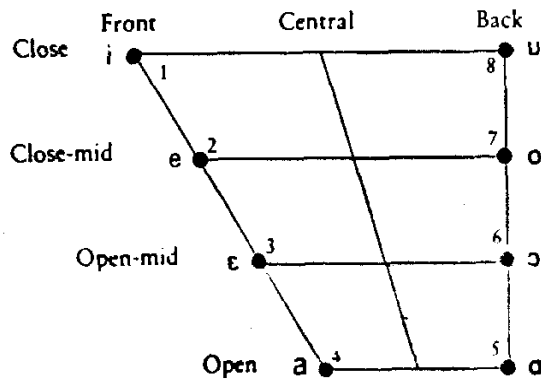
Fig. 3. Primary cardinal vowels. Peter Roach. (1988). *English Phonetic and Phonology.*

2.4.1. VOWEL SOUNDS.

In English we can divide vowels into two basic blocks: short vowels and long vowels. Following the work of Peter Roach (Chapter 2: 14) the classification would be as follows:

2.4.1.1. SHORT VOWELS.

The symbols used for short vowels are: ɪ, e, æ, ʌ, ɒ, ʊ. Again, it should be noted that these short vowels are not fixed standards since the sounds that precede them or those that follow them will mark certain flexibility in their duration within the range of short vowels.

Roach (Chapter 2: 14-15) describes the vowel sounds in relation to the cardinal vowels.
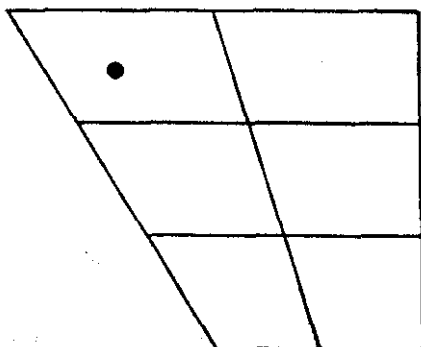
/ɪ/ (example words: *bit, pin, fish*). The diagram shows that, though this vowel is in the close front area, compared with cardinal vowel nº 1 /ɪ/ it is more open, and nearer in to the centre. The lips are slightly spread.
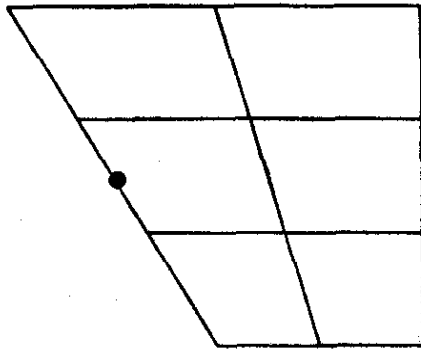
/e/ (example words: *bet, men, yes*). This is a front vowel between cardinal vowels no 2 /e/ and no 3 /ɛ/. The lips are slightly spread.
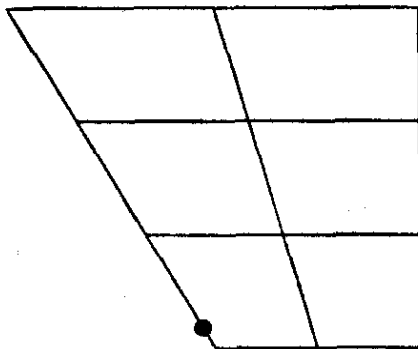
/æ/ (example words: *bat, man, gas*). This vowel is front, but not quite as open as cardinal vowel no4 /a/. The lips are slightly spread.
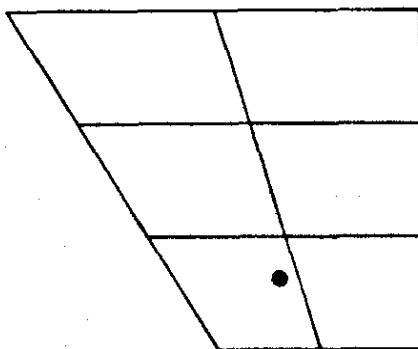
/ʌ/ (example words: *but, some, rush*). This is a central vowel, and the diagram shows that it is more open than the open-mid tongue height. The lip position is neutral.
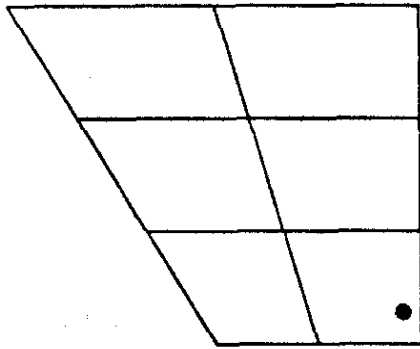
/ɒ/ (examples words: *pot, gone, cross*). This vowel is not quite fully back, and between open-mid and open in tongue height. The lips are slightly rounded.
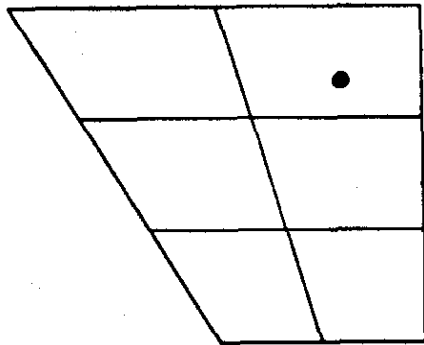
/ʊ/ (example words: *put, pull, push*). The nearest cardinal vowel is nₒ 8 /u/, but it can be seen that /ʊ/ is more open and nearer to central. The lips are rounded.

2.4.1.2. LONG VOWELS.

Long vowels are characterised by a longer duration than short vowels and are equally conditioned by the context in which they are produced, in other words, they are influenced by the sounds before and after them, as well as the presence or absence of accent. Their graphic representation is as follows: the symbol of the vowel proceeded by a colon. The five long vowels in English are: iː, ɜː, ɑː, ɔː, uː

We follow again the description made by Roach (Chapter 3: 18-19).
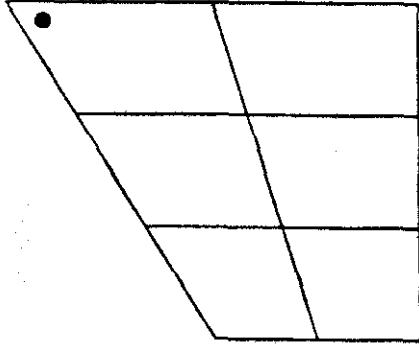
/i:/ (example words: *beat, mean, peace*). This vowel is nearer to cardinal vowel n∘ 1 /i/ (that is, it is more closed and front) than the short i vowel of *bid, pin, fish*). Although the tongue shape is not much different from cardinal vowel n∘1, the lips are only slightly spread and this results in rather different vowel quality.
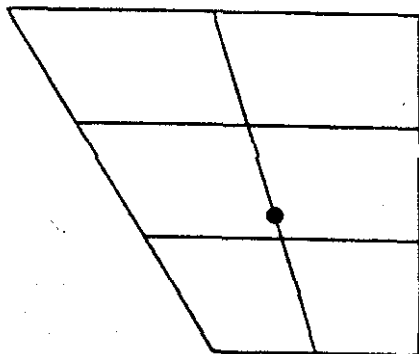
/ɜ:/ (example words: *bird, fern, purse*). This is a central vowel which is well-known in most English accents as a hesitation sound (spelt `er´), but which many foreigners find difficult to copy. The lip position is neutral.
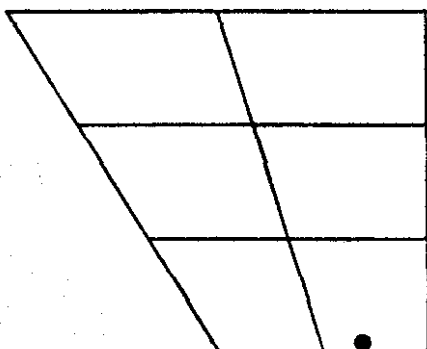
/ɑ:/ (example words: *card, half, pass*). This is an open vowel in the region of cardinal vowel n∘ 5 /ɑ/, but not as back as this. The lip position is neutral.
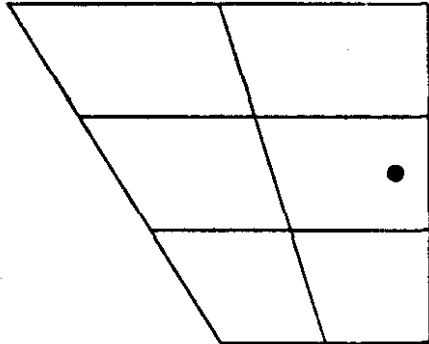
/ɔ:/ (example words: *board, torn, horse*). The tongue height for this vowel is between cardinal vowel nº 6 /ɔ/ and nº 7 /o/. This vowel is almost fully back and has quite strong lip-rounding.
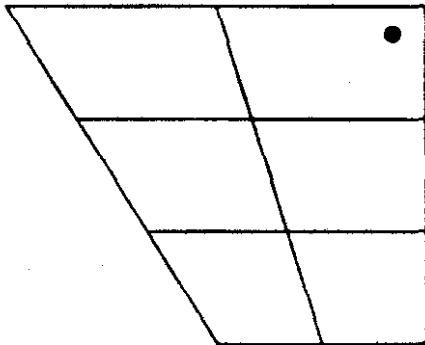
/u:/ (example words: *food, soon, loose*). This vowel is not very different from cardinal vowel nº 8 /u/, but it is not quite so back nor so close, and the lips are only moderately rounded.

2.4.1.3. DIPHTHONGS.

There are eight diphthongs in English. The first vowel is the strong and long vowel while the second is shorter and weaker. As you can see in this diagram the diphthongs would be divided into three groups.
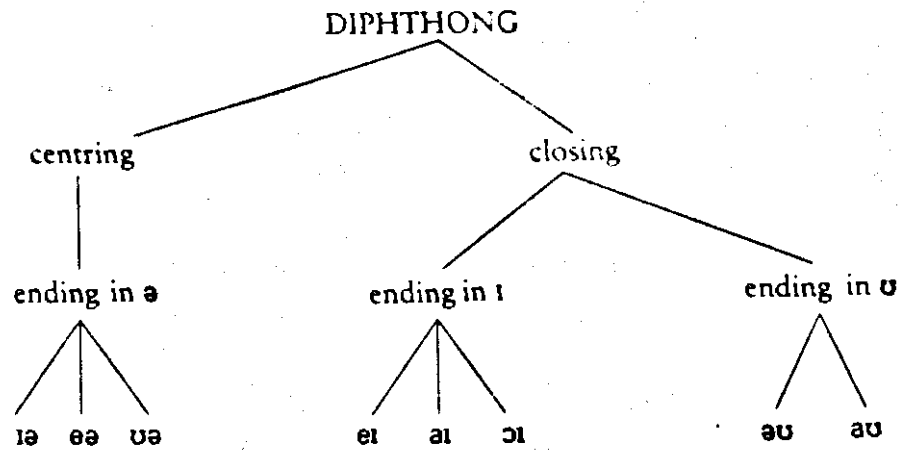
Fig.4. Peter Roach. (1988). *English Phonetic and Phonology.*

In this figure, we can see how the eight English diphthongs are grouped into three groups according to the weak final vowel that ends them. And since the closing diphthongs are distributed in two endings, the first in / ɪ / and the second in / ʊ /, the centring diphthongs only have one ending, which is in / ə /.

We will first describe the central diphthongs that slide towards the vowel /ə/ (schwa). For this we follow the description made by Peter Roach (Chapter 3: 20-22).
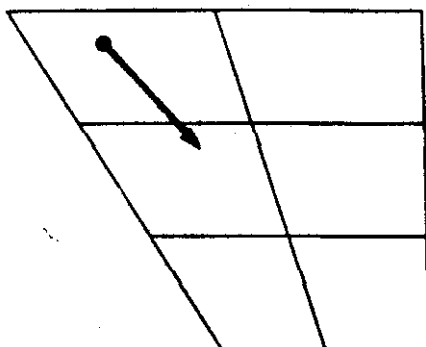
/ɪə/ (example words: *beard, Ian, fierce*). The starting point is a little closer than /ɪ/ in *bit, bin*.
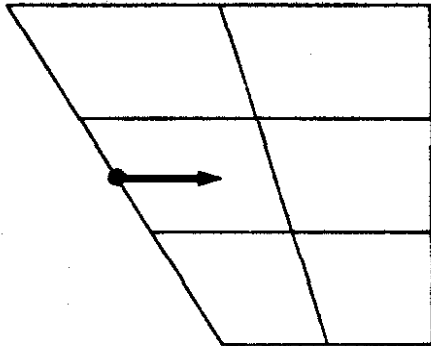
/eə/ (example words: *aired, cairn, scarce*). This diphthong begins with the same vowel sound as the /e/ of `get´, `men´.
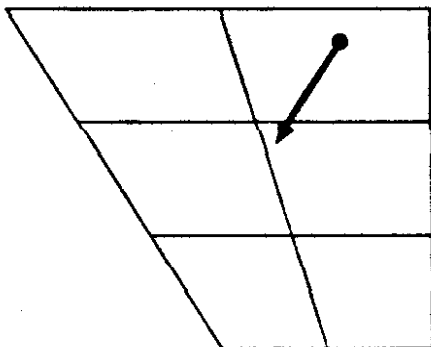
/ʊe/ (example words: *moored, tour*). This has a starting point slightly closer tan /ʊ/ in*put, pull*.

The following diphthongs are closing diphthongs. In the first three there is a sliding towards ɪ.
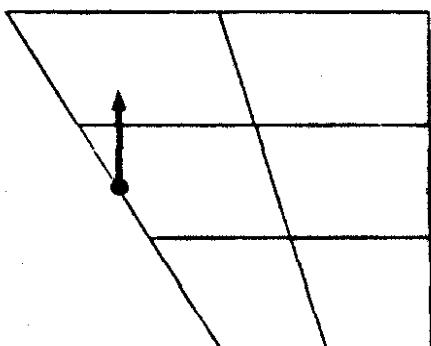
/eɪ/ (example words: *paid, pain, face*). The starting point is the same as the /e/ of *get, men*.
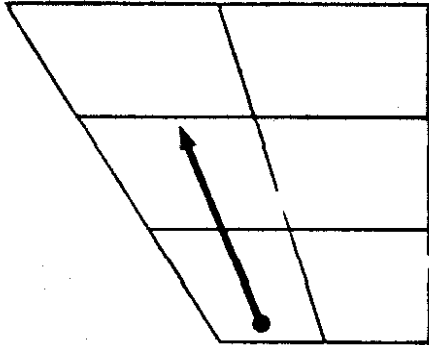
/aɪ/ (example words: *tide, time, nice*). This diphthong begins with an open vowel that is between front and back; it is quite similar to the /ʌ/ of the words *cut, bun*.
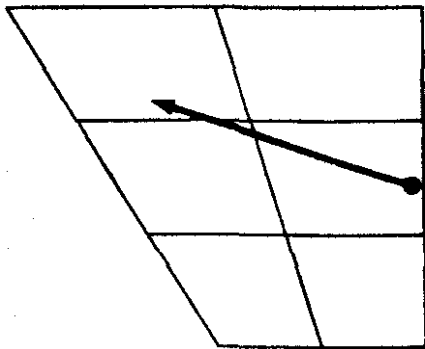
/ɔɪ/ (example words: *void, loin, voice*). The first part of this diphthong has the same quality as /ɔ:/ in *ought, born*.

The second group of closing diphthongs slides towards ʊ, so the position of the tongue is very close to the palate and is accompanied by a rounding of the lips.
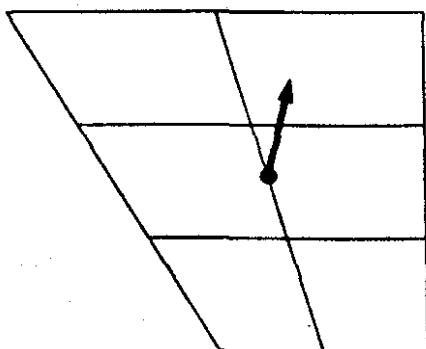
/əʊ/ (example words: *load, home, most*). The vowel position for the beginning of this is the same as for the "schwa" vowel /ə/, as found in the first syllable of the word *about*. The lips may be slightly rounded in anticipation of the glide towards /ʊ/, for which there is quite noticeable lip-rounding.
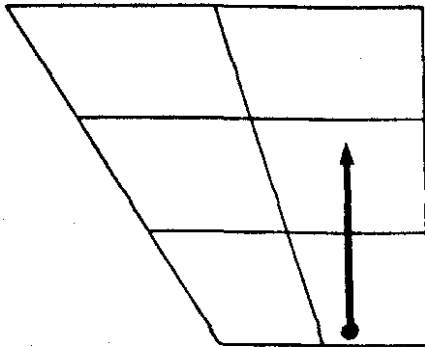
/aʊ/ (example words: *loud, gown, house*). This diphthong begins with a vowel similar to /ɑ:/ but a little more front. Since this is an open vowel, a glide to /ʊ/ would necessitate a large movement. Usually in English the glide towards /ʊ/ begins but is not completed, the end of the diphthong being somewhere between close-mid and open-mid in tongue height. There is only slight lip-rounding.

2.4.1.4. TRIPHTHONGS.

Triphthongs cause great difficulty of pronunciation for non-native speakers due to the chaining of three vowel sounds without interruption, in such sequence the intermediate vowel that is the sound ɪ or the sound ʊ are hardly perceptible for the listener.

In English we can locate five triphthongs (Roach, Chapter 3: 23):

eɪ + ə = eɪə as in `layer´

aɪ + ə = aɪə as in `liar´

ɔɪ + ə = ɔɪə as in`loyal´

əʊ + ə = əʊə as in lower´

aʊ + ə =aʊə as in `hour´

2.4.2. CONSONANT SOUNDS.

English has 24 consonant sounds. A summary of these can be found in the following table:

Place → Manner ↓	BILABIAL		LABIO-DENTAL		(INTER) DENTAL		ALVEOLAR		PALATO-ALVEOLAR		PLATAL		VELAR		GLOTTAL	
PLOSIVE	p	b					t	d					k	g		
(nasal)		m						n						ŋ		
AFFRICATIVE									ʧ	ʤ						
FRICATIVE			f	v	θ	ð	s	z	ʃ	ʒ					h	
APPROXIM.							r					j		w		
LATERAL							l									

Table 1. English consonant sounds

2.5. BASIC PHONOLOGICAL DIFFERENCES BETWEEN SPANISH AND ENGLISH.

Every language has its own phonological system that defines it. The phonological systems of Spanish and English have some differences that present difficulties for people who study them as a second language. The differences between Spanish and English are reflected in many areas. For this study we are interested in the following three areas:

1. The phonemes.

2. The allophones of these phonemes.

3. The groupings of phonemes in each language and the rules by which they are governed.

In the study carried out in this work, we will first focus on the selected phonemes of both languages to see their characteristics, similarities and differences in Spanish and English. At the same time, we consider the allophones of the selected phonemes since for example in English there are the phonemes /s/ and /z/, but in Spanish /z/ is an allophone of /s/. That shows a feature of difficulty that has to be analysed in the data extracted from the research. And finally, it is important to see the rules of restriction of each language in the combination of phonemes in certain positions in the word, for example, we have in the final English word sound /ŋ/ which in Spanish does not exist. That is another difficulty in the process of English pronunciation by Spanish students of English.

This section will compare and analyse the differences between the segmented elements of the two languages. The following figure compares the vowel systems of English and Spanish and shows that the former has a greater variety of sounds than the latter. The higher number of vowels in English represents a difficulty for the native Spanish speakers since they have to reproduce sounds that are not in their mother tongue.

TABLA 1
Fonemas vocálicos españoles e ingleses.

		VOCALES ESPAÑOLAS		VOCALES INGLESAS		
		Anteriores	Posteriores	Anteriores	Posteriores	
Altas	(tensa)	I	u	i	u	
	(relajada)			I	ʊ	
Medias	(tensa)	e	o	e	o	
	(relajada)			ɛ	ʌ	ɔ
Bajas		a		æ	ɑ	

Tabla 2. Fonemas vocálicos españoles e ingleses. (Valenzuela, 2002). *Linguistica contrastive ingles-español: una vision general (English-Spanish contrastive linguistics: an overview).*

The comparison of consonant systems also shows that there are differences in elements. Thus, we can establish two groups in both Spanish and English:

1. Spanish phonemes that do not exist in English. The most characteristics are:

- Phoneme /ɲ/ corresponding to the spelling <ñ> (palatal nasal): paño.

- Phoneme /x/ corresponding to spelling <j> (voiceless velar fricative): jota.

- Phoneme /r/ corresponding to the spelling <rr> (multiple vibrating lateral): carro.

2. English phonemes that do not exist in Spanish as phonemes but as allophones:

- Phoneme /ʃ/ corresponding to the spelling <sh> (voiceless fricative palatoalveolar): shine.

- Phoneme /dʒ/ corresponding to the spelling <g> (voiced affricate palatoalveolar): orange.

- Phoneme /ð/ corresponding to the spelling <th> (voiced fricative dental): the.

- Phoneme /z/ corresponding to the spelling <s> (voiced dental fricative): business.

- Phoneme /v/ corresponding to the spelling <v> (voiced fricative labiodental): vet.

- Phoneme /ŋ/ corresponding to the spelling <ng> (velarized nasal): reading.

In a previous section I defined in detail what an allophone is. Summarising, an allophone is a variant of a phoneme that is influenced by the context in which the speech is produced. In context, we include both, the concomitant sounds that affect it in its pronunciation, and the speaker's speech style or regional varieties, the difference with the phoneme is that they do not change the meaning of a word. If an allophone is predictable by context, it is an allophone in complementary distribution. It means that if an allophone appears, another allophone cannot appear, e.g. [p] and [pʰ] phones are in complementary distribution because [p] is in the middle position of a word as in *spill* while [pʰ] occurs in a stressed initial syllable as in *pepper* [pʰeppe].

But, when an allophone is not predictable it means that it is an allophone in free variation, this phenomenon arises when two or more phonemes can replace each other in the same position without changing the meaning of the word or its grammatical category, e.g. *again* /əˈgen/ or /əˈgeɪn/.

In both languages the number of allophones is very large, so I will only mention those related to my study.

- /s/ and /z/ are English phonemes, but in Spanish /z/ is an allophone of /s/.

- /n/ and /ŋ/ are English phonemes, but in Spanish /ŋ/ is an allophone of /n/.

- /b/, /d/ are voiced occlusives, in Spanish they have a fricative allophone: /b/ [β] and /d/ [ð].

- /r/ in Spanish has two allophones: /r/ intervocalic [ɾ] and /r/ in the rest of positions [r].

2.6. REPRESENTING SOUNDS.

There are two ways to represent the sounds of speech. The first is the phonetic transcription, which uses alphabetic symbols to represent the sounds of speech. This is the

type of representation that we find in dictionaries to show the pronunciation of words, it is based on the alphabetic principle that gives each sound a certain symbol.

The second type of representation is based on acoustic analysis through waveforms and spectrograms, making it possible to see specific aspects of sounds individually. Its main contribution is to show that the sounds of speech are in constant change, and they are affected by the adjacent sounds.

Transcriptions generally have a linguistic status as they attempt to represent the sounds we are analysing, they are systematic, easy to use and to share with other individuals. However, the use of the Roman alphabet shows two problems, the first is that there are letters that can have different values depending on spelling conventions that are based on etymological reasons, as in <a> in *sofa* or *hat*. The other aspect that shows a problem is that not all the sounds of a language have a possible representation using the Roman alphabet, so we have <th> that represents two different sounds, on the one hand [θ] in *think* and [ð] in *this*. As a consequence of this and to unify criteria, thus making the representation and study of sounds easier, the International Phonetic Alphabet (IPA) was created. It is a set of charts with agreed upon symbols organised in rows and columns. A basic principle of IPA is that only those elements that are linguistically meaningful can be transcribed.

French and British linguists under the leadership of Paul Passy, who in 1886 founded the International Phonetic Association, created the IPA in 1888. The main idea of the IPA was to create a code of universal phonological symbols that could be applied to all languages and that would facilitate the research work of linguists and lexicographers, speech therapists as well as language teachers and translation professionals. Its function is to represent the qualities that are relevant to the pronunciation of a language, such as place of articulation, mode of articulation, separation and accentuation of words and syllables.

The International Phonetic Alphabet is composed of 107 basic symbols and 55 modifiers distributed in three categories containing different subcategories:

    1. Letters indicate the basic sounds.

- Vowels.

- Consonants.

2. Diacritics, specify sounds.

- Articulation.

- Phonation.

- Tone.

- Intonation.

- Accentuation.

3. Suprasegmental, indicate qualities of them.

- Articulation.

- Phonation.

- Tone.

- Intonation.

- Accentuation.

It basically consists of assigning a phonic symbol to each sound or speech segment, and the context in which it is found will have no relevance when defining the sound. The fact that most Latin and Greek letters are used, or modifications thereof, is due to the fact that the Latin alphabet was used as a homogenisation tool in its origin. Even so, there has been room for symbols that are not related to this Latin alphabet, such as [Ө] used to represent the consonantal bilabial click found in some languages such as Bantu or Khoisan languages.

The IPA as a working tool for professionals has had revisions and changes; between the 1890s and 1940s there were several updates, and it was not until the Kiel's convention in 1989 that it was revised again adding four letters for the vowel sounds (mid central vowels) and eliminating the voiceless implosives. The last revision was in 2005.

Doctor Miguel Domínguez Mondoñero in 1999 explains in the *Handbook of the International Phonetic Association* that replaces the *Principles of the International Phonetic Association*, whose last revision was in 1949, and that only presented a brief description, without theoretical justification, of the principles used when transcribing texts. The justification was that they were linked to the phoneme theory. *Principles* was created exclusively for the use of specialists, phonetics was not considered as a tool that could be used in the study of other linguistic fields, but it was reformed in the Kiel's convention. In his work, Domínguez Mondoñero explains how its structure is divided, and that its purpose is to serve as a tool both for linguistic professionals and for those who are not linguists. This handbook consists of three parts:

1. Introduction to the phonetic description.

2. Phonetic samples of twenty-nine languages.

3. Five appendixes with the principles approved in Kiel, the codes for the use of the IPA in computerised systems, an extension of the IPA for pathological speech, a brief history of the Association, and finally large-scale tables with the official number of each IPA symbol.

Francis Nolan, Peter Ladefoged, Ian Maddieson, among other authors, contributed by providing different points of view and proposing aspects to be considered. The IPA raises the understanding of speech as a sequence of sounds that is susceptible to being segmented into a closed set of units that are combined in different ways in order to cover all possible expressions of a language.

Despite its new approaches in the field of phonetic transcription, the roots of the Handbook remain in the tradition of two types of transcriptions: The extensive transcription, which consists of the annexation of the most frequent phonetic features. And the narrow transcription that provides more accurate details of the phonetics the phonetic realisation. This last type includes the transcription of the allophones. The representation of letters is done with the lower case leaving the use of capital letters for archiphonemes and natural

classes of phonemes as wildcards: <C> for consonant, <V> for vowel, <T> for tone, <N> for nasal, among other examples.

There are two main types of IPA transcription:

1. [square brackets] for phonetic notations.

2. /slashes/ for phonemic notations.

The International Phonetic Alphabet divides letter symbols into three categories (tables are found on the next page):

1. Infraglottal or egress (lung) consonants. They are articulated exhaling air from the lungs. In 2005 International Phonetic Association approved a new phonetic symbol to represent a sound found in the languages spoken in central and southeastern Africa. IPA´s chart in 2005 is:

THE INTERNATIONAL PHONETIC ALPHABET (revised to 2005)

CONSONANTS (PULMONIC)   © 2005 IPA

	Bilabial	Labiodental	Dental	Alveolar	Postalveolar	Retroflex	Palatal	Velar	Uvular	Pharyngeal	Glottal
Plosive	p b			t d		ʈ ɖ	c ɟ	k ɡ	q ɢ		ʔ
Nasal	m	ɱ		n		ɳ	ɲ	ŋ	N		
Trill	ʙ			r					R		
Tap or Flap		ⱱ		ɾ		ɽ					
Fricative	ɸ β	f v	θ ð	s z	ʃ ʒ	ʂ ʐ	ç ʝ	x ɣ	χ ʁ	ħ ʕ	h ɦ
Lateral fricative				ɬ ɮ							
Approximant		ʋ		ɹ		ɻ	j	ɰ			
Lateral approximant				l		ɭ	ʎ	L			

Where symbols appear in pairs, the one to the right represents a voiced consonant. Shaded areas denote articulations judged impossible.

Chart 1. IPA 2005. wikipedia.org/wiki/International Phonetic Alphabet.

2. Supraglottal or intrusive (non-lung) consonants.

3. Vowels, the IPA defines them as a sound produced in the nucleus of a syllable.

It also indicates which diacritical sounds are used to show a more specific description of pronunciation, they are represented by small marks in the letter at issue. This International Phonetic Alphabet covered the description of suprasegmental elements such as prosodic

tone and stress, rhythm, length and intonation (the chart of these elements can be found on page 79).

IPA coexists with the Americanist Phonetic Alphabet (APA) that has a more extensive use in the United States of America. Its origin is in the interest in studying the indigenous languages of America that, due to the orthography being different, necessitated the creation of a system that could transcribe them phonetically. It should be noted that some of the symbols used in phonetic transcription by the APA are no longer used in the IPA.

We will apply the IPA in our study and, as can be seen in the table below, we notice that their signs are presented in 5 charts. There is a sixth chart which appears above with the Pulmonic Consonants and which we do not include here:

1. Pulmonic Consonants.

2. Non-Pulmonic Consonants.

3. The Vowels.

4. The suprasegmental elements (tonality, intensity, and length).

5. Diacritics.

6. Other symbols are those that include coarticulations and strange articulation points.

THE INTERNATIONAL PHONETIC ALPHABET (revised to 2018).

Chart.2. IPA 2018 wikimedia.org/wikipedia/commons/8/8e/IPA_chart_2018.pdf

The aspect of how to deal with Oral Corpus is defined in Joaquín Llisterri's article "Transcripción, etiquetado y codificación de corpus orales" ["Transcription, labelling and codification of oral corpus"] (1999), which deals with three aspects or levels of representation: orthographic transcriptions, phonetic representations and labelling. We are going to focus on the second level, the phonetic representations of the oral corpus. The first thing that stands out is the validity of the approaches that Johansson made in the context of the Text Encoding Initiative (TEI), which is a project for the digital representation of texts. It is included in the research guidelines of the digital humanities, whose influence on the creation of linguistic corpora is essential. Also, it uses a metalanguage that is XML (eXtensible Markup Language), which suggests that the degree of phonetic detail provided in the transcription goes from none to a very high grade of phonetic and phonemic transcription. And because of this high degree of detail, it is necessary to use a specialised writing system and here the IPA shows its full value as a descriptive tool.

The arrival of digital media has resulted in the need to develop procedures adapted to them to perform the analysis of the oral corpus. In this way, we have the computerised version of the IPA that is the SAMPA (SAM Phonetic Alphabet). It is used in the study of European languages at the time of making a phonological transcription. This programme, with details, is explained further down.

Therefore, we see that at the time of the phonetic representation of the segmental elements IPA is shown as a basic tool that at the end of the decade of the '80s of the last century was supported by the development of a coding system for its symbols. Each IPA symbol was assigned a number that could also be realised with the ASCII codes formed by Esling 1988, 1990; IPA 1989; Esling and Gaylord 1993. The equivalences between these IPA numbers and the ASCII codes conform to the conventions known as Computer Representation of Individual Languages, which emerged from the 1991 IFA congress in Kiel.

SAMPA, which is a computerised phonetic transcription system, has its origin in the ESPRIT 1541 SAM-Speech Assessment Methods project, which was carried out between 1987 and 1989. Versions were made, which were gradually incorporated into the SAMPA for the different European languages, and so Spanish was incorporated in 1993. Three years later, in 1996, it was applied to the languages of Eastern Europe under the BABEL project, which is a system developed for the transcription of the multiple corpus EUROM and the ONOMASTICA project, the latter focused on the transcription of proper names of different European languages.

SAMPA is ruled by the phonological principle when making transcriptions. It has an extension called X-SAMPA, created by Wells in 1994, whose main characteristic is to cover those elements of the IPA that the SAMPA does not have. Another valuable tool that is currently available is the Wordbet that studies in more detail different elements and provides more information. Its task is to provide the transcription of multilingual databases that cover in addition to European, African, Indian and Asian languages.

The tool called CPA (Computer Phonetic Alphabet) arose within the ESPRIT Linguistic Analysis of European Languages project in 1987. And finally, we point out the existence of PHONASCII, created by Allen in 1988. It uses UNIBET, which is a set of phonological symbols combined with a phonetic alphabet that provides a more precise detail of the transcription.

One aspect to highlight is that there are different types and levels of transcriptions. The transcriptions can vary depending on the different needs that originate them. We can find narrow transcriptions where many details are analysed and described in a large number of explanatory notes. It is typical of the memos that remind us of what we have heard; broad transcription where the work is focused on a relevant aspect; simple transcription that uses familiar Roman letter shapes in preference to non-Roman letter shapes; comparative transcription that compares the different varieties of a single sound, like the Scottish and the Irish; systematic transcription uses a limited number of symbols; phonemic transcription based on the idea that a linguistically meaningful sound is represented by a given symbol. It is always systematic; allophonic transcription which, together with

phonemic transcription, forms the basis of the phonemic analysis of speech; and finally, impressionistic transcription which is used by the IPA to carry out a more detailed study. When using this tool, whatever type of transcription it is, what we have to plan in advance is which one is the most suitable for the tasks we have.

In order to make the transcriptions, the use of technology makes it possible to convert the changes in air pressure, which occur in the airflow through the vowel tract, into static images analysed by our brain processes as electrical signals. This is known as acoustic phonetics and is represented in two different ways: waveforms and spectrograms, both of which show particular aspects of speech detail and can be used for transcription.

> Waveforms are a kind of graph. Graphs have an x-axis, which runs horizontally, and a y-axis, which runs vertically. In waveforms of speech, the x-axis represents time and is usually scaled in seconds or milliseconds, while the y-axis shows (to simplify a great deal) amplitude, a representation of loudness.

> Spectrograms are pictures of speech: in spy movies they are often called 'voiceprints' which, although inaccurate,[2] conveys the idea that it shows a picture of someone speaking.

> Spectrograms provide more complex information than waveforms. Time, as in waveforms, is marked on the x-axis. The y-axis shows frequency. Amplitude is reflected in darkness: the louder a given component in the speech signal is, the darker it appears on the spectrogram.

> A spectrogram is three-dimensional because it shows three factors: time on the horizontal axis, frequency on the vertical axis, and amplitude by shading.

> There are three types of sounds, corresponding to three different acoustic categories, which are clearly differentiated in the spectrogram: Periodic, that which is repeated periodically; Aperiodic, which is random and can be continuous; and Transient, understanding by transient those sounds that are short and momentary (Ogden: 30-31).
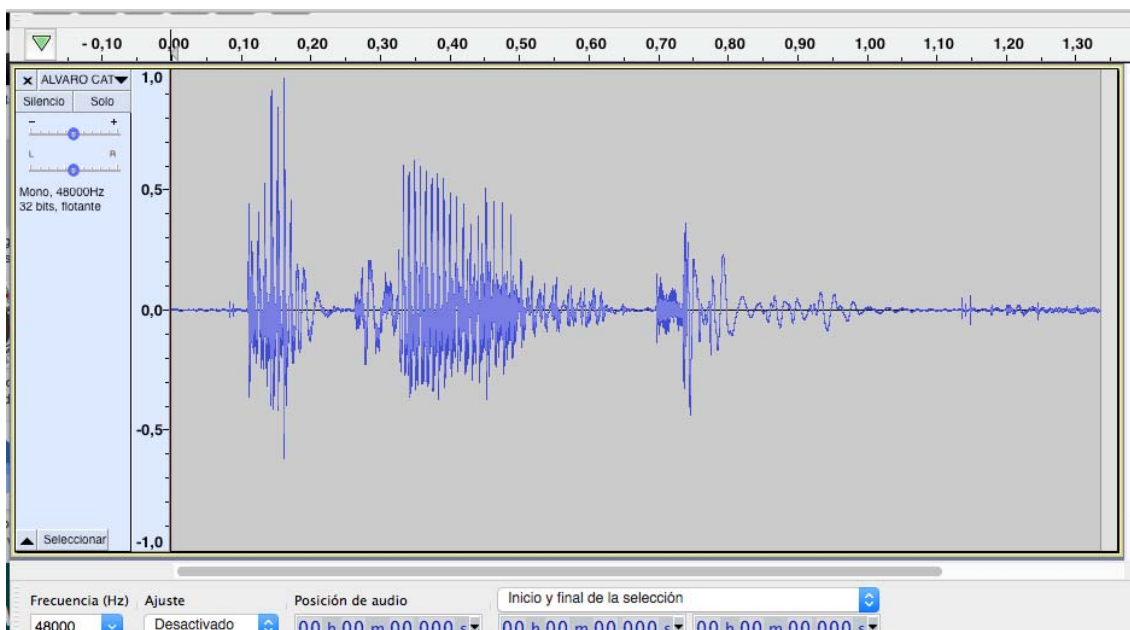
Fig. 5. Spectrogram corresponding to the word *Appeared*.

We observe in dark grey components with more amplitude values, and lighter shades of grey components with lower amplitude values, silence has no amplitude. The greater amplitude corresponds to the open vowel <a>, while the pronunciation of the second syllable decreases its amplitude and we observe that the darker area corresponds to the plosive consonants. At the end, there is another dark area corresponding to the plosive consonant of the past.

CHAPTER 3. CONTRASTIVE ANALYSIS.

The comparative studies are included in the Comparative Historical Linguistics. Jacek Fisiak in his paper "Some Introductory Notes Concerning Contrastive Linguistics"(included in *Contrastive Linguistics and the Language Teacher* [1981]) makes a historical review of the CA and its importance in the field of Linguistics. Comparative Historical Linguistics encompasses the comparative studies that have been carried out in the field of linguistics over the years. Its purpose was the study of a language in different periods or the study of several similar languages comparing them, always with the aim of finding what is known as proto-language. The classification of these languages into different typological groups is done with Comparative Typological Linguistics.

In the 1940s, the term Contrastive Analysis or Contrastive Study began to be used to refer to studies between two or more languages to contrast their similarities and differences. This is included in the field of Second Language Acquisition (SLA), which became very important after the Second World War. The Synchronic Comparative Linguistics includes both typological and comparative studies, since they share the same interest in synchronously comparing languages, although for different purposes.

It was at the beginning of the 19th century that scientific rigour was applied to comparative language studies. The studies were carried out in different countries; among the American scholars is the figure of Charles H. Grandgent who in 1892 published *German and English sounds*, where he made a phonological comparison between those languages. In 1894 in Germany, Wilhelm Viëtor stood out with his study *Element der Phonetik des Deutschen, Englischen und Französischen* [*Element of phonetics of German, English and French*]. In France the figure of Paul Passy stands out in 1906, the year of the publication of his study *Petite phonétique comparée des principales langues européen* [*Small comparative phonetics of the main European languages*]. In the United Kingdom Daniel Jones published *Out Line of English Phonetics* in 1918. The inter-war period was also fruitful in this field, examples of it are the works of P. Genévrier Précis *De phonéthique comparée française et anglaise et manuel de prononciation française a l'usagé dés étudiants angloaxons* [Summary of French and English Comparative Phonetics and French

Pronunciation Manual for Anglo-Saxon Students] in 1927, or Yuen Ran Chac's *A Preliminary Study of English Intonation with American variants and its Chinese Equivalents* published in 1933. All of these studies were included in the general context of linguistics and were not understood as a contrastive linguistic discipline. It was not until 1945 that, thanks to the studies of Fries, this new discipline was promoted and with it the idea of pedagogic and contrastive linguistics.

Bloomfield's studies of second language learning in the first half of the 20th century are the basis for the studies that were developed later in the field of CA. He describes learning a second language as a process of imitation, memorisation, and reinforcement that can be either positive or negative. He died before Contrastive Analysis (CA) and Contrastive Analysis Hypothesis (CAH) began to have the importance that they have today and, as Margaret Thomas (2002) points out, Bloomfieldian behaviourism did not automatically adopt the postulates of CA.

Linguists began to work in the field of contrastive linguistics. For Jan Rusiecki, *Development of Contrastive Linguistics* (1976), the objective of contrastive linguistics is to compare two languages or groups of languages to describe them. The purpose of these analyses is more practical than theoretical. The reason is their application to SLA, and those contrastive linguistics and contrastive analysis are limited to the field of applied studies.

From Fisiak's point of view the concept of Contrastive Linguistics is unfortunate. For him:

> Contrastive Linguistics may roughly be defined as a subdiscipline of linguistics concerned with the comparison of two or more languages or subsystems of languages in order to determine both the differences and similarities between them (Fisiak [Fisiak et al, 1978; cf Hackson, 1976] 1981].

There are two types of contrastive analysis: theoretical and applied. The first focuses on designing a model for comparing languages and on which elements to analyse. It works with universals and in the field of phonology with phonological primes, analysing in two or more languages how certain features work. It works more, although not exclusively, on

the surface representation of languages, the reason being that the student generally faces this before working on the underlying interpretation and being able to develop adequate competence in its use. Also, this focusses on how one universal category works in two languages. There is no interest in how the two languages interact with each other.

Concerning applied contrastive studies; there are two aspects to be considered. First, when performing a contrastive study of two languages it wants to draw a series of conclusions that can be applied to different fields such as teaching or translation. It differs from the above in the sense that here they observe how two features work, one in each language, and how through the comparison of the data a series of linguistic consequences can be deduced.

Second, in the identification of problematic areas in the target language (TL) comparing the languages. This could happen because there is no such feature in the surface of the TL or because there is an interference with the NL. For this reason, applied contrastive studies have to analyse both the differences and the similarities between the languages subject to comparison because, as will be explained later, both are sources of problems.

There are many definitions of CA; among them are three classic definitions. The first is by Lado (1957) in which he explains that it is possible to analyse what learning difficulties the students of a language could find by comparing their mother language and the target one, also the cultures they represent. His work focuses on a combination of applied linguistics and analysis of culture. Hammer and Rice, who in 1965 show the positive and negative aspects of CA as a discipline, give the second definition. They think that data analysis provides information about the language that helps the elaboration of teaching texts and facilitates the work of the teacher in class preparation. The third and last definition comes from Nickel in 1971, perhaps the closest to what is understood as CA today. He says it is a discipline that, when comparing languages, offers data that improves the teaching of a second language.

CA has had other names over the years. Among these names are "linguistic comparison" by Lado in 1953; "bilingual description" by Haugen in1954; "comparative analysis of the

structural patterns of the two languages" by Sitachitts in 1955; "interlingual comparison" by Politzer and "contrasting the structures of native and target language in the teaching process" by Penzl, both in 1958; "parallel descriptive structural analysis" by Fries in 1959; "synchronic descriptive comparisons of language" by Lado in 1960 and "descriptive comparisons" by Catford in1968.

As will be explained later, this linguistic approach that compares two languages to analyse them has had periods of greater acceptance and others of complete abandonment. Thus, in the 40s and 50s of the 20th Century, the studies of Contrastive Analysis arose thanks to American structuralism and conductive psychology. After this period of splendour that reaches up to the sixties, there was a decline that led to the abandonment of this linguistic approach until it was taken up again but refine aspects that were not adequate in the comparative analysis of two languages. In order to facilitate the learning of a second language (L2) the contrasted analyses became the base stone.

3.1. BASIC CONCEPTS OF CONTRASTIVE ANALYSIS.

Contrastive Analysis (CA) arises as an attempt to find a theoretical explanation for the errors that occur in language learning and the search for solutions to them. It is based on the idea that by comparing two languages, the mother language and the target language, it is possible to predict the possible mistakes that students may make in their learning due to the interference that the mother language causes on the target one. In 1970 Whiteman described this comparative analysis based on four steps:

1. Formal description of the L1 and L2

2. Selection of the features to be studied.

3. Comparison of the differences and similarities between the two languages.

4. Prediction of the errors that might occur.

It has a psycholinguistic aspect that is based on Conductivism and therefore the L2 as the L1 has a process based on the creation of habits that come from the imitation and repetition of patterns, and in addition to the reinforcement of the correct responses of the individual.

Some researchers share this point of view. They argue that the learning mechanisms of L2 are the same as those of L1 and, therefore, this affects the methodology applied to foreign language teaching.

For the CA study, linguists generally use a set of terms, although there are some authors who, because of their research, prefer to use others that are more precise and more accurate for their needs. Some of the most common ones are explained below.

When comparing two languages, the terms mother language, mother tongue or L1 and target language or L2 are generally used. Mother language/tongue is the language to which a person is exposed from birth. It is also called L1 or native language, although the latter also refers to an ethnic group. Target Language or L2 is the foreign language that a person intends to learn. It is different from native language.

A Native Speaker or L1 speaker is the person who speaks a language in which he or she has been immersed since birth. The pattern of language use of the native speaker is considered valid and a model to be achieved by those who study it. The native speakers do not necessarily have a deep knowledge of the grammatical rules of their language but have an intuitive knowledge of them. On the other hand, speakers are the people who undertake learning a language that is not their own and try to communicate with other people.

CA studies try to explain that there is an influence from L1 on L2. Selinker calls this one "transfer." Therefore, language transfer occurs when linguistic characteristics of the mother tongue are applied to the target language in its learning. There is a positive or negative transfer and it is considered the reason for the mistakes made by the students; this idea is discussed by some linguists and accepted by others, but what is certain is there is always an influence on the target language from the mother language.

Inevitably linked to Contrastive Analysis is Error Analysis and its consequences on SLA. A differentiation is made between "error" and "mistake". In the context of applied linguistics, the error arises when the L2 student, due to unfamiliarity with the rules that govern it, deviates from them, while the second is a speech performance error, and it is not studied from a linguistic point of view. At first, an error was considered a negative and

harmful element but now it is considered a positive element on which to base and design the teaching and learning strategy of L2. Pit Corder was the first to note its usefulness in L2 learning, and set the basis for its study to develop teaching and learning strategies. On the other hand, it has to do with Interlanguage since, as Douglas Brown (2007) points out, its presence may have to do with the interlanguage competence of the student. Teachers handle students' errors thanks to "error treatment", they do it either by reinforcing in a positive or negative way the student's response or by helping students to have more autonomy when it comes to analysing their errors.

The term crosslinguistic relating to the comparison of two or more different languages, is what CA does in order to find the difficulties students of L2 could find, and then tries to solve them.

3.2. CONTRASTIVE ANALYSIS HYPOTHESIS AND VARIANTS.

Several linguists creating different theories have studied the field of Contrast Analysis. Each of them has contributed to new aspects of the study. Some of these theories are Contrastive Analysis Hypothesis (CAH), Sapir-Whorf hypothesis, and language-Acquisition Device Hypothesis. Focusing on CAH, it should be noted that it is of special interest in the field of teaching but presents many difficulties in practice, so that the value of its results for both teachers and curriculum can be questioned.

In learning a second language we can basically identify two hypotheses: identity hypothesis and contrastive hypothesis. The first is based on the idea that L2 learning is not, or is hardly, influenced by L1 while the second hypothesis states the opposite, that L2 learning is influenced by L1. To study this last hypothesis, linguists use different assessments such as Contrast Analysis; Error Analysis; Performance Analysis; and Dialogue Analysis. We will focus on the first of these in this chapter. Comparing languages in order to observe and analyse common features and differences among languages motivated contrast analysis. The aim was to facilitate language learning (Larsen-Freeman 1999).

In the 1950s and 1960s the works of Charles Fries, "Teaching and learning English as a second language" (1945) and his disciple Robert Lado, *Linguistics across cultures: Applied linguistics for language teachers* (1957) are seminal in the proposal of Contrastive Analysis Hypothesis. The Hypothesis of Contrastive Analysis is one of the most important frameworks in which studies of the processes of Second Language Acquisition (SLA) have been developed. It includes aspects of behaviourist psychology and structural linguistics since both provide an important point of view in SLA.

Defenders of the identity hypothesis are Jakobovits and Ervin-Tripp among others, while supporters of the contrastive hypothesis are Lado and Fries. What we understand by "contrastive hypothesis" is the theory itself, while by "contrastive analysis" we mean the method of implementation of the hypothesis, which is why Contrastive Hypothesis Analysis is the union of both.

The Contrastive Analysis Hypothesis considers transfer as a basic mechanism in the learning process of L2, where the analysis of the error is important to understand. In this regard, Brown (2007) says that despite the criticism suffered by the CA there is no doubt about its capacity to explain the errors and the problems.

Comparing the mother tongue with the target tongue, the linguist notes a number of similarities and differences between them and can hypothesise which features will be easier to learn and perform and those which will be more difficult. As mentioned above, this is where the factor of interference of L1 into L2 appears and its reasons and consequences can be both positive and negative. If there are no interferences, no predictions will be made, and the transfer from the mother tongue to the target language will be carried out without problems. The hypotheses will be generated when there is a negative interference that produces errors in the learning of the L2 and these factors will be studied and the causes analysed to solve it. This is the analysis process that Whitman designed in 1970.

"Teaching and learning English as a second language" is the product of Fries' vision about the dichotomy that affected second language learning. There were two positions; a

conservative and traditional position followed by the traditional grammarians, and a new wave of structuralists linguists who focused their work on a descriptive analysis of language.

He explains in the Preface of his paper mentioned above that his intention is to apply the principles of modern linguistics, and the results of scientific linguistic research to the field of teaching English as a second language. He states that the interest in seeking a new approach to language teaching arose from the World War, and it is from this time that the importance of language teaching is seen from a practical, scientific and systematic point of view. And this is the reason why he creates an approach that elaborated new teaching materials to provide the student with tools for learning.

In relation to material development, Fries recognises the importance of contrastive studies in language teaching, both in terms of methodology and materials. He writes:

> The most efficient materials are those that are based upon a scientific description of the language to be learned, carefully compared with a parallel description of the native language of the learner (Fisiak [Fries 1945] 1981:4).

A fundamental aspect for Fries is the need for the English Second Language (ESL) teachers to know the sound system, the structural system and the vocabulary of the language he or she teaches. Also, they need to apply a descriptive analysis from a perspective framed in modern linguistic science.

And fundamental point in SLA is habit acquisition. It is closely linked to the behavioural school since they believed that, as in other fields, in linguistics the acquisition of habits is done through a concatenation of stimuli that conditions the response. When these habits are positively reinforced, they are resolved. The way to create habits is through exercises of memorisation of dialogues, imitation and practice of models. And this is linked with CA since comparing the two languages makes it possible to prevent the problems, to find the solution to them and to create positive habits (Larsen-Freeman 1999).

To Fries, the psychological perspective is important since he believes that every language is a set of communicative habits, which affect both the emission and the reception of speech. Hence the so-called "Oral Approach" is the goal to be achieved in the first stage of learning through the construction of such communicative habits. As early as 1927, he stated that a speaker should focus on clearly expressing his ideas by choosing and organising the materials that support them, while everything related to the grammatical apparatus will arise automatically. His theory for learning a second language is based on the fact that it is necessary to establish oral patterns as subconscious habits. In *Pattern Practice Materials* (1953), carried out in collaboration with Lado, he establishes a series of exercises based on a pattern where a different element is changed each time, so the student can reproduce different sentences without falling into repetition, thus creating the necessary habits for learning.

Other linguists have questioned some of Fries' postulates. This is partly because of the relevance that transformational linguistics and cognitive psychology have subsequently taken on in applied linguistics and language teaching. Fries' theory is criticised in Selinker, Morley, Wallace, Robinett and Devon (1984). They analyse Fries' theory and observe that it has been blamed for the lack of empirical foundations in it. Although in Selinker's opinion, this criticism does not take into account two realities. First, Fries' theory states that the mastery of a language is a matter of practice. Second, tools used for researching the teaching and learning of a second language in all its aspects were not available at the time when Fries developed his theory. Besides, empirical research was not an indispensable requirement when he developed his work.

On the other hand, Selinker, Morley, Wallace, Robinett and Devon (1968) argue that Fries' view of "applying theory to the solution of practical problems" is wrong. These authors believe that a more objective criterion for analysing problems would be to establish "criteria for success" in a theory and "criteria for success" in a practical problem.

There is another group of criticisms centred on the general way in which Fries argues his ideas:

Truism → Conclusion = Fact

It is understood for *truism* "an undoubted or self-evident truth" (Merriam-Webster Dictionary).

Going back to Fries' theory the following quotation will help us to understand what Fries' argument is:

> Very early as small children we master the sound system of our language. We learn to hear the significant sounds in sequences that become familiar, and then to produce these significant sounds and sound sequence with amazing accuracy. This mastery of the sound system of our native language has (for all of us without noticeable speech defects) become entirely unconscious and, like the ability to walk, we cannot remember the learning process. The same thing is true concerning our mastery of the use of the devices which our language uses structurally - the fundamental matters of word-order and the patterns of form. These we learn to use automatically and they are not items of conscious choice. The ordinary adult speaker of English finds it extremely difficult to describe what he does in these matters, so thoroughly have they become unconscious habits in early childhood. But in matters of vocabulary the situation is entirely different. The "words" one knows depend upon the experience one has had. A child's experience is much limited in its range. His vocabulary is therefore greatly limited. But he continually grows in experience and also in the vocabulary that necessarily accompanies new experiences... (Selinker & et [Fries 1945] 1984).

Based on the above, Fries writes his conclusions, which are as follows:

> In learning a new language, then, the chief problem is not at first that of learning vocabulary items. It is, first, the mastery of the sound system - to understand the stream of speech, to hear the distinctive sound features and to approximate their production. It is, second, the mastery of the features of arrangement that constitute the structure of the language. These are the matters that the native speaker as a child has early acquired as unconscious habits; they must become automatic habits of the adult learner of a new language (Selinker & et [Fries 1945] 1984).

Therefore, in his argument Fries compares learning the native language with learning a second language. He observes that the child learns the sounds of his or her mother tongue

in a natural and unconscious way, allowing him to reproduce and communicate them, and the same happens when he or she reproduces the structural patterns of the language, for example the word order. He thinks this is because unconscious habits are acquired from the beginning of the learning of the mother tongue. Concerning the vocabulary learned, the situation is different since it will depend mainly on the experiences and exposure to it, a child will have a limited vocabulary that, through the extension of experiences, will enrich it.

Based on the above, Fries establishes two fundamental points in the learning of a second language by an adult. The first is the mastery of the sound system, and the second is the mastery of features of arrangement that form the structure of the language. Therefore, learning material has to be developed to allow the creation of automatic habits for both the sound system and the structural system.

Just as for some linguists there is an idea of an analogy between the acquisition of the native language by children and the acquisition of a second language by adults, some scholars like Saporta (1965, 1966) criticise it. They believe that adult education cannot be designed only based on a possible analogy with the process of learning that the children have in the mother tongue.

As has been said before, Fries theories are the pillar of contrastive analysis studies. His approach is that learning a second language is based on teaching it to students who already have their native language background. It leads him to assert that the most suitable materials for this purpose will be those based on a scientific description of the second language, compared to the parallel description of the learner's mother tongue.

Besides, concerning the importance of the systematic errors, Fries' studies in the first half of the twentieth century are fundamental to understanding the importance in the learning process of an L2, because students can learn from them. Marcel Danesi (1985) highlights the pioneering studies of Fries, for which all are in debt to a greater or lesser extent.

Marcel Danesi in his article "Charles Fries and Contrastive Analysis", included in the book *Toward an Understanding of Language: Charles Carpenter Fries in Perspective* (Fries

1985:227), points out the importance of the studies of Fries in the 1940s and 1950s, *American English Grammar* (1940) and *The Structure of English* (1952), which allow us to understand contrastive analysis as we understand it today. Six fundamental principles are established in Fries´ theory:

1. Learning the mother tongue is different from learning a second language when the student is an adult.

2. Native language is a determining factor in how the second language will be learned.

3. The teaching and learning of a second language have to be based on material and strategies that have a scientific description of the target language compared to a parallel description of the mother language.

4. Compare L1 and L2 to identify and select the material to be taught.

5. Achieve success in teaching and learning L2.

6. Understand the culture of the L2 for greater improvement of the communicative capacity.

We can infer, from the first principle, that this constitutes the heart of contrastive analysis. For Fries, learning L2 comes from the acquisition of new linguistic habits that have no connection with those already possessed by the student coming from his or her mother tongue. Understanding the "habits" gives the student the ability to perform a linguistic action without being aware of it, in other words, "habits" cannot be related with behaviouristic psychology, fundamentally because the contrastive analysis is not psycholinguist. Fries, with regard to the materials to be used in the learning of L2, points out that these cannot be the same as those used by the learner when learning his or her mother tongue since in this case, he uses the so-called "natural´ method".

Its second principle comes directly from the first since it states that how the mother language has been learned will be decisive when it comes to learning L2. For him, it is an advantage to transfer the native language to the target language although he recognises that in the same way, it can produce what he calls "blind spots" especially in the initial stages of learning.

The third principle, based on the structuralism principles of linguistic analysis, contains the term "scientific", which for Fries has a double aspect. On the one hand, it means that the tests and exercises based on the principle of trial and error have to be eliminated, because they are not reliable to identify and analyse the difficulties presented in the process of learning. On the other hand, it suggests that the structural and lexical approach has to be descriptive since it should be seen how the native speaker naturally uses the language.

The fourth principle is based on Fries' idea that contrastive analysis is a heuristic device that allows the student to identify, select and dispose of the lexical and linguistic elements from his or her NL into the TL. The student's knowledge of his or her native language helps him, and this is the basis for the elaboration of learning material but it is not the material itself. Although the concept of hierarchies of the difficulties appears here, thus brought and brings controversy to its application as it is not possible to know the level of difficulty, Fries unequivocally establishes that the purpose of the contrastive analysis is the organisation of the materials in a coherent way within a corpus.

The fifth relates to the previous principle; once the teacher has already focused on what has to be taught, based on the comparison of both languages, he or she should move on to the most important point which is the improvement of the target language, and for this they use what Fries calls "oral approach". This "oral approach" mentioned above is based on what the student is able to do with what he or she learned every day because the student should use the language orally in the appropriate context. For this, the learning material has to be pertinent, and the contrastive analysis is valuable because it participates in the process of selecting it. And the most important thing that Fries says is that in order to obtain mastering the task language the four skills, reading, speaking, listening, and writing, need to form a unified corpus in the learning and should not be broken down individually. Also, the practice of target language is not the only repetition of patterns, but has to be monitored by the automatic control of the significant contrasts of it and should be spontaneous in its production and consciousness of it.

The sixth and last principle, supposes the culmination of all the process of learning; the student understands the uses and cultural stereotypes of the L2, and this understanding

facilitates communication without ambiguities and misunderstandings. In fact, although contrastive analysis focuses on linguistic and lexical aspects, it does not neglect the analysis of the cultural differences given by the linguistic and lexical uses that each speaker has in L1 and L2. This is why Fries insists on the need to join psychological and sociological nuances involved in the structural and lexical patterns of the target language. Danesi states that Fries actually emphasises the importance of cultural content and that what he really advocates is that contrastive analysis is `pragmalinguistic´.

As mentioned above, another important linguist in this field is Lado, a disciple of Fries, who writes a fundamental trilogy in this area: *Linguistic across cultures* (1957), *Language Testing* (1961), and *Language Teaching* (1964). The initial postulates proposed by this author have been modified down through the years as the studies in this field evolve. An example of these new approaches it is what is called "Chomskyan revolution". This approach differs from Lado´s point of view because it is basically neo-rationalist, and left aside the importance of the acquisition of habits. Chomsky argues that the problems of grammatical construction and repetition of sounds cannot be solved through contrastive studies. This point of view led thinking until the sixties, that contrastive linguistics did not have a relevant role in language learning. It is from Filmore in 1966 and Chafe in 1970, when the post-transformational period is opened, that contrastive linguistics is promoted again.

Coming back to Lado´s work, in his book *Linguistics across cultures: Applied linguistics for language teachers* (1957) he publishes his ideas to facilitate the teaching practice where some linguistics observations have a new approach. The point of this work is that any person learning a language tends to transfer linguistic elements from their native language to the target one. That is the reason why teachers have to be able to compare both languages.

Lado's work shows how to make comparisons between different languages in different fields of study. It explains how to compare two sounds systems, two grammatical structures, two vocabulary systems, two writing systems and two cultures to achieve the mastering in the language.

Therefore, it is through this comparison of the NL with the TL that learning difficulties will be discovered and predicted as Fries explains:

> the student who comes in contact with a foreign language will find some features of it quite easy and others extremely difficult. Those elements that are similar to his native language will be simple for him, and those elements that are different will be difficult. The teacher who has made a comparison of a foreign language with the native language of the student will know better what the real learning proms are and can better provide for teaching them ´ (Fisiak [Fries 1945] 1981:4).

This idea says that similar features will not be complicated in their learning while different features will be. It was very controversial, in both America and Europe, from the 60's of the last century. In fact, studies have shown that both types of features can be difficult to learn.

All comparative language studies need material and in this regard Robert Lado, as well as Fries, defends the effectiveness of materials that are based on a scientific description of the L2. Although in his work he exposes a series of universal tools to compare any kind of languages, the truth is that he has a special interest in the comparison of Spanish and English because they are the two languages that the author and his colleagues use most frequently. The fact that the teaching of two languages is encouraged by comparing them in all the mentioned aspects does not mean that the direct-method, aural-oral approach, is not considered in the acquisition of a second language.

Then the teacher should pay special attention to the pronunciation and grammatical problems presented by the students and not give too much emphasis to the similar or common characteristics in both. This means that a second language should not be taught as if it were the native language. In the article written by Lado "Contrastive Linguistics in a Mentalistic Theory of Language Learning" (1965) the importance of contrastive linguistics is analysed, and two important points are also pointed out: the first is that transformational grammar does not explain all the difficulties of the student when acquiring a structure; the second is a negative assessment of transformational generative grammar based on the analysis of isolated sentences. Lado's opinion is that a grammatical explanation has to be

based on sequences of sentences from which final rules applicable to the whole set are drawn. The above-mentioned article emphasises the need for the patterns of adaptation of the forms and meanings of the language be made according to the semantic field of thought.

Two new approaches to the problem of CA appeared in the second half of the 20th century, both come from generative-transformational theory, one rejecting CA, and the other trying to create a dominant theory that serves for prediction in the *strong version* or explanation in the *weak version*. To these two versions we should add a third, proposed by Oller and Ziahosseiny; the *moderate version* which they summarise as "the categorization of abstract and concrete patterns according to their perceived similarities and differences is the basis for learning; therefore, wherever patterns are minimally distinct inform or meaning in one or more systems, confusion may result" (1970: 186).

The *strong version* aims to predict areas of difficulty for students based on the contrastive analysis of two languages. There are two notions here: positive transfer and negative transfer (also known as interference from L1). The *weak version* tries to explain aposteriori why students make some mistakes based on our knowledge of languages.

Both versions present difficulties for linguists to the extent that there is a trend that questions the usefulness of CA. Lado argues that by comparing two languages linguistically and culturally we can predict which elements will be difficult, or not, to learn and Fries considers that only materials based on scientific descriptions of the L2, once compared with the parallel description of the L1, are valid. The group of linguistics that advocates for the strong version include Bela Banathy, Edith Trager, and Carl Waddle in their work "The use of contrastive data in foreign language course development" (In A. Valdman, Ed. [1966]) argues that it is the best method to predict and explain students' errors in learning. The results obtained from the comparison of NL and TL should be the working guidelines for teachers when they develop materials that will be based on the differences between NL and TL.

The key to the strong version is its predictive character of the mistakes that the student can make and it is the teacher, from his or her knowledge of the L1 and L2, who determines the aspects that could present difficulties. And he or she can design material oriented to anticipate and solve the problems. That has been a factor that gave the teacher much notoriety in the field of the teaching of languages.

It requires the linguistics to have a set of skills that allows them to create a set of linguistic universals; these linguistic universals should be formulated within a comprehensive linguistic theory that covers syntactic, semantic and phonological aspects. The problem in the phonological aspect is that there are linguists who present contrastive statements of two languages without previously checking whether it is possible to contrast both phonemic systems. To avoid it, authors like Weinreich, prefer to work with phonemes since they are more manageable and have to do with articulatory and acoustic phenomena.

It should also be mentioned that some aspects that could be easy for learning according to CAH turn out not to be. The work of Diane Larsen-Freeman and Michael H. Long is important in this regard. Their approach in *An introduction to second language acquisition research* (2014), is that research done on SLA does not have to focus exclusively on the differences between L1 and L2, as from their point of view often the similarities between the two languages could confuse.

In the work "Second Language Acquisition Research: Staking out the Territory" Diane Larsen-Freeeman develops this idea based on the studies of other linguists such as Wode, who in "Developmental sequences in naturalistic L2 acquisition" (1978), explains that in those structures of L1 and L2 where there is great similarity there will be a situation of interference that comes from the dependence that the student has of his or her knowledge of L1. This coincides with Taylor's approach, "The use of overgeneralization and transfer learning strategies by elementary and intermediate students in ESL" (1975), who also believes transfer is a cognitive strategy that allows the student to use elements of his or her NL in the TL. But Eckman, "The markedness differential hypothesis: Theory and Applications" (1985), points out that the marked difference between both languages is an important factor. If L2 is more markedness than L1, students will have a higher difficulty

level while, on the contrary, if L2 is not more marked than L1 then that difficulty will not appear. Therefore, the degree of markedness in both languages will correspond directly to the difficulty in learning.

The arrival of Generative Linguistics with Chomsky's proposal gave a new focus to the strong version of CA; he asserts that the formation of rules is more important than the formation of habits, the latter being the point on which the strong version of CA was based. From Chomsky's point of view students who practice TL are building their hypothesis and the scheme of rules that allows them to deduce the function they need.

For him, the explanation that in the same way that a child learns his or her mother tongue he or she will acquire the target language is not valid, this is due to the fact that children have a Universal Grammar (UG) that sometimes limit their language development; this happens when the input is not adequate and they make a mistake. The UG is a set of fixed abstract principles that organise the child's language and whose parameters are different from one language to another.

Chomsky's theory on UG has had a great impact on SLA, as many authors have written about it such as Flynn, *A parameter-setting model of L2 acquisition* (1987); Grass & Schacter, *Linguistic perspectives on second language acquisition* (1989); White, "Island effects in second language acquisition among others" (1988). For this last one, UG also intervenes in the acquisition of a second language since, like a child, the adult tries to learn a language from a degenerative and limited input. For these scholars, the UG is present in the learning of a second language and therefore the resulting grammar of the student will be influenced by it.

An alternative approach is the *weak version*; Ronald Wardhaugh defined it in "The contrastive analysis hypothesis" (1970). From his point of view the *strong version* is unrealistic and non-viable, however, the *weak version* has certain aspects that can help in the learning process, although this does not mean that this version is accepted without some reticence from some linguists. It requires that linguists use their knowledge to determine the difficulties in L2, leaving aside the prediction of the problems and the listing

of those phenomena that will not present any difficulty. It is based on the observation of the interferences between both languages; they try to describe the similarities and differences between the two systems.

The systems are important in this version as there is no regression to any pre-systemic view of language, nor is there a summary classification of errors found during the investigation. Factors such as residual foreign accent and learning difficulties, among others, will be the starting point of the contrast and only the systems will explain the interferences that appear. An example of a *weak version* is the research done by Stockwell and Bowen, comparing English and Spanish in *The Sounds of English and Spanish* (1965), and in the work by Robert P. Stockwell, J. Donald Bowen and John W. Martin *The Grammatical Structures of English and Spanish* (1965). In both books the authors make a comparison of both languages and establish a scale of difficulty based more on their own experience than on predictions of problems that might appear.

Following the generative-transformational theory, Wardhaugh argues that the deep structures of languages are very similar and that someone who has learned a language already has a good deal of knowledge of the other languages he or she is learning. And that is why, since the deep structures are very similar, the differences they present are superficial. At the same time, Wardhaugh establishes that CA is of little or no help when learning a second language because the student has to learn the specific deep structures of the language and observe how they appear in the superficial structure and in the phonetic representation. And as each language is unique in the rules that shape it, any comparison between languages is not workable.

It is said before that CA tries to analyse which are the linguistic aspects that present difficulty for the L2 student, doing it from two points of view inside the CAH mentioned above: the *strong version* whose focus is to predict the problems and to analyse them and the *weak version* which starts from a position closer to the Error Analysis since it tries to explain the errors after they are produced and, from that, look for solutions. Therefore, it tries to explain the differences between the student's performance and the native model by

analysing the causes of these problems, one of the main causes being what is called language transfer from L1 to L2.

Kurt Kohn in his chapter "English as a Lingua Franca" (Annick De Houwer and Antje Wilton, 2011: 83-85), points out that the correction of non-native speakers depends on the realities in which they are immersed, which is a social constructivist model approach to English Lingua Franca (ELF). On the other hand, the behaviourism structuralists contrastive analysis approach is based on the fact that "correctness" depends on two aspects; on the one hand, the rule that has to be internalised by the student and, on the other, the performance that he or she makes of it. Social constructivist bases the success and the error in internal factors of the subject more than in external factors, and it is necessary to bear in mind that both factors do not have to be equivalent to one another, in such a way that Standard English and the native speaker's performance work as models to be followed by the L2 student and this will internalise it and will realise it in its own and individual way. This shows there is a difference between what linguists say is the correct goal to achieve in language practice and what the non-native speaker has internalised.

Khansir in his paper "Error Analysis and Second Language Acquisition" (2004), establishes that Contrastive Analysis (CA) and Error Analysis (EA) go together, in fact, they are considered branches of Applied Linguistic Science, although he does not feel that the CA is the definitive answer to the existence of errors; for him the EA also provides valuable information on this point. It is important to note how useful EA is in predicting difficulties in the process of SLA because a comparison between the errors in L2 and the L2 in itself should be done.

In addition, there is a *moderate version* of CAH which says that language interference is caused not by those aspects that are different in L1 and L2, but precisely by those that are similar enough to cause confusion. Ziahosseiny's "Questions and answers on contrastive analysis and error analysis" (2006), argues that L1 interference in L2 only affects one third of the mistakes made by students in their learning of a second language. Following this argument, he studies the cause of spelling errors among students of English as a second language, which follows the line of analysis he developed in 1970. Together with Oller in

The contrastive analysis hypothesis and spelling errors (1970), they focused on the study of spelling errors made by foreign students when learning English. To this purpose, they chose two groups of students, the first being students whose NL is another Romance language and the second being students whose mother tongues do not use the Romance alphabet, and paradoxically they found that the students in the first group presented more difficulties than those in the second group. They observe that the student establishes a series of patterns, both abstract and concrete, through learning, and that errors appear when differences in the contrasting systems are very small in both form and meaning (Khasir, 2012).

Ziahosseiny (2006), applying the weak version, points out that the phonological error is not due to the influence of the NL on the TL but that the student, not knowing the phonological system of the L2 for the moment, uses his or her own phonological system as a help, which does not mean that the L1 interferes with the L2, but that it is used as a tool to help (Khanbeiki and Abdolmanafi-Rokni 2015).

In relation to the validity of contrastive analysis in phonology, Jack C. Richard in his work "A Non-Contrastive Approach to Error Analysis" (1971), states that the fields where CA is applied are morphological, syntactic and phonological. In the first two, the ability to predict difficulties in the learning of a second language is lower than in the last. This idea is followed by MacBride Smith in his work "Some comments on the English of Eight Bilinguals" [in *A Brief Study of Spanish-English Bilingualism* (1969)], says that although it is thought that the errors made by the bilingual person come from a mixture of both languages, from his research he deduces that it is not the interference of Spanish that creates problems when the person constructs sentences and uses the language.

Richard and Renandya, *Methodology in Language Teaching* (2002), establish the main point of discussion by stating that "...the extent to which inter-language phonology is affected by L1 transfer" should be analysed. Scholars such as Brown, Kranke and Christison, Evans address the issue of the influence of transfer on the phonological aspect of second language acquisition. Brown, *Principles of language learning and teaching* (2000), argues that the foreign accent presented by adult learners of a second language is

caused by a transfer of phonological categories from NL to TL. Kranke and Christison, *Methodology in Language Teaching* (2002), argue that NL interferes with the second language system more strongly than with other systems such as grammar. Jones and Evans, *Teaching pronunciation through voice quality* (1995), talk about the need to include CA in pronunciation teaching materials, although they warn that it is a very helpful tool to predict phonological difficulties. It has the problem that since predictions are made on individual sounds and sound segments, but not for supra-segmental features, this is why the latter is not included in the methods. In his work Brown states that the most conflictive moment when learning an L2, due to the transfer from L1 to L2, are the first stages of learning. The reason for this is that the student has not yet become familiar with the L2 system and therefore is helped with the system of his or her mother tongue, as the learning progresses this situation disappears as more intra-language transfer becomes manifest.

This point of view is innovative if we compare it with what authors in the 70s and 80s of the 20th century. The aforementioned linguists argue that only the transfer from NL can explain the pronunciation errors, as opposed to other linguists such as Tarone, "The phonology of interlanguage" (1977), and Fledge, "A critical period for learning to pronounce second languages" (1987), state that the transfer is only one factor, but not the only one, since overgeneralisation, approximation, and avoidance should also be taken into account. Fledge's position is that an L2 student, when faced with a new phonological system, may opt for two solutions. If he or she finds categories similar to his or her own, he or she will tend to use the latter, but if the student finds unknown categories, he or she will tend to create new ones.

Cook, *Second language learning and language teaching* (1991), appeals to interlanguage phonology to explain why English consonant clusters are difficult for a student of English and, from his point of view, it is because interlanguage phonology is made up of rules for the formation of syllables. Therefore, in the early stages, a student usually tries to match the English syllabic structure, which he or she does not master, to that of his or her mother tongue. As a result, he or she sometimes adapts the English consonantal groups by adding vowels that do not exist (Khanbeiki and Abdolmanafi-Rokni, 2015).

Finally, I would like to mention the psycholinguistic models, where contrasted analysis based on a static vision of language is not enough to answer all the questions that arise. That is why Sajavaara (1981) explains it is necessary to draw up a mapping that shows the similarities and differences in the interactions of the speaker and the hearer in acts of communication. In this way, contextualised communication codes in speech communication processes across the languages will provide valuable information for the analysis of languages and extend the scope of contrastive analysis.

To conclude this section, it is interesting to include other works in this field of study that have contributed ideas and approaches. The grammatical aspect caught the attention of the linguists Stockwell, Bowen and Martin who wrote their proposals in *The Grammatical Structures of English and Spanish* (1965). One of the strong points of this work is the way they analyse difficult features of L2 and how they present them organised in a hierarchy thus facilitating the work of teachers and students in the progression of the learning. The hierarchy they establish is complex since they distinguish between structural and functional/semantic correspondence. Structural correspondence could be the same word order and the same represented categories. Functional/semantic correspondence could be different word order; the sentences match one-for one in having corresponding items as subject-verb-object (Stockwell, 1965: 283).

Langacker´s opinion is that the syntactic comparison of two languages must be the comparison of two sets of rules. In this comparison, each set of rules should provide structural descriptions to be applied in possible sentence constructions. This author quotes Stockwell, Bowen and Martin who write: "In theory, the aim of a contrastive structure study would be to provide just the set of rules for each language that would make it possible to analyze any pair of corresponding sentences ... string by string and rule by rule" (Langacker, 1968: 212).

In *The Grammatical Structures of English and Spanish* (1965), the authors focus their job in the transformational theory. In their opinion the teacher has to present examples in which the aspects he or she wants to teach are used. His preference for learning through

examples rather than memorising rules because the students will assimilate rules thought the examples. Therefore, they can turn to the assimilated rules whenever they need them.

In their works they observe that, as is to be expected, the student will have fewer problems in those linguistic aspects in which the L1 and L2 correspond structurally and functionally/semantically. But the difficulty will increase when one of the following assumptions occurs: when there are several forms of the L1 that correspond to only one of the L2; when there are forms in the L1 that do not exist in the L2; and finally, the new forms in the L2. They point out that the most complicated situation of learning emerges when splits appear, this happens when one form of L1 manifests as two or more in L2 (Larsen-Freeman, 1999).

Moreover, unlike Lado, Stockwell and Bowen do not establish that the greater degree of difficulty is that which corresponds to the new and absent categories, although this is to be expected. This is later corroborated by the comparative studies between English and French that in Buteau carried out in 1970, and published in "Study's error and the learning of French as a second language" (Larsen-Freeman, 1999).

Lado designed a horizontally organised contrastive analysis of systems and constructions across languages and extracting data from it. He found a series of difficulties to be overcome in learning. For this purpose, the so-called hierarchies of difficulties were established based on the fact that the differences between languages are the sources of the problems. From this emerges what is called interference, the greater the interference the greater the difficulty and vice versa. However, there is a critical attitude on the validity of establishing a hierarchy of difficulties. This is because such a hierarchy should not be based exclusively on contrastive studies (Fisiak, 1981).

In summary, contrastive analysis is applied in SLA in different language fields. Linguists apply CA to compare two languages, the student's mother tongue and the target language he or she is learning. The following section sets out some of the studies in the phonological field.

3.3. SPANISH-ENGLISH CONTRASTIVE PHONOLOGY.

Spanish and English are two of the most widely spoken languages in the world, hence it is one of the reasons for scholarly interest. There is much research in Spanish/English Contrast Analysis where the phonological aspect is as highly studied as the grammatical one. Although this study focuses on the phonological aspect, I include some works in the comparative of grammar because I understand that a global vision is necessary to explain the contrastive analysis between English and Spanish.

The acquisition of the phonological system of a second language (L2) can be described in terms of how distinctive acoustic material is organised into different abstract representations, and how the student´s native language phonetic repertoire and phonology affect the phonological system of the L2 (Olsen: 2012).

In 1956 Robert Lado analysed the sound systems of English and Spanish in his paper "A comparison of the sound systems of English and Spanish". From his studies, he concluded that the pronunciation difficulties of Native American students of Spanish as L2 tend to be solved by transferring the native sound system into Spanish. This transfer includes the phonemes, the positional variants of the phonemes and the restrictions on distribution as well as syllable patterns, word patterns and intonation patterns. And this tendency to transfer from English to Spanish is evident when the sound systems of the two languages differ. The consequence of this is that two types of errors are established when the differences are phonemic, the students say a word that they did not want instead of the correct one, and if the difference is sub-phonemic there is not a word change but a foreign effect. Lado thinks that the greatest difficulty in eradicating the errors that the student makes is because the habit is so rooted in his or her native language that it ends up being imposed on the target language.

Both vowel and consonant sounds systems make difficulties for the student. Lado gives the example of the sound [s] as in *casa, osa*, and [z] as in *desde, mismo*. In Spanish these sounds do not represent different words unlike the situation in English where the difference between both sounds do distinguish words as is explained in the following examples:

sip/zip; eyes/ice. Therefore, there is a phonemic difference while in Spanish what is produced is a sub-phonemic difference since it does not differentiate words.

With vowels, the same situation happens; where there is a transfer from L1 to L2 there is a darkness of vowels. When English weak stress is transferred to Spanish, the relaxed mid-central English vowel /ə/ is transferred with it. Lado gives the example of the word /be-ne-mé-ri-ta/ which will be pronounced incorrectly as /ben- ə-mér- ə-t ə/.He comes to two conclusions. On the one hand, he thinks it is necessary to pay more attention to these problems when teaching languages and, on the other hand, he perceives the student´s need to establish gradual progress so he or she can build new habits of pronunciation in the L2.

In the previous section, I have mentioned the work of Stockwell and Bowen, *The Sounds of English and Spanish* (1965), comparing the sounds of English and Spanish. This study was based on their personal experiences of language teaching. From that experience, they were able to measure and establish an order in the difficulties that appeared in learning relating to these languages and this facilitated the work of the teachers when they were carrying out their activity.

Langacker reviewed this work and, in his opinion, the reason why it is a text of great help for teachers is that it does not try to impose a particular orientation of how to teach Spanish to native English speakers. But it does provide information on how to apply the transfer of contrastive structural analysis of the two languages in the classroom. The book is based on the authors' personal experience of teaching Spanish and he elaborates on a hierarchy of problems and structural obstacles that English-speaking students encounter when learning Spanish and this hierarchy helps the teacher when he or she has to deal with the teaching of specific problem areas.

For Stockwell and Bowen (1965), it is important to take into consideration these three factors, phonemic contrast, conditioned variation allophone and the environment in the phonological field. Also, to establish the hierarchy of the difficulty of the phonemes, they look at the three possible scenarios that students face when they need to perform a phoneme in L2. On the one hand, the student has an optional choice among phonemes.

This choice is free, and the phoneme belongs to the whole group of available phonemes. Another situation occurs when the student has chosen the phoneme from a predetermined selection, which includes a mandatory factor in the choice, as it is not open to all phonemes. And finally, the student makes a zero choice, which happens when in one language there is a phonological element that does not exist in the other language. As an example of this Langacker writes: "they suggest that post-vocalic [β] allophone of Spanish /b/ will be harder to learn than post-vocalic [ð] allophone of /d/. [β] and [ð] are both obligatory choices in Spanish, but [β] is a zero choice in English (not occurring at all) while [ð] is an optional choice" (Langacker 1968: 211).

When Stockwell and Bowen study the differences in the vowel and consonant systems of the two languages, they conclude that when a native English speaker tries to speak Spanish, he or she tends to impose the pronunciation patterns of his or her mother language to the pronunciation patterns of Spanish in the most nearly similar Spanish phonetic sequences. In the end the analysis, with a background of two phonological systems, is reduced to a comparison of elements from both languages or what they call "two small inventories of segment types".

Several factors are involved in the learning of languages. The work by Judith Becker and Sylvia K. Fisher, "Comparison of associations to vowel speech sounds by English and Spanish speakers" (1988), provide a contrastive analysis between English and Spanish vowels, taking into account psycholinguistic factors. They start from the hypothesis developed by many psycholinguists that raises the existence of intrinsic associations that speakers make between speech sounds and different semantic dimensions. They establish that semantic associations with vowels embrace dimensions of size and brightness. Becker and Fisher applied a different method in their research when they organised 40 Native American participants and 40 Spanish native participants, and asked them to associate nonsense syllables with different dimensions. At the end of the research they concluded that no different results were obtained from those obtained with other methods, as in the following:

- /i/ as in *heed*, /I/ as in *hid*, /e/ as in *hay*, and /ɛ/ as in *head* tend to be judged as small and bright. In contrast, the vowels /a/ as in *father*, /ɔ/ as in *paw*, /o/ as in *hoed*, and /u/ as in *who* tend to be judged as large and dark. Typically, the greatest contrast is found between /i/ and /ɑ/ (1988:55).

For them, this is probably not due to the orthographic representation of the vowels but seems to be related to the manner of articulation of each vowel. On the one hand, the high, front vowels /i,I,e/ which are articulated with the tongue raised in the direction of the hard palate, towards the front of the mouth, are considered bright and small, while on the other hand, the low back vowels /ɑ, ɔ/, which are articulated with the tongue pulled towards the back of the mouth and the jaw lowered, are considered dim and large. The phonemes /i/ and / ɑ/ are considered to be the most different psychologically.

From the data extracted from their research comparing the American student group with the Spanish student group, they deduced that the semantic associations could be culturally universal. The American and Spanish participants agreed on identifying between front and back vowels and they were also able to make different associations involving different dimensions like size or brightness.

Interest in the comparative study of the English and Spanish vowel systems continues to grow. In 1995 Fox, Flege, and Munro published in The Journal of the Acoustical Society of America their paper "The perception of English and Spanish vowels by native English and Spanish listeners: a multidimensional scaling analysis". In this paper, they analysed the perceptual responses to three Spanish vowels (/i/, /e/, /a/), and seven English vowels (/i/, /ɪ/, /eɪ/, /æ/, /ɛ/, /inverted vee, and /ɑ/), and chose three monolingual speakers of each language and thirty monolingual English listeners and thirty native Spanish listeners who had English as a second language. Their task was to organise these nine vowels on a nine-point dissimilarity scale.

The outcomes were analysed and they saw that monolingual English speakers employed three underlying dimensions in rating the vowel: duration, a front-back distinction and a central/non-central distinction. Bilingual Spanish-English speakers employed only two dimensions: duration and central/non-central distinction. However, the distribution of

vowels was better observed in the results of this second group of participants. The two groups of individuals were subdivided into smaller groups according to their greater or lesser language proficiency. The result was that the vowel space of the proficient Spanish listeners was more English like than that of the no proficient Spanish listeners. Fox, Flege, and Munro concluded that the level of language skills improved as they progressed in their study and practice (Fox, Flege, and Munro 1995:1).

A branch in SLA is the study of language learning in children and adolescents as it is commonly accepted that the sooner you start studying a language the easier it will be and the result will be the student's bilingualism. In this context, Brian Goldstein and Patricia Swasey Washington conducted an investigation in 2001, in which they studied bilingualism in four-year-olds. Their paper was entitled "An Initial Investigation of Phonological Patterns in Typically Developing 4-Year-Old Spanish-English Bilingual Children". The study was designed with twelve bilingual Spanish-English children, each given two versions of the same material, one Spanish and one English. The following aspects were analysed: phonetic inventory; percentage of consonants correct; percentage of consonants correct for voicing, place of articulation, manner of articulation and the percentage of occurrence by the phonological process.

The study concluded that in all aspects, the children did not show significant differences but different production patterns were shown in the two languages when compared to the monolingual children of each language. As a conclusion, Goldstein and Swasey exposed the phonological systems in bilingual children are very similar to the monolingual children.

In the same field of study, Barbara Davis and Elizabeth Peña studied the phenomenon of bilingualism with children between 3 and 4 years of age. They published their findings in their paper "English Speech Sound Development in Preschool-Aged Children From Bilingual English-Spanish Environments" (2008). They chose thirty-three children classified into three groups: the first group monolingual English children; the second group English-Spanish bilingual children who were predominantly exposed to English; the third group English-Spanish bilingual children with almost equal exposure to both languages. The phonetic inventory, phoneme accuracy, and error pattern frequencies were analysed.

The result was: first, some bilingual children reproduced Spanish phonemes with alterations because they were closer to their English pattern. Also, they produced few consonant cluster sequences; second, children who were bilingual but with similar exposure to both languages showed more errors than bilingual children who were only exposed to English; third, monolingual children showed a smaller average of errors than the previous ones, especially in syllable-level error patterns. Their study concludes that exposure to both languages can lead to an increase in the number of errors at this age. This study was repeated successively with these groups and from the results obtained they deduced that the three groups in adulthood would reach the same level in English with practice.

Stanley Whitley, *Spanish/English contrasts: A course in Spanish linguistics* (2002), provides a description of Spanish and its differences with English under the perspective of applied linguistics. His work has a clear pedagogical orientation. When he analyses Spanish and English sounds, he realises there is an interference of L1 over L2 and this is because the English rules interfere with the pronunciation of Spanish. Error prediction/error analyses incorporating functional load, language variation, transfer and interlanguage are used to analyse the influence of one language on another. From a generative theoretical approach, it establishes the phonological rules that it defines by its categorical/variable and general/dialectal value. The importance of the dialects in the study of languages has grown since the time dialects were irrelevant for study. The interest Whitley shows in dialects sets him within the sociolinguistic perspective that is another aspect to be taken into account in these studies.

His work compares different aspects as phonological, grammatical or lexical, and also different skills as communicative skills. Concerning the phonological aspect, which is the one that interests us most, first, he explains the Spanish and English systems and then goes on to describe the differences between them and the difficulties they may present in their learning. Whitley designs two tables, one of Spanish consonants phonemes and the other of English consonants phonemes where these phonemes can be compared (2002: 21).

		bilabial	labio-dental	dental	alveolar	alveo-palatal	palatal	velar	labio-velar
STOP	voiceless	p		t		tʃ		k	
	voiced	b		d				g	
FRICATIVE	voiceless		f	(θ)	s			x	
NASAL	voiced	m			n		ɲ		
LATERAL	voiced				l		(ʎ)		
FLAP	voiced				r				
TRILL	voiced				r̄				
GLIDE	voiced						j		w

Table 3. Spanish consonant phonemes (phonemes in parentheses do not occur in all dialects).

		bilabial	labio-dental	dental	alveolar	alveo-palatal	palatal	velar	labio-velar
STOP	voiceless	p		t		tʃ		k	
	voiced	b		d				g	
FRICATIVE	voiceless		f	(θ)	s			x	
NASAL	voiced	m			n		ɲ		
LATERAL	voiced				l		(ʎ)		
FLAP	voiced				r				
TRILL	voiced				r̄				
GLIDE	voiced						j		w

Table 4. English consonant phonemes.

Comparing tables, he points out that the systems in Spanish and English are constructed similarly. For example, in their stops consonants (/p t k/ vs. /b d g/) both make voiceless/voiced distinctions; each language distinguishes two glides (/j w/) and three nasals; and that there is an overlap in that /f m l s ʧ n g/ and others phonemes in both languages. But he distinguishes three main groups of phonemes: there are phonemes that exist in one language but not in the other one. For example, the unshared Spanish consonants (eñe /ɲ/, jota /x/ and the flap and trill /ɾ r/. Also, there are phonemes such as /m/ shared for both languages; and finally, there are similar elements but with different forms or functions such as /t/ and /r/ in both languages.

The first group is the most difficult for students. They need to learn a new sound and reproduce it as close as possible to the native model. The Spanish phonemes that English

does not have are the afore-mentioned /ɲ/, /x/, /r/ vs. /ɾ/. Concerning the Spanish palatal nasal sound /ɲ/, which does not exist in English, Whitley states that the assimilation to the English *ni* or *ny* is not correct since these are generally sequences of two sounds.

The Spanish voiceless velar fricative sound /x/, transcribes the letter *jota*, but it cannot be assimilated to the English /ks/ sound as in *tax*, or the Spanish sound as in *excelente*. Its counterpart is the stop /k/ and both contrast in minimal pairs as in *carro/ jarro*. Whitley explains that native English speakers find this sound difficult and because of the influence of the mother tongue they assimilate it to /k/. Another difficult sound for students is the sound of <r> because English has only one r-phoneme and it is different from the Spanish one. For the flap and trill /ɾ r/ he explains that there is confusion since English has an r-phoneme, its representation is also /r/, but it is not the same as in Spanish. In Spanish there are two *r* phonemes, one is an alveolar flap sound /ɾ/ as in *caro* and the other is an alveolar trill sound /r/ as in *carro*. From Whitley's point of view, the problem that a native English speaker has with /ɾ/ is both phonetic and orthographic. The students identified and used it but, due to the influence of the laws of phonology and spelling of their mother tongue, they consider it as /t/ or /d/. He gives as an example that American and Canadian speakers have the same sound /ɾ/ for their intervocalic /t/ or/d/ as in *Betty*, *water*, *ladder*. But in his opinion the trill /r/ is more difficult than /ɾ/ for the students (Whitley, 2002: 23).

This author continues by pointing out other sounds that can present different degrees of difficulty for students. For example, Whitley points out that concerning the sounds /t/ and /d/, both Spanish and English have these two phonemes, but it does not mean that they are identical. He points out several differences, the first is that the point of articulation is different in the two languages because in English it is alveolar, but in Spanish it is dental. There is also a difference in its distribution within the word, while in Spanish the position occurs before the glide /j/ as in *tierno* /tjérno/ in English it is not. On the other hand, the phonological rules also establish differences since in Spanish /d/ often weakens to a fricative [ð] and the English /t/ can be aspirated, flapped or preglottalized. Whitley also notes several similarities, the first of which is that in both languages they are used to contrast minimal pairs such as *tía/día* and *tie/die* and occupy comparable positions in their

respective systems. In general, /t d/ does not present a great difficulty when the students use it because even if they do not pronounce it perfectly, they are understood (2002: 21-22).

These sounds are examples of the problems students face when they learn Spanish. Whitley designs a ranking of phonological problems based on the hierarchy proposed by Stockwell and Bowen in 1965. These two authors make a ranking of difficulty, from highest to lowest, and they consider eight types of problems that are organised in three "magnitudes" of difficulty. Whitley sets (2002: 61):

Magnitude 1:

1. An obligatory feature (rule, pattern) of Spanish, lacking in English: Spirantization of /b/.
2. A phoneme or phonemic distinction of Spanish, lacking in English: *r-* sounds and /k/ vs /x/.
3. An obligatory feature of Spanish that merges an English distinction: Spirantization of /d/, which means that [d] and [ð] must be treated as allophones, not as separate phonemes.

Magnitude 2:

4. Units that are distinguished in Spanish are obligatorily merged in English: Reduction, which merges into a schwa unstressed vowels that Spanish continues to contrast.
5. An obligatory pattern of English that Spanish lacks: Flapping, which changes /t/ and /d/ into a flap, whereas Spanish distinguishes all there in *mito, mido, miro.*
6. An English distinction that has no Spanish counterpart: *sock* with /ɑ/ vs. *sack* with /æ/, with the Spanish /a/ is between.

Magnitude 3:

7. Shared distinctions: both languages contrast /p b t d m n s f …/ word-initially.
8. Shared rules and patterns: both languages allow the cluster /sw-/ with a vowel afterwards.

Spirantization: is a phonological process by which a plosive sound (or stop) becomes a fricative in the same place of articulation.

Other works comparing the set of sounds in Spanish and the set of sounds in English are the ones by Olsen, Face and Rose. Olsen (2012) focuses on the rhotic sound that creates

difficulties for the native English speaker when learning Spanish as L2. Face (2006), and Rose (2010) share his interest in this sound and study the rhotic perception and production in L2 Spanish learners. Face investigates intervocalic rhotics in native English students learning Spanish as a second language. And Rose, applying the Perceptual Assimilation Model in L2 students to analyse the perceptual discrimination of rhotics, concluded that the higher the level of language proficiency in L2 the higher the discrimination of rhotics. He expands his study by analysing and describing the range of phonemes that native English speakers use for Spanish rhotics in an intervocalic position. The conclusion he reaches is that, in the initial stages, English students use the rhotic [ɹ] in all contexts; as they advance in the mastery of this sound they will pronounce more [r] dominant in all the rhotic contexts and finally when they are at advanced stages they will be able to differentiate between [ɾ] and [r] (Olsen, 2012).

MacBride Smith in his work "Some comments on the English of Eight Bilinguals" [included in *A Brief Study of Spanish-English Bilingualism* (1969)], explains that although usually, the students make the mistakes because they mix up the two languages, in his research, he deduces that it is not the interference of Spanish that creates problems when the person constructs sentences and uses the language. The problems come more from socio-environmental factors and from what he calls "arrested language development". The students belong to Spanish families living in Texas. MacBride noted that the difficulties these students had where due to different situations: the parent´s low level of education in English, the children reproduced what they heard at home; language development problems that even the native speakers encounter when they learn their mother language; the children had the normal problems that any elementary school children had.

The contrastive analysis studies that have been carried out between Spanish and English cover many linguistic aspects, as mentioned above. In 2016, Shannon Barrios, Nan Jiang and William J Idsardi published the paper "Similarity in L2 Phonology: Evidence from L1 Spanish late-learners' perception and lexical representation of English vowel contrasts". It focuses on the role of phonological features in the perception and lexical representation of two vowel contrasts that exist in English, but not in Spanish. Following Brown's approach,

they investigated two aspects, the first was whether the student could use phonological features of his or her mother tongue to represent non-native contrasts in the target language; the second was to be able to assess the degree of difficulty that an adult student might have when learning new phonological features. The study focuses on the phonetic perception and lexical representation of two English vowel contrasts: /ɑ/ - /æ/ and / i / - /ɪ/ by Spanish late-learners.

The difficulty these two sounds have is the similarity between them, which does not mean they are equivalent. They exist in English but not in Spanish. Barrios, Jiang and Idsardi's studies are based on Shepard's spatial models of similarity based on the spatial representation of two objects. The elements will be more similar if they are spatially closer and will be more dissimilar as the space between them increases. This spatial model of similarity is a tool that has facilitated phonetic explanations in the learning of L2. This relevant space between sounds can be analysed from different points of view such as the perceptual, the articulatory, or the acoustic ones. They provide data about the learning of sounds. The Flege´s *Speech Learning Model*, developed in the 1990s, explains the ease or difficulty of learning non-native sounds. This model states that the degree of ease or difficulty that an adult student will have when learning and making a sound will depend on whether that new sound is "identical", "new" or "similar" to his or her mother language.

This model states that if the sounds are identical in the two languages there will be no problem in their learning and reproduction due to the process of "positive transfer". Sounds that only exist in the target language will not present serious problems for the student either. And finally, sounds that are similar in both languages but not identical will present the greatest degree of difficulty as a result of the process of "equivalence classification", which means that equivalence is established between the sounds of mother language and target language.

Barrios, Jiang and Idsardi carried out this study to find out if phonological features can be recombined to represent non-native contrasts in the target language. They chose English tense/lax contrast / i / - /ɪ/ and front/back contrast: /ɑ/ - /æ/, and then they conducted two experiments in order to extract data that will lead them to conclusions. In the first

experiment, they established two groups of students: adult English students and native English speakers. As material they were provided with minimally contrastive English words and nonwords. The second experiment involved the same subjects as the first. They used medium-term repetition priming in an auditory and lexical decision task to investigate word-recognition processes.

The authors of this research came to two conclusions. The first is that, as expected, native Spanish speakers had more difficulty than native English speakers in discriminating between sounds. The second conclusion is that native Spanish speakers performed both tasks much better than predicted. The results in the first experiment were respectively .82 and .77 for word contrasts / i / - /ɪ/ and /ɑ/ - /æ/ and for nonwords the score was .77 and .69. All were above the established figure of .5 and so they did better than would be expected from non-native English speakers who have difficulty with these sounds.

Patricia Elhazaz Walsh's study analyses pronunciation errors and measures oral reading fluency of Spanish students of English as a foreign language. Her paper "Analysis of pronunciation errors and oral reading fluency in a read corpus of Spanish learners of English as a foreign language" (2018) shows the results of her research. To carry this out she recruited 117 Spanish students studying in bilingual schools to whom she provided texts from DIBELS (The Dynamic Indicators of Basic Early Literacy Skills). These texts are designed to assess the reading fluency of the students.

The students recorded the reading texts and a transcript was made of each of them to analyse the different features that interested the researcher. She grouped the errors into two categories, the first, message intelligibility problems due to, for example, crucial phonemic contrasts between vowels such as / i / - /ɪ/. And the second, problems that produce difficulty in understanding such as the confusion of dental fricatives /θ/ - /t/.

The following typology of errors was created for analysis (Elhazaz, 2018: 94):

1. Vocal

   a) Vowel substitution: Changes of tone or stress in the pronunciation of vowels, e.g. the word *again* pronounced as [aˈgen], instead of [əˈgen].
   b) Vowel insertion: e.g., the insertion of an epenthesic vowel at the beginning of a word before a consonantal group in the word *still*; [estɪl] instead of [stɪl].
   c) Vowel elision: e.g. *wanted* pronounced as [wɑntd] instead of [ˈwɑntɪd].

2. Consonants

   a) Consonant substitution: Changes in the point and/or manner of articulation: e.g., the word *just* pronounced as [xʌst] instead of [dʒʌst].
   b) Consonant insertion: the insertion of the phoneme /l/ in the word *could*; [kʊld] instead of [kʊd].
   c) Consonantal elision: the elimination of the phoneme /t/ in the final position in the word *asked*; [ɑːsk] instead of [ɑːskt].
   d) Metathesis: the change of position of the phonemes /k/ and /tʃ/ in the word *kitchen*; [ˈtʃɪkɪn] instead of [ˈkɪtʃɪn].

3 .Prosody

   a) Accent errors: the change of accent intensity in the word *upset* from the second syllable to the first; [ˈʌpset] instead of [ʌpˈset].

Analysing pronunciation errors, Elhazaz Walsh identified vowel substitution as the most frequent error (45.23%) and attributed it to the complexity of the English vowel system as opposed to the Spanish one, which has only five vowels. She observed that students had two problems, the first reproducing the seven vowels that do not exist in Spanish, and the second was distinguishing vowels that are both in Spanish and English but are not the same. She noted that the long, central vowels that do not exist in Spanish such as i:/, /ɜː/, /ʊ/, /ʌ/, and /ə/ and with the diphthongs /ei/, / əʊ/ and /ai/ were the most problematic. Elhazaz considers as a possible answer to this that when reading the text, spelling influenced the substitution of some vowels by others.

Another problem detected was the insertion of consonants, especially in those sounds that appear in the spelling but have no phonetic correspondence in the speech. Vowel insertion occurred mainly in cases where an epenthetic vowel was added as in /es'steɪ/ instead of /steɪ/.

The researcher concluded that another problem that appeared for this group of students was in the consonantal groups at the end of the word, the past tense and regular verb participles such as in asked which were pronounced /ask/ instead of /askt/).

The following study was conducted in 2012 by Yehicy Orduz Navarrete and was entitled *"Mother tongue phonological transfer in the acquisition of English as a foreign language"*. It studies the influence of the phonology of the mother tongue on the practice of the target language. This paper associates the theoretical foundations of psycholinguistics with the phonological transfer and interlanguage.

The study was conducted with Spanish-speaking adolescents of both sexes who were provided with a ten-word corpus. A native English speaker pronounced these words, the students listened to them and tried to reproduce the sounds as close as possible to the native model. The words were: *walk, hat, pen, cat, shirt, television, church, bridge, thin* and *this*. In this study, unlike the previous one carried out by Elhazaz Walsh, the students were not given a written copy of the words to avoid interference. They were first asked to listen to an audio recording of the ten words. Once they heard the recording, the students were asked to repeat and record them.

Once the students submitted the recordings, the sounds they had made were compared with those of the native English speaker. Every sound was phonologically transcribed, and then the researcher looked for two points; the first, to locate the most problematic sounds for the pupils, and second whether there had been a transfer from the mother tongue to the target language.

The first conclusion was that the students were far from the native model when pronouncing the sounds. Then the phonological processes that appeared were classified into seven categories (Orduz, 2012: 102):

1. Prosthesis: used to facilitate pronunciation at the beginning of the word, *walk* (wɔk > gwɒk; >gwæk).
2. Epenthesis: applied to reinforce or can be an influence of the mother tongue, as in *television* (ˈtɛlɪvɪʃən > teleˈbitʃion; > ˈteleˈbiʃion; > ˈteliˈbiʃion).
3. Paragoge: used at the end of the word as in *hat* (hæt>hɑpˈs; >hət; >hɒt).

4. Apheresis: elision facilitates the production of the beginning of the word, as in *bridge* (bidʒ>ritʃ).

5. Syncope: elide an element that presents an articulatory difficulty, as in *shirt* (ʃʌɹt > ʃiːt).

6. Apocope: used to enable pronunciation at the end of the word, as in the case of *shirt* (ʃʌɹt > ʧiɾ).

7. Substitution: applied as a result of the interlanguage. It has representativeness in the transfer of consonant sounds such as the Spanish sound /ʧ / that replaces the English sound /dʒ/. And vowel sounds such as the Spanish vowel /a/ which replaces the English vowel sound /ɔ/.

Yehicy Orduz Navarrete gives two conclusions on the data obtained. The first concerns the linguistic-phonological aspects, and the second concerns the pedagogical aspects that can benefit from this study. The linguistic-phonological aspect refers to the sounds that are in Spanish and English but which are not found in the words of the corpus. Then what the student does is generate, according to his or her phonological and syntactic knowledge of his or her mother tongue, an intermediate sound. It is in an intermediate stage and is the evidence of the existence of the interlanguage. The second condition refers to the pedagogical advantages because this kind of study can improve the learning of the foreign language. The methodology can be used to show the formal differences between the students´ native language and the target language. And then, the students would receive instruction that helps them to learn and analyse the differences between their mother tongue and the language they are learning.

To conclude, this part focused more on the phonological aspects and we must mention the concepts of Syllable Structure Universals and Syllable Structure Transfer Hypothesis. Studies in the field or phonology point out the importance of the syllabic structure of a language in the learning of a second language are of great significance. The syllable structure transfer hypothesis tries to explain how this influence of L1 on L2 works.

In 2001, Robert Carlisle from California State University wrote a paper titled "Syllable Structure Universals and Second Language Acquisition". In this work he reviewed researches that focused on the influence syllable structure universal has on the structure of interlanguage phonology. Amongst these researches, Carlisle highlights the studies of

Battistella, *Markedness differential hypothesis and syllable structure difficulty* (1990); Blevins "The syllable in phonological theory"(1995); Cairns & Feinstein " Markedness and the theory of syllable structur*e"* (1982); Clemnts "The role of the sonority cycle in core syllabification" (1990); Greenberg "Some generalizations concerning initial and final consonant clusters" (1965); Kaye & Lowenstamm "Syllable structure and markedness theory" (1981); and Venneman *Preferences laws for syllable structure and the explanation of sound change* (1988). The syllable has three constituents: the onset, the nucleus, and the coda, and the three of them facilitate the description of the universals and the review the L2 research.

All these authors recognise in their descriptive and theoretical studies that the syllable structure CV is universal in all the languages in the world. Also, they observe that in some languages there are other syllable structures such as V, CCV, and CVC that come from the phonic evolution of the word that can reduce the CV structure to V as in German *hnigan>nigan*; or CCV to CV as in Pali *ambra>amba* (2001: 2-3).

It is therefore clear that all languages have the CV structure and some may have other syllabic structures in addition to that one. Focussing on Spanish syllable structure, Carlisle explains that English has in the onset the structure of /sC(C)-/, but Spanish has the sequence /esC/ in the same syllabic position.

<div align="center">

school - escuela

spin   - espejo

</div>

Carlisle's conclusion is that in the cases where the syllabic structure /sC(C)-/ appears in English, a prothesis occurs as the native Spanish speaker inserts /e/ by phonological rules. This prothesis of /e/ will also occur at the beginning of the word in combinations that are not allowed in Spanish such as /sk/, /st/ and sp.

Consequently, in the underlying representations /s/ is an extrasyllabic consonant, and Spanish speakers respond to this consonant by inserting a vowel before it. The resyllabification convention then applies forming a syllable of the extrasyllabic consonant and the prothetic vowel, thereby resulting in the relevant derived words in Spanish

beginning with the VC syllable. This same rule of prosthesis is transferred into Spanish/English interlanguage phonology (2001:7).

What happens is that the so-called distribution restriction rules are applied. These are those that allow or prohibit certain combinations of sounds in a word. In the previous examples we have seen how these rules arrange in Spanish the combination of sounds in onset syllables. The syllable structure transfer hypothesis analyses the influence that distribution restriction rules have on two languages. There are sounds subjected to distribution restrictions that do not allow them in NL but in TL, and this implies difficulty in learning them. Also, there is an influence, or transfer, from L1 to L2, as the student tries to adapt the new sounds with his or her own. This occurs mostly in the initial stages of learning. On the other hand, there are sounds that can be similar in both languages and create difficulties because of their similarity but not equivalence.

Focusing on the sounds we analysed in this study, the syllable structure transfer hypothesis would predict that the native Spanish speaker would have problems with the allowed consonant sequences <-nt>, <-st> and <-nd> which do not exist in the final position in Spanish and would employ strategies to adapt the English sounds to the sound restrictions of their mother tongue. Ultimately, this hypothesis questions whether the sound patterns of the NL can explain the errors in the TL. Therefore, the CAH could predict that the native Spanish speaker would have difficulty producing these consonantal sequences in the final position.

With respect to the phoneme /-m/ it can be said that in Spanish, except for those words that come from Latin or linguistic borrowings, it is not a sound that is normally given in the final word position. So the hypothesis would be that the Spanish native speaker would tend to eliminate it or replace it with the phoneme /-n/.

The rules of distribution restrictions do not admit the nasal velar sound /ŋ/ in the final position in Spanish, so when learning it, the hypothesis that would be raised is the suppression of the velarization converting this sound into a nasal sound /n/ or the adaptation of a sound of the L1 for its realization.

The case of special interest is that of the phoneme /r/, which is a sound of deceptive similarity that we find in English. Monroy (1981) performs a contrastive palatographic analysis of the simple Spanish /r/ and the English /r/ Received Pronunciation (RP), concluding that both have a clear articulatory difference. The Spanish /r/ presents a continuous contact all along the alveolar ridge, with greater intensity in the frontal area, while the English /r/ lacks that contact of the language with the alveoli. This corroborates the conclusions of Navarro Tomás (2004) who describes the Spanish /r/ in its simple variant as a sound with alveolar realisation for which the tongue adopts a retracted position with lateral pressure against the upper molars while the tip shakes the alveoli. Gimson, *Introduction to the Pronunciation of English* (1970), states that the /r/ in English RP is a frictionless postalveolar continuum. With this sound the hypothesis would be if the subject would be able to reproduce the Spanish /r/ as a vibrating alveolar and the English /r/ as a postalveolar or if on the contrary there would be a transfer from L1 to L2 assimilating the English sound to the Spanish one.

The palatal alveolar fricative phoneme /ʃ/ is a sound that, due to the rules of distribution restrictions, is not produced in Spanish, it corresponds to the spelling <sh>, the hypothesis that arises is if the subject will make assimilation of this English sound to the Spanish voiceless alveolar fricative phoneme /s/ or the palatal affricate phoneme /tʃ/.

The spelling <ch> corresponds in English to the palatoalveolar affricate phoneme /tʃ/, the hypothesis being that if this spelling, which since 1994, is a digraph sound in Spanish, presents difficulty in its sound realisation or if, on the contrary, it would be assimilated to a alveolar affricate sound.

The letter <s> represents a voiceless sound in current Spanish since the differentiation between the voiceless and the voiced variants disappeared gradually in the evolution of the language, prevailing only the former. This makes it difficult for the native Spanish speaker to make the voiced phoneme /z/, the hypothesis being launched is whether there will be a transfer from L1 to L2 making it a voiceless phoneme like Spanish.

The /v/ sound in English corresponds to a voiced labiodental fricative sound. This sound does not exist in Spanish although if it does the grapheme <v> that is pronounced the same as the grapheme <b>, both correspond to a bilabial occlusive sound. The hypothesis is that the native Spanish speaker assimilates the /v/ labiodental fricative sound to the Spanish voiced bilabial occlusive.

The consonant sound at the beginning of a word /s/ in English is very common, however, in Spanish, the rules of distribution restrictions do not allow it. The hypothesis is that the native Spanish speaker will tend to generate a prosthetic /e/ sound when pronounced, e.g. *street**/ˈestriːt/ instead of its correct realisation which would be /ˈstriːt/.

The past formation in English by means of the <-ed> suffix generates two types of phonic realisations. On the one hand, the vowel sound falls, e.g. *stopped* /stɒpt/, and on the other hand, if it is pronounced as /i/ as in *dented* /ˈdɛntɪd/. The established hypothesis is that the candidate, faced with the difficulty of pronouncing it, will opt to eliminate it or to pronounce it by assimilating the vowel to the Spanish vowel /e/.

The pronunciation of the plural sound in the suffix <-es> and its different realisations is interesting from the point of view of seeing how the student of English solves it. The hypothesis would be if the pronunciation of the suffix <-es> with phonic realisation /-iz/ as in *changes* /ˈtʃeɪndʒiz/ would present difficulty to the native Spanish speaker and would choose to eliminate it or pronounce it by making a vowel change from /i/ to /e/.

3.4. THE CRITICISM OF THE THEORY.

The theory of Contrastive Analysis has had and still has detractors. The relationship that CA had with behaviourism, despite being positive at first, ended up being one of the points most criticised by their detractors. It can be observed that even if the CA predicted the possible mistakes that a student would make, it could not foresee them all and, on the other hand, it sometimes predicted errors that did not arise. Factors such as the age of the students, their language skills, the procedure for analysing errors that were not unified, and so on, affected the conclusions drawn from the studies (Larsen-Freeman, 1999).

Whitman and Jackson in *"The unpredictability of contrastive analysis"* (1972) after analysing four contrastive studies of English and Japanese came to the following conclusion:

> Interference… plays such a small role in language learning performance that no contrastive analysis, no matter how well conceived could correlate highly with performance data, at least at the level of syntax´ (Larsen-Freeman [Whitman & Jackson 1972] 1999: 56).

For Fisiak it is clear that not all interferences can be explained from a linguistic point of view since extralinguistic, psychological factors are also involved. For this reason, he believes that it would be necessary to apply contrastive studies with a psycholinguistic component capable of analysing psycholinguistic problems. Sharing this idea Larsen-Freeman points out that for other linguists, like Long and Sato, the worst defect of CAH is the extrapolation of a single linguistic result to the whole language. A single result is not sufficiently relevant to give a definitive explanation of the psycholinguistic process of language acquisition.

Detractors are based on their criticism that CA only focuses on the influence of NL on TL when predicting the difficulties that may appear in the learning process, leaving aside aspects such as communication strategies, training or overgeneralisations among others, since these factors also influence the formation of mistakes in the student's performance. Fisiak (1981) states that although CA has the value of detecting possible areas of interference and errors from the point of view of the influence of NL on TL, it fails when it excludes other factors such as psychological and pedagogical factors that also contribute to the formation of errors. Researchers have observed that sometimes an analogical replacement could cause errors, that is because the student by analogy applies indiscriminately the rules of the L2 he or she has learned, and a complete disorder in the production is the consequence, They think it is necessary to take into account the conditions in which the learning takes place since poor teaching or the practice not carried out in an adequate way can also influence. This situation led to the fact that from the 70s of the 20th century CA was losing its validity in favour of Error Analysis and Interlanguage.

Willian R. Lee in Thoughts on Contrastive Linguistics in the Context of Language Teaching (1968) explains that from his point of view CAH does not serve as the only explanation for the mistakes that the student makes in the transfer from the native language to the target language. For this reason, Lee thinks it is from the observation of the use of the language in the classroom when they can be predicted in a suitable way, and this is due to the fact that not all the errors can be predicted through a CA. In his opinion, there are some points of contrast that do not generate an error for the student. He also believes that the student overcomes the obstacle that may arise through gradual progress in the understanding and mastery of TL, and for this, it is not possible to talk about the learning process as a reduced succession of mastered difficulties. This is why teaching a second language should be planned, not only from the point of view of comparison between languages but also, from the point of view of the language itself and not in contrast with the other one.

The phonological models used in Contrastive Analysis show their limitations. Taxonomic Phonology shows problems when it analyses certain phenomena. For example, two main causes could be the reason, one is the degree of difficulty of the sound, and the other is because it is not possible to distinguish the origin of the problem, whether it is the transmitter or the receiver. Likewise, Generative Phonology is not able to analyse elements that appear in the deep structure but not in the surface structure.

Among those who point out the limitations of CA is the linguist Jacquelyn Schachter who in *An error in Error Analysis* (1974) points out that CA is *a priori* inadequate to solve the learning problems that a second language presents, although she recognises that *a posteriori* it presents advantages over them but once the error analysis points out what the difficulties are.

In the decline of contrastive studies in America 1968 was a turning point due to the work of the Georgetown Roundtable (Atlantis). This American position brought criticism of those who considered contrastive linguistics part of applied linguistics. From Fisiak's point of view (1981), it is wrong because contrastive linguistics has two branches that are co-existent but separate: the theoretical branch and the applied branch. Sajavaara shares this

point of view, in his paper "Contrastive linguistics past and present and a communicative approach" (1977), he explains that the criticisms come from forgetting the theoretical aspect of contrastive studies, which is why many studies that were not essentially pedagogical were considered as such.

The linguists observed that it did not solve all the problems and could even lead to confusion, but the cause of this was that there was no clear distinction between the theoretical branch and the applied branch. About this, Fisiak explains that:

> This has been aggravated by a confusion of the relationship between contrastive studies, the psycholinguistic theory of interference and errors, and the theory of second language learning. Some confusion stems from the misunderstanding of the relationship between contrastive studies and linguistic theory (Fisiak, 1981:6).

One of the strongest criticisms against contrastive analysis is that its results cannot be taken immediately to the classroom. The problem is that the conclusions that are extracted are theoretical and not practical. As has been said before, this is one of the errors of their critics, to mix the theoretical aspect with the practical one. On the other hand, the conditions of the students in the classroom must be taken into account: age, educational and linguistic background, etc.

Another point of criticism of this theory is that it does not serve to predict problems, but this is because theoretical contrastive studies do not aim to predict problems but to compare two languages. It is the theory of interference that is in charge of analysing with the data provided by the contrastive studies plus psychological and extralinguistic factors that take care of it.

Fred Eckman in "Theoretical L2 phonology" (Okim Kang 2017: Chapter 2) states that CAH cannot explain some of the differences that occur in students' L2. CAH cannot explain why some features present difficulty in learning. That is why Greenberg coined the concept in 1966 of `typological markedness´ that works to graduate the learning difficulties. It is based on the idea that the structural differences between L1 and L2 are systematic and implicit. Eckman in 1977 talks about the Markedness Differential

Hypothesis (MDH) with which he tries to explain that the differences between NL and TL do not help to explain the student's learning difficulties.

3.5. COMPUTER SOFTWARE IN THE FIELD OF CONTRASTIVE ANALYSIS AND CORPUS STUDIES.

Technologies have also broken into linguistics to facilitate research and analysis. Regarding the use of computer software in the field of CA and corpus studies we can observe that there is an increase in the use of these tools. The reason is they facilitate a more objective and empirical analysis of the corpus, and helps in its elaboration. Also, they have the advantage over the traditional system of comparing elements selected in a wider spectrum, and not one by one as in the traditional system. Its application in the field of teaching is an elemental and indispensable element. There are two important projects in corpus-driven contrastive linguistics, one is the ParaConc created by Barlow, and the other is the Corpógrafo created by PoloCLUP, which is a project of the Linguateca resource centre in Oporto directed by Belinda Maia.

Michael Barlow (2008) explores new technologies for contrastive analysis. His works are more focused on the field of translation. For this he pointed out that it is in modern multilingual Europe where the needs have been developed more. He notes the convenience of using appropriate software for the tasks. He presents what is called Parallel Concordancing (ParaConc) which is a search engine that provides a range of "translate equivalences". This author qualifies that the original idea of finding total equivalents was already discarded in the 70s when Nickel points out that as well as the "formal equivalent" it can be established in a more or less certain way the "functional-semantic equivalence" presents a great difficulty at the time of being established.

The purpose of the Corpógrafo is to provide, free of charge, a series of tools that helps to carry out the most complete linguistic analysis possible on an element previously chosen for it. It provides both text and language tools to carry out its aims. Its pedagogical use is obvious and of great importance.

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CHAPTER 4. ERROR ANALYSIS AND INTERLANGUAGE.

4.1. ERROR ANALYSIS AND INTERLANGUAGE.

Second Languages Acquisition (SLA) studies showed that the mistakes made by L2 students could not be explained only by the influence of the mother language (ML) on the target language (TL). For this reason, learning theory and error analysis (EA) were rethought. It was Corder who started this line of work in 1967 with his paper "The significance of learners' errors". He focuses on the study of the deviations from the native model that the L2 student makes. The principle of contrasting the student´s mother language and target language to find the issues that should be analysed and solved is one of the most important contributions of linguistics.

When the linguistic and psychological theory was applied to the study of language learning the discussion of the errors took a new dimension. Linguistics wanted to know how the interference from L1 to L2 works because students tended to reproduce in the foreign language the habits they had in their mother language. When this interference happens is when the errors occur because students do not adjust to the rules of L2.

Corder (1967) explains there are two schools of thought that deal with the issue of error and do so from different perspectives. The first one is very rigid in its approach since it thinks that the error is the consequence of an imperfect practice of language teaching. Errors have no place in it. The second school, on the contrary, believes that errors are a reflection of the imperfect world in which we move and therefore they are inevitable. In fact, in Corder's opinion, both points of view are compatible with the same theoretical standpoint about language and language learning, psychologically behaviourist and linguistically taxonomic. He suggested that the students could build their own "built-in syllabus" with the errors, and use it as a tool in their learning.(Corder, 1967:163).

Besides, cognitive theories led to the idea that the process of acquiring a second language was not a simple repetition of habits, but rather a complex process in which students established rules through the formation and testing of hypotheses. In this context, EA applies a strict methodological model to identify, describe, classify, and explain errors. It also establishes that the subjects will go through different stages in their learning that

follow universal rules and these rules will demonstrate that the influence of L1 on L2 is not the only one (A. Alexopoulou, 2010).

This new approach has two consequences: firstly, the importance of the transfer from L1 to L2 is reconsidered, and secondly, the error is given a positive value in language teaching. In this process of reorienting SLA-related studies, Selinker in 1972 developed the theory of Interlanguage; he postulated that interlanguage (IL) is a systematic, dynamic, and continuously evolving transitional dialect that develops during the process of learning a second language. This evolution is positive since students go through different stages in which they progress and come closer to the native model.

Selinker and Corder agree it is necessary to study all of the student's work, the wrong work as well as the correct work. Moreover, Corder establishes that the idiosyncratic features of a student have to be analysed one by one. Selinker understands "idiosyncratic" as "IL-particular" and the interference of the L1 in L2 is considered positive in any case since it, the native language (NL), can be taken as "heuristic tool" that helps to find solutions to the problems that the target language (TL) student faces in his or her learning (Selinker, 1997:157).As a result, EA focuses on the pragmatic adaptation of communication, giving importance to Performance Analysis, which raises the need to broaden the perspective from which the interlanguage is approached (A. Alexopoulou, 2010).

4.1.1. TERMINOLOGY OF ERROR ANALYSIS AND INTERLANGUAGE.

New disciplines require new terminology. This is the case with EA and IL studies. We will now explain some of the more common and important terms we will be studying in this work.

In the 1970s Error Analysis was recognised as an important part of applied linguistics. Previously Corder realised the importance of categorising errors to analyse them and help the student correct them. In this way, the information that the error gave became relevant as a learning tool. Corder (1967) distinguishes among Error, Mistake and Lapse. An error

is a deviation in student language, which results from lack of knowledge of the correct rule. A mistake, on the other hand, is a deviation in student language that occurs when students fail to perform their competence. And a lapse reflects processing problems.

The term "Interlanguage" refers to an intermediate language between L1 and L2. It is an independent linguistic system, although influenced by the native language and the target language. The error is a decisive element in its formation and is a dynamic movement that will get closer to the rules of the L2. Selinker coined this term although he is indebted to Corder´s work about "transitional competence". Lennon (2008) explains that today the researchers prefer the term "language learner language".

Nowadays we can talk about the "interlinguistic influence" in which the transfer is sometimes done in a selective way by choosing some elements and not others to carry it out, and how different aspects such as marking factors or learning strategies combined with the transfer influence this selection. And this leads us to think that the negative transfer from the mother language fosters the possibility of fossilisation.

Then the concept of transfer is linked to that of interlanguage. Transfer happens when there is an influence of the mother language (ML) on the target language (TL). This influence can be positive or negative. Positive transfer happens when the L1 and L2 have similar linguistic structure and/or vocabulary that facilitates learning for the L2 student. Negative transfer happens when the influence of the L1 interferes with the acquisition of the L2 and the student makes mistakes/errors in the language being learned.

Many works try to explain what is the phenomenon of transfer, for example in the work *Teaching English as a second language: theory and techniques for the secondary stage* (1970), Bright and McGregor explain that the grammatical apparatus that the speaker has in his or her native language interferes with the learning of the foreign language.

The role of transfer in IL is based on four components: natural languages; universal grammar; L1 transfer; and markedness. Natural languages are understood to be those that have had a natural evolution. Their development has been carried out spontaneously, unlike, for example, computer languages. From the beginning, some linguists like Finer

and Broselow; Liceras; Schwartz and Sprouse, and White pointed out that if IL is a system independent of L1 and L2 systems, then a Universal Grammar should be considered to rule it. From their point of view, interlanguage grammars are natural language systems. Previously, the influence of the L1 on the L2 has been discussed. How L1 transfer works in L2 is a key factor in any study to find out the reason and nature of the students' errors. The concept of markedness can be applied to one language or to several. Markedness is defined as follows by Eckman (Lingxia Jin [Eckman 1977], 2008):

> Markedness: A phenomenon A in some language is more marked than B if the presence of A in a language implies the presence of B; but the presence of B does not imply the presence of A.

This concept appeared in the Prague School with the theories of Jacobson and Trubetzkoy. This refers to the relationship between two poles of opposition. These poles are evaluated as "unmarked" or "marked". The first is the more general pole, and the second is the more complex and focused pole. An example of a morphological marker can be the plural <-s> as opposed to the unmarked singular (Edwin L. Battistella, *Markedness: The Evaluative Superstructure of Language*. 1990).

The influence of L1 on L2 affects all linguistic fields, including phonology, which is the focus of this study. Sounds are affected by concomitant sounds, which are usually on the same syllable, hence the importance of the pressure that the syllable structure of L1 on L2. In the following section it is explained that not all languages share the same syllable structure models. And this means that the student usually turns to the models of his or her mother tongue to be able to face those of the target language, even if this leads to errors in the performance.

The learning process is not progressive; there are stages of regression or stagnation. Selinker (1972) defines "fossilization" as a permanent stagnation in the learning process. Fossilization can occur when the L2 student internalises unconsciously and permanently in his or her interlanguage features that do not belong to the linguistic system of it. Zhao Hong Han explains the properties of fossilization: persistent deviation; resistance to external influence, including instruction and corrective feedback; and being out of the

student´s control (Zhao Hong Han "Interlanguage and Fossilization: Towards an Analytic Model" 2004).

With regard to the phenomenon of fossilization, mentioned above, Scovel points out that although morphology, syntax, and lexicon are not fossilized phonology is in this field of phonological fossilization. He and Selinker believe that it is due to its neurolinguistic nature and then it is inevitable. However, linguists such as Han believe that fossilization has a sociolinguistic nature and, if it is avoidable, they think that the more the student communicates and the more they identify with the native speakers of the L2 by sharing more and more communicative situations the sooner and better they will approach the target language pattern to the point of being able to become bilingual. Therefore, the aspect of fossilization has to be taken into account with that of the evolution of IL in the learning process.

The linguists study how students go through different stages in their learning. In this regard, Corder's studies are of great importance. He calls each stage "etat de langue". Each one of them will have particular characteristics that will have to be analysed by the researcher. As it has been said during the learning process, the student goes through several phases, some of them progressive and others stagnant. The term "definition of change" refers to the establishment of the different phases through which the interlanguage study takes place.

In relation to IL and EA, linguistics use the term "idiosyncratic dialect". It is when the subject's dialect has his or her own and individual rules. Corder defined them as "dialects governed by rules that are peculiar to the language of the speaker" (Sutor [Corder 1981], 2013:36). Selinker agrees with him because he understands "idiosyncratic" as "IL-particular". Also the interference of the L1 in L2 is considered positive in any case since it, the native language (NL), can be taken as an "heuristic tool" (Selinker, 1997:157).

SLA focuses on two points, the first is the different sources of a linguistic phenomenon and the second is the final causes of that linguistic phenomenon. To study the latter, Jacobson and Trubetzkoy in the 1960s elaborated the concept of "teleology" as it applies to

SLA. It is a branch of philosophy that focuses on final causes or ends (Lúdmila Lacková, "The Prague school, teleology and language as a dynamic system", 2018).

4.2. ERROR ANALYSIS.

The tool used to analyse the errors is Error Analysis. It studies the errors generated by the students of L2, tries to explain them and find a solution to eradicate them. Error Analysis became one of the most important instruments in SLA. It is so important that Corder argues that all the information that EA provides helps to adapt language teaching to the student's specific needs. Also, the researchers implement Performance Analysis to study the data extracted under the focus of analysis.

In the process of learning a language the student practices a deviant use of the norms in the L2 and then the errors appear. It is a systematic deviation in the performance of a second language because the rule is not known.

Chronologically it was not until the 1970s that the importance of error in the language learning process was considered. Until then, errors were treated as negative elements of the learning process. Pedagogically, they were practically worthless. This situation was favoured by the rise of Contrast Analysis (CA) at that time. Then the behaviour list movement considered that the error had to be prevented, but it was neither defined nor treated in psychological terms (Bueno, 1992).

John Norrish's works including in *Language Learners and their Errors* (1983) speaks of the need to consider errors in a more lenient way. He divides errors into three types: errors or systematic deviations; mistakes or inconsistent deviations; and lapses or errors which may be due to personal factors such as lack of concentration or fatigue.

J. Edge in his book *Mistakes and Correction* (1989) explains that he prefers to talk more about mistakes than errors from a didactic point of view. He thinks that students cannot solve errors by themselves, but they can solve mistakes, and that is because there is a mismatch between form and meaning due to the fact that the student has not enough knowledge of the target language. From his point of view, mistakes are a learning tool, but

what is important is that the teacher should focus more on the mistakes of meaning than on mistakes of form. He classifies the causes for mistakes of form: the student has not enough knowledge of his or her first language; he or she uses a rule they have not mastered completely; the student does not know he or she uses an incorrect form; and for personal reasons, the student could be tired, in a hurry, etc.

All these new points of view were possible because everything changes when Corder published his works. In his article "The significance of learner´s errors" (1967) he explains that error is a positive element in the learning process because in his opinion in the process of exploring a new language the student forms hypotheses based on language input, and performs a speech production containing errors from which he or she will learn. These errors are the product of the discrepancy of the transitional competence of the student's native language and the target language. By "transitional competence" he means the dynamic exchange that takes place in the learning process between L1 and L2.

Therefore, the material of study of the EA is the "error" and linguists in the EA gave different definitions of it. Bueno (1992) refers to some of them that help us to understand its nature. Svartvik in his work *Errata: Papers in Error Analysis* (1973) says of the error:

> Error has a positive import with a function in learning strategy. Errors constitute a valuable feedback in the teaching process. We might say that it is, at least partly, by locating error that students learn to learn and teachers learn to teach.

Previously Strevens, in "Two ways of looking at error analysis" (1969), defined the error as "normal and inevitable features indicating the strategies that learners use". Later Pit Corder in *Introducing Applied Linguistics* (1973) says about it: "When we talk about "errors" - what we are saying is that the learner is not yet a speaker of that language". Richards agrees with him and writes in his book *Error Analysis: Perspectives on Second Language Acquisition* (1974):

> Learner´s errors are seen as manifestations of how the learner reconstructs the syntactic and phonological rules for the realization of these conceptual sets and deep structures.

Frei believes that by discerning what is wrong we can know what is correct. For him, error is a deficiency that has to do with linguistic change, which is reversible, and with linguistic evolution, which is irreversible. And Norris notes that errors can be very significant as they can give more information about the learning process. In his work *Language Learners and their Errors* (1983) he writes: "the error itself may actually be a necessary part of learning a language". As a result, it can be said that the error is more important than was previously thought since it can provide a great deal of information about the process of learning a language. And it also has the advantage of showing what strategies the student uses to solve them. For this reason, Norris argues that they could be an essential part of the learning process.

And with the definition of error we have the definition of EA that is a branch of Applied Linguistics whose task is analysing the error. Vivian Cook defines Error Analysis as a methodology that has more to do with data than with acquisition theory itself. This idea is supported by Carl James (2013) when he points out the striking difference of EA studies in contrast to those of CA or Interlanguage (IL). He defines Error Analysis as "the process of determining the incidence, nature, causes and consequences of unsuccessful language" as well as "as an unsuccessful bit of language" (2013:1).

In 1971, Corder argued the need to analyse the total work of the student in order to be able to make a description and analysis of the "dialectal states". The latter made the objectives of Error Analysis focus on the effects of pragmatic-linguistic adaptation of communication, thus giving rise to Performance Analysis and interlanguage to consider new aspects than those merely dealt with up to now (Alexopoulou, 2010:4).

It was mentioned above that it is from the 1970s onwards that error analysis takes on greater importance. S.P. Corder´s papers "The Significance of Learners Errors" (1967); "Describing the Language Learners Errors" (1971); and "Error Analysis" and "Error Analysis and remedial teaching" (1974) that marked a turning point in this field. Their approach was based on the analysis of errors that show how the system of acquiring a second language worked.

This is the reason why Corder is considered the pioneer and one of the most relevant figures in this field. His work is the basis on which linguists have been and are based. He deals with the methodological and theoretical aspect of error in his work *Error Analysis and Interlanguage* (1981). He studies the significance of the student's error, which for him is the sign of a transitory system rather than a deviance from norms. He believes that the student has a kind of built-in syllabus that he or she uses even if it is not adjusted to the native model. He also analyses the importance of dialects in the EA and he believes it is necessary to have a good interpretation of the errors to help students methodologically. Corder also discusses the elicitation of interlanguage and the study of it. He points out that for a better understanding and use of the errors it is necessary to carry out longitudinal studies that cover more aspects (Applied Linguistics, spring 1984).

He believes that when students make mistakes it is because they have made hypotheses and are testing them. That shows that the error has a positive aspect because it is a tool that the students use to progress in their learning. In his paper, "The significance of Learners Errors" (1967), this author states that when a student learns the rules of the target language he or she does not memorise and reproduce them, but rather through these rules they build their own rules and the consequence of this is the "error". Corder, therefore, considers "error" as a consequence of the learning process that serves to indicate how this process takes place, and what stages the student goes through in the process of acquiring a second language. Hence, "error" is a source of information about what hypotheses the student makes at each stage of his or her learning.

As said, this vision is completely new as it separates itself from the hitherto wider view that took error as a negative element. This vision pointed out the deficiencies that the student had of the L2, and therefore it tried to eradicate the errors that the student made. This eradication was generally done through repetitive exercises to automate the correct rule.

For Corder, not all errors are predictable or avoidable, nor does he consider them to be signs of failure in the learning process. Based on the psycholinguistic mechanisms involved in learning a language, he thinks it can be concluded that not all errors result from

NL interference in TL. In this sense, Corder relies on Chomsky's studies in the field of mother tongue acquisition, and on the application of conclusions drawn from these studies in SLA. The underlying idea is that the mechanisms of L2 acquisition are the same as those applied to mother tongue acquisition. This approach to the value and functionality of learning errors, and the analysis of them, leads directly to the concept of Interlanguage, which will be discussed later in this chapter.

Both Corder and Selinker appreciate that the process of learning through error for a student to learn L2 shares the same process as that of a child learning his or her mother tongue. In short, it is a process of hypothesis testing on the language being learned. So Corder gives us two important contributions; the first is that mistakes are not random but are the product of a systematic process and the second is that errors are positive when learning a language. Also, in his 1967 paper, he points out the importance that only the longitudinal studies are the key to solving theorical questions, that this is a pillar of the EA/IL theory and a fundamental element for understanding IL as "as a type of language".

Continuing with this idea of similarity between the processes of learning the mother tongue and the target language, Corder in 1971 released his paper "Describing the Language Learners Errors". In this paper, in addition to the above-mentioned idea, he made a deeper study of the student´s performance and made proposals about it. He finds that concerning the student's performance the teacher does not control the input and can only infer the output. This is one of the reasons why he proposes a longitudinal system of studies to apply to the student´s production in L2. That would serve to describe and analyse the "etats de dialecte", that is, the different stages in where the student stands in his or her learning and "By comparing and logging them he changes and then correlates them with the data of potential input thus making interferences about the learning process" (Corder, 1971:58). This would be done using two techniques: testing and error analysis.

He proposes, that to give a more correct description of the "etat de dialecte", it would be convenient to consider that what the student speaks is a "transitional idiolect", which would be studied in the same way as the mother tongue that a child learns. In that idiolect,

there would be correct and incorrect production that would not be considered as an error, but as a peculiarity of a certain moment in the development of the learning of the L2.

On this point, within SLA learning there are two important aspects, the first is the need for a description of the TL to study all its nuances, this consequently implies teleology in the process. The second aspect is to analyse the learning and production process of the student´s TL, where the Interlanguage appears and therefore where we can analyse the idiosyncratic dialect of the student through performance analysis.

Regarding this point, Corder published "Idiosyncratic Dialects and Error Analysis" (1971) where he states there are two types of dialects. He names the first "social dialects" (dialects) that attends to specific rules that both languages share, for example, grammar; and the second "idiosyncratic dialects" (idiolects) where the rules are personal and individual of each subject This means that some phrases cannot be interpreted since not all participants in the communicative act share the same rules. However, for Corder, it is important to point out that dialects and idiolects have to be analysed and interpreted keeping in mind the instability of the second. But he does not think that idiosyncratic dialects are not grammatical; on the contrary, he thinks they correspond to the grammar of the person who learns L2.

In relation to it he distinguishes between different kinds of idiosyncratic dialects that frame the errors in a specific category. These dialects are:

1. Idiosyncratic dialects in the language of poems, where EA is established on a bilingual comparison.

2. Idiosyncratic dialect in the speech of an aphasic, which presents the same problems of interpretation as linguistics.

3. Idiosyncratic dialects in the infant learning his or her mother tongue.

4. Idiosyncratic dialects in the learning of a second language. This kind of dialects has some characteristics; they are regular, systematic, and meaningful, for

example grammar. However, it can be unstable when social groups do not share the rules or conventions. At this point it is possible to speak of interlanguage from Selinker's point of view since it implies that there can be a dialect that shares rules with two other different dialects that in turn do not necessarily have rules in common. From this position, it can be said that interlanguage is a transitional dialect.

Corder exposes what is a "general law" of EA/IL studies by saying: "every sentence is to be regarded as idiosyncratic until shown to be otherwise" (Corder, 1981:21). He states that for him the only sentences that are erroneous are those in which the performance is incorrect and may contain false starts, changes of mind, and so on, Hockett defined it as lapses in 1948. The interesting point about these errors is that they do not entail problems of interpretation because it is thought that in every language there are "rules for making mistakes". The erroneous sentences for Corder have the characteristic that they can be self-corrected by the speaker when he or she realises the rule they should apply correctly. Then, as soon as the speakers note the mistake and because they know the rule they correct it, or if they do not know the rule when they speak and the mistake appears, when they learn the rule then he or she applies it and the mistake is eradicated.

Summarising this information, Corder expresses in his theory that the error can come from a bad performance or another series of factors and that the methodology to analyse and describe these in the idiosyncratic dialect is the EA. And this is done through three stages:

1. Recognition of idiosyncrasy. He believes that idiosyncrasy has two aspects. There are sentences with "covertly idiosyncratic", it happens when a sentence is well-formed at a superficial level but it is idiosyncratic in the sense that keeps particular characteristics. And sentences that are "overtly idiosyncratic", happens when a sentence is badly formed because it does not follow the rules of the target language.

From Corder's point of view, it would be necessary to analyse how a speaker of the target language would solve the sentence, in other words, how he or she performs an exercise of "reconstructed sentence´.

When the linguists use EA in their studies, they should take into account different factors besides the comparison of sentences. It is important to analyse those three points: how the mother tongue has been learned; the degree of linguistic competence the student has; and how the language has been taught. Therefore, those factors have to be considered when analysing what was produced in the original overall idiosyncratic sentence.

2. Description. This is a linguistic description of the articles. The idiosyncratic characteristics that it presents have to be analysed based on the idiosyncratic dialect of the student. The aim is to study with accuracy the use that the student makes of the language that he or she is learning. In this sense, it will be easier to understand the stage of linguistic development that the student has in L2 and the cause of the mistakes that he or she makes in it.

3. Explanation. The explanation is in the field of psycholinguistic. It tries to explain the idiosyncratic dialect of the speaker, why it has some characteristics and not another, and how they are shown.

Each of these idiosyncrasies shows the personal characteristics of the speaker when he or she performs the L2. Then the process of interference of the NL in the TL appears and shows the specific difficulties the student has in L2.

From analysis of the errors and the idiosyncratic dialect the teacher can profile and improve strategies and exercises to overcome learning difficulties, and this supports the idea that errors should not be seen from a negative perspective. That is what Corder explains in his paper "The significance of learner´s errors" (1967).

Another contribution from Corder (1974) is that it establishes two functions in EA: theoretical and practical. The first is framed in the methodology applied in the study of a

second language. The second is aimed at identifying the error and finding a way to solve it pedagogically. It is at this point that the question arises as to whether or not there is a need for remedial action. When a mismatch or disparity arises between someone's knowledge, skills and linguistic achievements, the need for remedial action should be considered.

The decisions made in the scope of remedial action present two situations. The first is to assess whether remedial treatment is necessary and the second is to analyse what, if any, remedial action would be taken. Corder explains that nobody has complete mastery of a language, so there will always be a mismatch between the speaker's linguistic knowledge and what the communicative situation requires.

His appreciation is that in most cases the student has the knowledge to be able to face the communicative situation in one way or another and so it would not be necessary to apply a remedial treatment here; he calls this an "acceptable degree of mismatch". But there are other situations in which the student lacks sufficient knowledge to cope. However, the student has some basic knowledge that, in combination with extralinguistic factors such as enthusiasm, motivation, etc., allows him or her to learn the knowledge required by the communicative situation; Corder calls this "remedial degree of mismatch". And finally, there is a third situation in which there is a complete mismatch between the subject's knowledge and what the communicative situation requires. In this case it is not possible to find a solution and Corder calls it an "irremediable degree of mismatch". This last situation happens, for example, when a student has a lower level of English than that required in a class, and then he or she cannot cope with the classes. The only solution is to remove the student from that class.

Corder states the problem that arises is to decide what type of mismatch should be applied to a given language situation. In language teaching, tests help in this task. Predictive tests will try to find out if the student has the knowledge capacity to face a situation successfully. These tests will be quantitative and not qualitative. What is required is the student´s level of "knowledge of a language". The problem is how to quantify that level and then apply appropriate remedial teaching treatment, even though it must be admitted that there will be situations beyond the teacher's ability and scope to solve. What Corder

specifies is that in this context of learning and teaching, what he calls the student's "knowledge of the language" has to be analysed, and it is here that EA is included.

Then the error is an instrument that the teacher uses to know if the student has reached the required level of knowledge. Although the teacher uses the tests to check in the most suitable objective way what stage of learning the students are at and what errors correspond to them, the truth is that it is not enough. Generally, the tendency is to know what the most general errors are and list them. This is usually done based on the student's knowledge of the code of a language, instead of the student's communicative errors of failures. And this is not sufficient to fix the student's learning problems.

Corder states that it is necessary to go beyond the simple list of common mistakes and strategies to re-teach them to give a solution. He thinks the point is to analyse the errors so that once the cause of the error is known it can be solved in a systematic way. He shares the idea that error may be the natural consequence of learning the rules of the second language or the consequence of NL interference in the TL. For these two reasons, it is necessary to analyse and know the learning process and on the other hand to compare the mother language and the target language.

Throughout this process of linguistic production in L2, the student establishes a series of hypotheses that he or she will put into practice. If they make mistakes, then they will reformulate the hypothesis and put it into practice again until they find the correct hypothesis. Therefore, the student's ability to correct his or her own hypotheses is thanks to the two factors mentioned above: the error and the analysis of it.

And what can be expected or not from the EA is defined by Corder´s words:

> Error analysis, however, cannot yet give us a clear and comprehensive picture of the learner´s communicative competence; it does not enable us to predict how a particular learner will cope with the demands of a situation of language use, though it will serve well to say how he will perform in a situation of language learning,… (Corder, 1974:11).

Besides these notions, Corder, in his book *Error Analysis and Interlanguage* (1981), stresses that error as a fundamental part of applied linguistics provides a validation of the data from CA. This CA makes predictions about the TL that will be validated or not by the EA. In addition to this, EA will give us information about the psycholinguistic processes of language learning. Therefore, Corder believes that it is part of the methodology of the psycholinguistic investigation in the learning process (1981:36).

Error detection comes from comparing what the student should say with what he or she says. That helps to identify the error. To achieve this, Corder works with "pairs of utterances", comparing original utterances with what he calls "reconstructed" utterances, that is, those produced by the student. He explains these reconstructed utterances as "translations" of the learner's utterances in the TL. Then Corder establishes that the methodology of the EA is based on the interpretation of the utterances that the learner produces in TL and in how he or she tries to express them.

The idea that learning a language is a living process and always has critical stages is commonly accepted. To understand it, Lennenberg proposed the Critical Period Hypothesis (CPH) in 1967. He explains the existence of what he calls a "critical period" for language acquisition, which occurs at puberty after which it is complicated to learn a second language because the process is slower and less successful than first language learning. For example, it is very complicated to perform an appropriate accent in this second language. The main point in CPH is that the process in SLA after puberty will be qualitatively different from the NL. In the field of linguistics, his work is important because it points to the need for prevention and eradication of error (Snow and Hoefnagel-Höhle, 1978).

On the other hand, in the context of EA, it is also necessary to take into account that most of the difficulties are systematic because they are part of the student´s habits, but some errors are random or accidental and therefore cannot be discerned. That is important because of the division of systematic and non-systematic errors show that only the firsts can be analysed. Then, the errors of performance are unsystematic and the errors of competence are systematic. The difficulty comes from knowing if the student has

committed an error of performance, in other words, a mistake, or a competency error, a true "error", and they show the system of the language used by the student. The context has some relevance here because it helps us to know if the student performs a mistake or an error.

Systematicity is therefore a characteristic of error, which together with generalization and simultaneity makes up, in Corder's words, the three important characteristics of it. He understands for systematicity, a feature that is describable and predictable from his point of view, that when a person or a group of people share an error in the same situations then the generalization appears, and when the same error happens at the same stage of learning we find the third characteristic, simultaneity. Nevertheless it has some detractors, such as José M. Bustos Gisbert (1998) who points out that there is difficulty in identifying the degree of systematicity of the error since this does not depend on the number of times it appears because more factors can be involved in it. On the other hand, it is not easy to know if the error is individual or collective, to know that it is necessary to analyse the homogeneity of the students.

And finally, it is complicated to establish the number of transitory dialects in the learning process, so that since this dialect is intimately linked to a given error, it is difficult to know which one corresponds to a specific level. Bustos, however, does show affinity to Sridhar's thesis that postulates that an error can be such in one but not in another student since it depends on the level to which certain contents correspond.

In Brown's opinion (2004), systematicity is reflected in different phases in learning languages. And he sets the error marks the existence of four phases in the development of language learning:

1. Pre-systematic stage: here we find random errors that happen when students attempt to perform a new feature.

2. Emergent stage: the internalisation of the rules of the target language is produced, which may or may not coincide with those of the mother tongue. Here an apparent stagnation in learning occurs which will lead to further progress. The students are

aware that there are several features that they do not know how to perform correctly and avoid them, and they are repeaters of their mistakes.

3. Systematic stage: at this stage the student is aware of his mistakes and self-corrects them, has more internalised the rules of the target language and progresses to a greater mastery of it.

4. Post systematic stage: there is a more precise use of the target language, and the frequency of errors decreases significantly.

There was another point of view about EA in the 1970s and 1980s, as some linguists supported the idea that the error made by a student was not an error but an element in a language system of a New English. Two of these linguists are Platt and Crewe. From Crew´s point of view when an error is systematically repeated it is because its use has become institutionalised.

Many have been and are the attempts to improve the linguistic level of the speakers in their native language in an effort to generalise the standard and avoid errors. The English media has done a great job in this field, creating a standard language in both grammar and phonology. Godfrey Howard´s work The Good English Guide (1992) explains that English is under pressure and influence from TV, computer terminology, and so on. In it, he shows a consensus of spelling, pronunciation, sentence structure, and the meaning of words in all fields (work, legal, business, and so on). And this has influenced the teaching of English as a second language.

Concluding, through the years, a lot of literature has been written on this topic. The following works have analysed the aspect of the error from different perspectives. Sundby and his colleagues developed at the University of Bergen in 1987 *Dictionary of English Normative Grammar* (DENG). That is a compendium of terms that were used to describe and evaluate errors. They study 18th century language and analysed the metalanguage used by grammarians like Ptiestley (1761), Sedger (1798) and Wood (1777). These 18th century grammarians believed that errors were a negative factor that should be eradicated.

At the beginning of the 20th century, in 1929, Leonard published *The Doctrine of Correctness in English Usage, 1700-1800*. Later, in 1948, Brown and Scragg published *Common Errors in Gold Coast English*, which offered a taxonomic viewpoint and treated the interference of the mother language in the target language as the primary cause of errors. Studies continued throughout the 20th century, becoming more intensive in the second half of the century. Some important works in this field are: Bernd Spillner's *Comprehensive Bibliography of Error Analysis* (1991), which considers errors as a source of information. Its origin is the unconscious transfer of mother tongue structures to the target language system. In the Interlingua Hypothesis about the learning of a second language, errors indicate different intermediate levels of learning and are useful for finding pedagogical solutions to them.

In 1974, J.C. Richards published *Error Analysis: Perspectives on Second Language Acquisition*, where he establishes three points in his work. The first is that he does not agree with the idea of EA in opposition to CA; on the contrary, he believes that the first one is a very important tool to corroborate the predictions of errors made for CA. This corroboration is significant if we go beyond taxonomy to explanatory and predictive power. Secondly, thanks to the error analysis, it is possible to establish rules that organise the student's interlanguage. And third, through the study of the student's errors, we can see the importance of the psychological factor in transfer theory, we can get data on the nature and meaning of the errors that will help the student understand the rules of TL (Richard, 2014: X).

As Alexopoulou notes, this model also presents deficiencies, since on the one hand it only picks up errors and not successes. On the other hand, it ignores that the student deliberately avoids the use of certain linguistic elements because he or she does not dominate them and thus avoids the error. It does not clarify the origin of errors that do not have to have a single cause.

Other linguists focus their studies on different aspects and their contributions have broadened the field of knowledge on this subject. Helen Woodfield, in 2008 presented a series of contrasting studies on analysing the interlanguages, using what is known as

Interlanguage Pragmatics (ILP), which is based on the student's knowledge of the pragmatic conventions of the target language and how they are used when carrying out a communicative act in it. Woodfield, and other authors such as Cook (1993), Kasper and Rosa (2002), Barron (2003), amongst others, believe it is important in the studies of "ILP a cross-sectional nature or follow a longitudinal design". Cook points out that in cross-sectional study "looks at different learners at different moments in time and establishes development by comparing these successive states in different people" (Woodfield: 231).

The errors have been classified in different taxonomies. Among them, there are Richard´s and Corder´s taxonomies that classify the errors from different perspectives. Richard divides errors into Interlingual errors and Intralingual errors. An interlingual error is caused by the interference of the mother language in the target language. Students transfer linguistic knowledge of L1 on the features of the L2. An intralingua error happens when there is a particular misuse of a particular rule of the L2. In interlingual error, the focus is on the L1 while in intralingual is on L2. In Corder's taxonomy grouping the errors are in four categories: presystematic errors, systematic errors, postsystematic errors and unpredictable errors. These are explained in greater detail later in this chapter.

4.2.1. ERROR TAXONOMIES.

The reasons why students make mistakes are diverse, for example, it could be due to overgeneralization and transfer. The study of the causes of errors is necessary to understand, prevent and solve them. That is why linguists are interested in the classification of errors so they can better understand them and make more pedagogical use of them.

As mentioned above, the controversy is to accept error as something negative to be eradicated or something positive that serves as a learning tool. It is linked to what is considered good English. There are guidelines of what is grammatically correct or not. Taxonomy researchers analysed and classified the errors. Through the analysis of the data,

the linguists study the linguistic system and the errors produced by the L2 students. And once they have collected all the information they try to find strategies to solve them.

Different taxonomies on errors have been made according to different criteria and aspects to be analysed. In 1970 Richards set out his classification of the types of intralingual and developmental errors in his paper "A non-contrastive approach to Error Analysis" (1970), he established that there are four possible causes and explained them:

1. Overgeneralization.
2. Ignorance of Rule Restrictions.
3. Incomplete Application of Rules.
4. False concepts hypothesized.

The first, overgeneralization, happens when the student applies deviant structures because he uses previous knowledge of other structures in the TL. Richard points out that overgeneralization produces one deviant structure instead of two regular structures. That may be because the student tends to simplify the rules because it minimises his effort. His example is enlightening: the omission of <-s> in the present tense, third person that can take place because of the pressure that other endingless forms exert, and then what happens is that the endless form becomes generalised for all persons.

All over-generalization is associated with redundancy reduction and this is most clear in the grammatical aspect. Richard gives another example: the use of the past morpheme <-ed> in a context where it is not necessary because there are already lexical elements indicating past and besides it is possible to use present tense in that context, e.g. *Last Monday I go to his house and I find that I don't have the key.*

The second cause is the ignorance of rule restrictions. It is closely linked to the first cause and happens when the student applies rules in contexts where they should not be applied, e.g. the sentence *The nurse who I visited her* shows a violation of limitations on the subject with the structures with who. That is a type of transfer that occurs when the student applies previous knowledge in new situations. Usually, what causes the rule restriction

errors are the analogy with other elements that the student already knows or how he or she has learned the rules in a roundabout way.

The third type is the incomplete application of rules that happens when the student applies a rule that he or she knows only partially. In this case, the error helps to show the student´s stage in his learning process.

The fourth and final type of error is false concepts hypothesised. It arises when the student does not understand well the distinctions in the TL and then makes the error.

On the other hand, Richards and Jain (Richards, 1974) establish two big categories of errors. The first is called "Interlingual Errors" in which there is a negative transfer from the mother tongue to the target one. The second refers to "Intralingual Errors", which are not related to L1 as they correspond to problems in the process of learning the development of L2. Therefore, their origin is within L2 itself and is based on two strategies that construct IL: hypergeneralization and reduction to a simplified system.

These taxonomies consider aspects other than those of the traditional classification, which groups them into errors by omission, addition, substitution and word order in the sentence. For this, and the following classifications, I consulted the works of Bueno González (1992:61) and Ahn Jang Yoon "A study of Error Analysis" (1982:190-191).

In 1974, Corder established four groups: presystematic errors, systematic errors, postsystematic errors and unpredictable errors. In making this division, he based his observations about the systematics of error in the communication process.

1. Presystematic errors: the learner is in the early stages of learning, and he or she is unaware of the system that L2 has and of the rules that run this system.

2. Systematic Errors: The learner has discovered a rule but misuses it. Frequently, these errors are predictable and appear repeatedly.

3. Postsystematic Errors: The student knows the rule and produces correct forms but in an inconsistent manner. The reasons for failure to apply the rule may be

different, such as a lack of attention or lapse of memory to implement it consistently. When the student makes an error, he or she has the knowledge and capacity to explain it and correct it.

4. Unpredictable errors: these arise when the teacher encounters errors that he or she had not even thought of.

One year later in 1975, Corder made another classification because the traditional one did not serve his aims. This new classification is based on the description of the different language levels: spelling, phonology, morphology or syntax, and vocabulary; and within each level according to the systems: vowel or consonant, time, number, genre or case.

From all of this it is possible to say that there is controversy concerning the different classifications of the error so there will always be a process of reviewing and adjusting them. Hence, in 1982 Dulay, Burt and Krashen published *Language Two* where they revised the existing classifications and established four sections:

1. Language category. It is of traditional design. Here, a morphosyntactic classification is made thanks to the taxonomy. It is based on the paper by Politzer and Ramirez "An error analysis of the spoken English of Mexican-American pupils in a bilingual school and a monolingual school" (1973), and in Burt and Kilparsky's work entitled *The Gooficon: a Repair Manual for English* (1972).

2. Surface strategy. Here they include errors related to omissions, additions, wrong formation of words or structures and word-order problems.

3. Comparative analysis. This group includes developmental, interlinguistic and ambiguous errors.

4. Communicative effects. They are divided into global and local. The global ones affect the global organisation of the sentence and affect the communication that stops being fluid. The local ones are related to the individual and do not interrupt the communication.

4.2.2. ERROR, ERROR ANALYSIS AND EVALUATION

In Bueno's opinion (1992), the value of the EA as a tool for evaluating the student is very high. The evaluation that EA carries out has to go far beyond making a list of the errors that the student makes and then classifying them. Its application is much more complex since it has to take into account the psychological and sociological factors that also intervene in the appearance of the error.

There are several opinions on this subject as Blanco (1992) notes in his overview of them. Bryan Jenner, in his paper "Error analysis: an introduction for teachers" (1976), affirms his view that EA and objective evaluation are opposite concepts. This is because EA only tells us what the student does wrong but not what he or she does right, so objectivity is affected.

Martinez Haro approves of the use of objective assessment where external factors do not influence the final result. He advocates the use of objective tests where only what is to be evaluated is assessed, without regard to non-linguistic factors such as psychological ones. He proposes an evaluation where the answer is a subconscious and automatic habit, so that there will only be correct or incorrect answers. Blanco has two criticisms of this position. The first is that it does not take into account the transitional competence postulated by Corder, nor the interlanguage Selinker's approach. The second is that the psycholinguistic factor is not taken into consideration. This factor gives information that makes the answers not only correct or incorrect because there are factors such as how many rules the student has learned that add important nuances to the analysis of the error.

Another option that is developed to achieve objectivity in the evaluation is the Multiple Choice Questioning. Its purpose is to train certain skills in which the student has several possible answers, some differentiated from others by small nuances. Munby in *Read and Think: Training in Intensive Reading Skills* (1968) writes that although this type of test has had its detractors, actually, it is very practical and its success depends on how it has been designed. His detractors argue that this type of test fails because the student does not have to think about the answer; he or she chooses one that is obvious. But Munby proposes to introduce distractors to avoid this simplification in the answer; they could pressure the

student to think about the correct answer. This would make it easier to know what the student knows or does not know. Furthermore, he proposes that the results of the tests be discussed among the students and with the teacher to draw objective conclusions from them.

Not all linguists are in favour of considering only objective assessment as the only possibility of analysing a student's production in L2. Jenner writes in "Error analysis: an introduction for teachers" (1976) that while the objective test focuses only on the negative outcome of what the student produces, the EA provides information on the process that has led to that outcome and does not address only the negative aspect. Therefore, he believes that EA is a very necessary tool for evaluating error because they provide nuances that objective tests ignore.

Blanco concludes that while EA is a bit speculative and not immediateas it needs some time to carry out the analysis process, the objective evaluative tests can control this speculative element to a greater extent. It is also faster in presenting the results. Hammarberg in his paper "The insufficiency of error analysis" (1973) precisely points out these two factors and adds that the psycholinguistic element should also be studied as part of the student's response. In his words:

> Even if EA (Error Analysis) is not the adequate basis for a description of learners´ difficulties that it has been believed to be, I think it has its given place in research procedure as a partial and preliminary source of information at an initial stage of investigation (…). Thus the study of errors becomes part of a cyclic experimental procedure to collect more and more specific information on target language treatment (Blanco [Hammarberg 1973], 1992).

4.2.3. CRITICISMS TO ERROR ANALYSIS.

Not all linguists agree with EA's approach. Schachter in "An error in error analysis" (1974) noticed that students use different strategies such as the use of periphrasis to avoid constructions that present difficulties. And this is not detected by EA since it focuses on the mistakes that the student makes, not on whether he or she avoids such a mistake by

using a strategy. Another aspect that he considers as improvement is the classification of errors that, from his point of view, is done in a diffuse way. James provided the solution, *Contrastive Analysis* (1980), when he says that it is necessary to unite EA with a rigorous CA since the purpose of both is "the means whereby a monolingual learn to be bilingual". (Bueno [James 1980], 1992).

The limitation in EA has been criticised by authors such as Schachterand Celce-Murcia (1977) who consider that it does not cover all the mistakes a student can make in his or her learning and this is due to the tendency of every student to avoid using those linguistic elements of the L2 with which he or she does not feel safe, Jiang (2009), who believes that the errors the student shows are partial because he or she focuses only on the errors and thus neglects a global vision of the learner's production, advocates the need to include the successes of the studies in the context of the linguistic production of the learner, because it is in the context of the learner's production that the errors can be contextualised and analysed appropriately (Mohammad Hamad Al-Khresheh, 2016).

A special mention in this section is the criticism that Bustos (1998) makes of some aspects of Corder's theory. Bustos establishes a critique in each of the properties that Corder assigns to error: systematicity; its use by an individual or a group of individuals who have the same level of knowledge; and to each level of learning corresponds a different dialect.

Regarding the first one, Bustos considers that it is difficult to establish the degree of systematicity of the error since it is not enough to determine if it is or is not an error by the mere number of appearances of it. The second property is also not precise since it is not clear whether the error is defined in terms of group or individual, here the factor of the homogeneity of the group in its level of knowledge of L2 should be considered. And finally, if each stage corresponds to a transitory dialect then it is admitted that in any stage there should be a certain type of error. The problem is to establish at which stage the error occurs to know which errors belong to each one. There is no consensus among linguists to establish it.

As explained above, EA has many positive aspects as we have seen, but it also has negative aspects or at least it can be improved. Dulay, Burt and Krashen (1982) point out among these the difficulty of explaining the causes of errors. And because there is no reliable method to classify the errors there is a tendency they fall into simplistic classifications of them.

Angelica Alexopoulous (2010: 3) outlines the criticism of AE in four points:

1. It only takes into account errors and not successes.

2. It cannot explain the errors that occur when the student who is aware of his or her limitations avoids using a rule and employs, for example, a paraphrase.

3. Confusion between explanation and description.

4. Lack of precision, especially in the etiological criterion, since a deviation can be attributed to several sources.

4.3. INTERLANGUAGE.

In Selinker's interview with Allwright, Eskey, Rutherford and Schumann (Selinker 1997: 219-220), he explains that the term "Interlanguage" (IL) is a term invented by Corder and himself. Although it was Selinker, in 1969, who first introduced the term "Interlanguage" with the modern concept we know today. At this time, he considers the cross-lingual influence as the most important influence on interlanguage.

Lennon (2008) points out that Selinker adapted it from Weinreich´s term "interlingual identifications". In 1972, Selinker published a fundamental article entitled "Interlanguage" which is the basis for what will be the future of this field of research.

As Tarone (2018) explains, the creation of the theory of Interlanguage arose as a reaction to the general idea that the student´s second language was the consequence of the transfer he or she did from his or her ML to the TL.

4.3.1. DEFINITION OF INTERLANGUAGE.

Selinker in 1972 coined the term Interlanguage. He uses it when he refers to a language intermediate between the native and the target language. It is the linguistic system that an L2 student has in each of its learning stages. Other authors use other terminology such as: "transitory competence" by Corder in 1967, "idiosyncratic dialect" also by Corder in 1971, "approximate system" by Nemser in 1971 and "intermediate system", by Porquier in 1975.

Linguists have studied interlanguage theory since Selinker published his paper "Interlanguage" in 1972. Each of them has defined the term "interlanguage" from their point of view and based on their studies. It has been used in different contexts and has acquired different meanings. That is because there is little consensus on the precise definition of the term and its theoretical implications for language acquisition. Below are some of these definitions that will help us to put ourselves in context and have a better understanding of the term.

"Interlanguage" was defined by Selinker (1972) as the separate linguistic system evidenced when adult second language learners spontaneously express meaning using a language they are in the process of learning (Tarone, 2018).For Richard Nordquist (2019) "Interlanguage is the type of language or linguistic system used by second- and foreign -language learners who are in the process of learning a target language"[3]. Cristal perceived the influence of L1 to L2 and described this term as:

> "[Interlanguage] reflects the learner's evolving system of rules, and results from a variety of processes, including the influence of the first language ("transfer"), contrastive interference from the target language, and the overgeneralization of newly encountered rules" (David Crystal, "A Dictionary of Linguistics and Phonetics").

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[3] https://www.thoughtco.com/what-is-interlanguage-1691074

And following this idea of rules that govern interlanguage Ellis defined it as "a term that refers to the variable progression through which a system of abstract linguistic rules is developed" (Second Language Acquisition, 1997).

The idea of interlanguage as a processing model that embraces all possible previous models is defined by Bialystok and Sharwood in 1985: "[Interlanguage] is a processing model which takes account of the general trends raised in the earlier accounts" One of the most important linguists in this field who has theorized about IL is Tarone, for her IL is a language system that students use when they study a second language. She defines it as follows "Interlanguage" (IL) refers to the linguistic system of learner language produced by adults when they attempt meaningful communication using a language they are in the process of learning" (Tarone, 2018).

And recently Mourssi (2013) pointed out the importance of considering that IL has its own grammatical system. For this reason, he says: "the interlanguage hypothesis is defined as the hypothesis that the language learners have a grammatical system that is different from both the first language and the target language but is nevertheless a natural language".

In conclusion, all these linguists talk about the student creating a system when learning a second language that is neither ML nor TL. And this new system is the object of study and is commonly called Interlanguage.

4.3.2. THE INTERLANGUAGE HYPOTHESIS.

The hypothesis is based on the fact that Interlanguage happens when a student begins to study a second language and tries to communicate with it. At the beginning Selinker formulated IL hypothesis only for adults' learning although later it was expanded to children's learning also. In 1975, some studies by Selinker, Swain and Dumas showed that children also create their own interlanguage and it has the same phenomena as adults´ IL, for example, fossilization. Swain imputes this fossilization to the lack of incentives young learners have to produce what he called "comprehensible output", i.e. in the artificial

communicative environment of L2 class, the students try to create an interlanguage to communicate in the group.

Interlanguage Hypothesis says that there is an intermediate system between the mother tongue and the target tongue. It is systematic and autonomous, with individual patterns because each student has his or her own interlanguage and it is continuously evolving. The students unconsciously create their own interlanguage because he or she is not aware of the rules that govern it.

This concept of interlanguage as an autonomous system differentiated from L1 and L2 has been studied by Selinker and also by other linguists such as Nemser, Corder and James. In 1971, Nemser theorised about "approximative system" focuses on the evolution of the learner in the acquisition of L2; then Corder coined the term "transitional competence". It works with the idea that the learner will develop and improve his or her knowledge of the TL until he or she can reach a high level of proficiency in it; and James who uses the term "interlingua" to refer to the very language system that the student creates when acquiring a second language.

As previously stated, errors appear because the student practices a deviant use of the norms in the L2. And error is considered a systematic deviation in the performance of a second language because the rule is not known. Since IL has systematic differences with the native speaker system, it can be said that the differences between the learner´s performance and the TL rules are not random. Because of the systematic factor, the errors are stable in each stage. Also, this provides a group of learners with an intelligible IL that all of them can understand (Lennon, 2008).

There are two relevant positions to take into account regarding this topic. The first takes the position that English is a uniform language where anything outside the academic standard is a mistake and therefore does not accept the different types of English. In 1985 Quirk took the position that standard English should prevail as it avoids the dissolution of the language in to different sub-languages. He cites the fate of Latin when it became a number of different languages. For him the varieties of English are not acceptable and he

favours World Standard English (WSE); he believes every English speaker should follow this model.

The second position is the opinion that there are some linguistic varieties in English, and the causes of them can be personal (age, education background, etc.), geographical and economical, among others. And all of them are as valid as standard English. It affects the consideration of what constitutes a mistake. In this way, Prator in 1968 claims that learner's IL is not a dialect of English but represents a language of its own. Then Interlanguage is considered a natural human language and therefore should be studied as such, and not try to rectify the features that do not coincide with the rules of L2 because they are wrong.

Studies conducted by Selinker are the basis for all subsequent IL studies. Summarising his theory, we can say that Selinker (1997) realises that when there is an attempt at communication between the learner and native speakers of the target language, a series of phenomena occur. On the one hand, the learner creates a separate linguistic system where both interlingua identifications and language transfer are basic. Moreover, to solve communication problems the student chooses NL by context, and this leads unequivocally to the problem of fossilization that will depend on both the linguistic level and the discourse domain. This created IL will be influenced by the different types of universal language as well as by interlanguage universals, creating the learner strategies of simplification as well as complexity, among others, all to achieve success in the communicative work.

> The IL Hypothesis as I currently see it, states that in attempting to express meanings in an L2 and in attempting to interact verbally with native speakers of that L2, at least the following occur (Selinker, 1997: 246-247).

As mentioned in previous sections of this paper, Selinker conceives interlanguage as a "dynamic system". That system is a product of a psycholinguistic process of interaction between the linguistic system of the native language (NL), and also of the target language (TL). Then it is an intermediate system that shows formal characteristics of the two of

them. In SLA, interlanguage is one of the main areas used to understand the use of the system of a second language (SL). The process of learning a SL is complex, Lennon (2008) expressed it has different processes and aspects to consider. In Selinker´s hypothesis these five processes are established: language transfer; transfer of training; strategies of L2 learning; strategies of L2 communication and overgeneralization of L2 rules.

In the context of classroom learning, two actors are involved: the student and the teacher. Both use processes and strategies to achieve the tasks they must carry out in the teaching and learning of L2. Selinker realises that in this process there is an influence from L1 to L2. He uses the term "language transfer" to define it since he considers that the term "interference" does not adequately reflect the active role of the student in the learning process.

On the other hand, he thinks that the quality of teaching is a key factor. This teaching process must meet certain quality requirements because if they are not met, what he calls "transfer of training" will occur. An example of the latter is when the student learns a formal and academic vocabulary that he or she uses correctly in a context that meets those characteristics but also uses it in informal contexts where its use is not appropriate.

There were other linguists interested in studying IL besides Selinker. The perception of one language influencing another attracted the attention of other linguists such as Uriel Weinreich. In his work *Languages in Contact* (1953), he studies the influence of one language on another, generally the strongest on the weakest. His contribution to linguistics is that language interference has psychological and psycholinguistic explanations. From his point of view, a speaker of two or more languages unconsciously carries out a process of "interlingual identifications"; in other words, he or she seeks equivalence of features between languages.

Weinreich establishes that there are two types of speakers: "compound bilinguals" and "co-ordinate bilinguals". The first group has a linguistic repertoire that replaces two similar traits of two languages by one that serves both. The second group are able to handle the

repertoires of both languages separately. They do not need to look for simplifying similarities between L1 and L2.

In the 1970s, Blurt and Dulay explained about interferences in L2 that the idea of a transfer from L1 is not the only possibility because the interference can come from other L2 that the learner knows. Later Corder (1982) suggests that the student establishes an "initial hypothesis" using the less complex systems that he or she has. That system can be from his or her mother language or from another that the student knows, and it helps the student to progress in his or her communicative capacity. This leads him to suggest that the similarities in aspects of interlanguage appeared between students with different mother languages, come from working with what Corder calls "basic" form of the "initial hypotheses".

The student tends to simplify the learning process by choosing those elements that are most important to him and omitting those that make learning difficult. To do this, he or she uses "L2 learning strategies" which, as Selinker points out, should not be confused with the "strategies of L2 communication", even though they are difficult to differentiate one from the other when analysing the student's production data. Communication strategies are a very interesting field of research since they show how the student avoids communication problems with another subject when interrupted or not understood. And, according to Brown, these strategies can be word coinage, code-switching, paraphrase, avoidance, appeals to the interlocutor and so on (Lennon [Brown 2007], 2008).

Besides the use of strategies, the student tries to maintain communication with another subject by doing what Selinker calls "overgeneralisation of L2 rules". This consists of generalising a rule for all cases without taking into account that this cannot be done. An example that appears very clearly in the first stages of learning is the tendency of students to form past with <ed>. The student generalises this rule with the irregular verbs to which it cannot be applied. Not all linguists agree with Selinker in the creation of this group as, for them, overgeneralisation is a simplification strategy, for this reason, it should be included in the strategies of learning.

In addition, Selinker understands interlanguage as a continuum in which there is a phenomenon called "backsliding" which consists of the reappearance of linguistic structures that were thought to be already overcome. He points out that although it might seem that this reappearance is random it is not really because it is connected with the student´s interlanguage norm. For him, the success of learning a language has to do with the reorganisation of the linguistic material related to the target language. Backsliding is a setback in the learning progress. The reasons for backsliding are diverse, they may be because the student is tired, distracted, or in stressful situations, among others. For Lennon (2008) backsliding is a feature of the emergent stage. It is represented by a U-shape that pictures how the student seems to go backwards in his or her learning before progressing.

One of Selinker's important contributions was his theory on "fossilization". In his work *Rediscovering Interlanguage*, introduces the term "fossilization", which describes the mechanism that the L2 students incorporate into their interlanguage by which a series of problems are embedded. Some areas may be affected by fossilization, such as grammatical, phonological, lexical or other areas. The problems that arise will, on the one hand, be independent of the degree of preparation and education that the student receives in the L2, and on the other hand, will hinder the learning of the L2 by blocking the ability to execute the rules of the L2. What happens then is that the student is no longer progressing his or her learning and continually repeats the mistakes, even though the teacher corrects and explains them.

Along with fossilization there are other aspects in IL theory to consider, such as "change". Researchers realised the change of IL organisation when they used different tasks to collect data. They realised from the beginning that when the students performed different tasks, their IL production was not stable because it suffered changes and variations. This opened up a new field of study on variability and systematicity.

Tarone carries out an exhaustive study of the work on variability and systematicity done by other linguists. For her, there are two elements of analysis, which are variability and systematicity that act on students' IL, that are covered by linguists from different approaches. Selinker considers that IL is variable because throughout the L2 learning

process there are forms that are maintained at different stages while new ones can replace them or not. In 1988 Elaine Tarone gave more emphasis to the idea of interlanguage variability and developed the concept of "attentionality continuum". This happens when it is more important for the student to maintain communication even at the cost of the formal correctness of the message.

In relation to these two elements, Corder (1982) theorises that variability in interlanguage is given by three factors: the student, the setting and the language involved. Regarding the first, he points out that age is an important element since learning a second language as a child or young person is not the same as learning a second language as an adult. He realises that the younger the students, the more similar their systems of interlanguage will be. The characteristics of the setting are also important since it is not the same as a formal learning setting where the main point is the acquisition of code than an informal setting where the importance is the use of the code in communication.

Long (1990) states that SLA theories attempt to explain the relationship between the process of language learning and product in interlanguage development. On this point, he argues that:

> Interlanguages exhibit systematicity and variability. . . The systematicity manifests itself in many ways, including the regular suppliance and non-suppliance of both targetlike and nontargetlike features in certain linguistic contexts and in the persistence of the same errors ... Interlanguages, that is, are, or at least appear to be, rule-governed. Much of the variability they also reveal turn out to be systematically related to such factors as task.., interlocutor, and linguistic context (Long: 658).

For him, variability and systematicity affect the student's production in the second language because it affects his or her IL. These are two essential aspects that have to be analysed and explained by second language theory although the environmentalist theories of SLA are not adequate because:

> Interlanguage systematicity, including adherence to regular developmental sequences and systematic production of nontargetlike forms never modelled in the input indicates a strong

cognitive contribution on the learner's part and means that environmentalist theories of SLA are inadequate (Long: 660).

Many studies were conducted on this topic; Larsen-Freeman was one of the first in 1975. She was interested to analyse whether adults who learned English as a second language acquired the morphemes in the same order as children who also studied English as SL. To do this she asked the adults to perform five tasks: speaking, listening, reading, writing and elicited imitation. Very little time elapsed between the end of each task to avoid alterations in the test. When the test was finished and the level of accuracy that the adults had in each of the five tasks was established, and the morphemes were organised in each task by the level of accuracy, the results were surprising. The morpheme accuracy statistics varied in each task and were not stable.

One year later, LoCoco conducted another study with adults performing three tasks: a free composition, a picture-description task and a translation task. The result of the data analysis showed that in each of them the subject's accuracy was very different. The students had more errors in the free composition than in the translation task, but in a picture description the accuracy level was intermediate. In neither of the two studies described could the causes of this variability be established because they were not designed for that. Since then, many other studies have been conducted to analyse the task effect on learners' accuracy (Tarone, 1988:13-14).

In the '80s, the interest was focused on the study of task effect in interlanguage grammatical forms. It was established from the beginning that student's grammatical accuracy varied as a function of task type. The researchers who defended the idea that IL was systematic found that these variations caused methodological and theoretical problems that they needed to explain. Trévise and Porquier describe the situation in "Second language acquisition by adult immigrants: exemplified methodology":

> The nature of the task (conversation, role-play, picture description or description of places, story-telling) produces unpredictable variation in a subject's IL. What then should be described is not only the IL system as it is revealed in a given task comparison between

similar tasks at different developmental stages yields a discrete criterion that can be used to compare the different stages (Tarone [Trévise and Porquier 1986:267], 1988).

Then the variations are of different types. Ellis´s work *Understanding Second Language Acquisition* (1985) divided the types of IL variability into systemic and non-systemic. The former can be predicted and are divided into two groups: individual variations, which occur when each subject presents its own variation that has nothing to do with that of other individuals. That happens because each student has his or her own characteristics when learning a language, such as motivation and attitude. The second group is contextual variation, which is generally due to the influence of the context in which they happen. Some occur because of the type of task the student has to perform, the topic, interlocutor, and so on. There is another type of contextual variation that affects the linguistic context; some are more accurate in some contexts than in others, as Ellis shows in this graph:
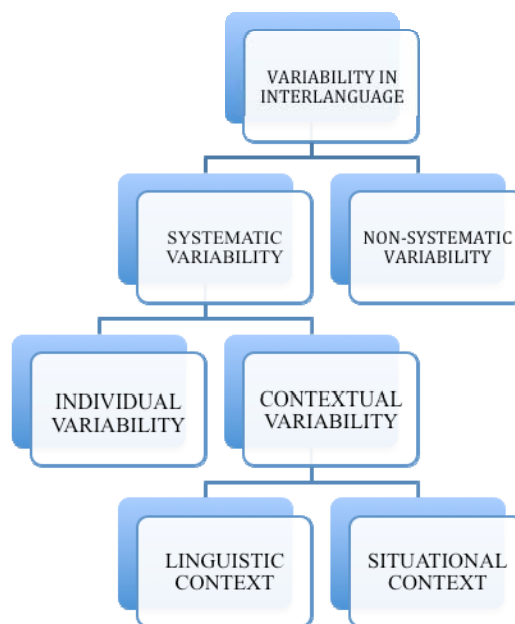
Fig. 6. Types of variability in language-learner language. (Tarone, 1988). *Variation in Interlanguage*. p.19.

Besides variability there is systematicity. For Tarone, communication has a systematic repetition of elements without which it cannot be carried out. Systematicity presents the

problem that it is not obvious; it is not appreciated as easily as variability. To identify this phenomenon, linguists propose three types of approaches:

1. Ethnographic approach. It takes into account social factors, body language, face gestures, and so on. From her point of view, everything is associated with language and everything has to be considered in the study. The problem with this approach is the large amount of data it provides which does not make it practical.

2. Rationalist approach. It has a Chomsky approach. Its purpose is to represent language as an abstract system. When a linguist uses this approach, he accepts that the native speaker does not have a priori categories of language. This perfect knowledge is achieved through introspection. And finally, this type of knowledge will be preferred because it is obtained through the imperfect senses.

3. Function-form approach. The first studies are located in the School of Prague and their objective was to show how in language the structural elements showed systematic functions. It is, therefore, an attempt to describe and explain how form and function in a given social context are related systematically. There are different perspectives since sociolinguistics focuses on how language is used to mark social, gender, racial and so on differences. While pragmatics analyses how language forms functions to signal, for example, topic, old and new information, and so on.

This systematicity appears in IL, and is analysed from three different approaches or views such as Chomskyan approach, Labovian approach, Function-form view/IL systematicity.

Focusing on Tarone's research, we see the importance of his contributions about the importance of variability in IL, as well as the systematicity are relevant. From her point of view both factors configure two of the most important characteristics of IL.

Tarone (1988) establishes three criteria to evaluate the theories of IL variation:

1. It should be there is systemacitity in the variation itself.

2. All the causes of IL variation should be empirically verifiable.

3. All facts of interlanguage variation should be accounted for by the theory.

She divides the numerous theories about IL into two groups that have some differences between them (1988: 113-114).

1. Those focus on inner processing factors as causes of variation. The Monitor theory, Chomskyan models, psychological processing models and the Labovian "attention to the speech" model integrate this group.

2. Those that focus on the observation of social factors know the causes of IL variation. In this group are the sociolinguistic and discourse theories, psychological models such as Speech Accommodation theory, and function-for models such as Huebner´s. The social factors they analyse are the identity/role of the interlocutor and the communicative function of the variable form.

Then there are two points of view among the groups of theories. The first denies the existence of underlying psychological processes since they prefer to focus on external data that can be analysed objectively. The second group analyses social data that can be observed and therefore it admits the psychological process as a criterion to be taken into account. On the other hand, Tarone (1988) considers that there is still no theory that can explain all the empirical data so the theories of both groups are not adequate for the third criterion.

Tarone concludes that there is an IL variation that affects SLA. This phenomenon of variation affects all levels of language: phonological, synthetic, morphological, pragmatic and lexical. She opposes Swan's theory that only a limited number of small rules become variable. Tarone thinks this is a generalised phenomenon that is not circumscribed, only to a few determined and marginal rules. She bases this on the studies carried out by Hakuta, "Becoming bilingual at age 5: the story of Uguisu" (1975) and Huebner, *A Longitudinal Analysis in the Acquisition of English"* (1983). Both authors research about SLA in two practical cases and they advocate for dynamic analysis of IL variation and the sources of the student´s errors.

It also notes that the causes of variation in IL can be reduced to four: the linguistic context, the psychological processing factor, social factors and the different functions that a given form performs in communicative discourse (1988: 114).And she proposes to develop the study work of IL variation in three aspects (1988:114).

1. In building an adequate theoretical model.
2. In the empirical evidence to be gathered.
3. In the design of studies.

Furthermore, she sets out some general lines for the study of this material; her proposals are of interest and have been followed by some linguists. Tarone (1988) points out the importance of establishing a good design in the studies of IL variation. The elicitation of data has to be enhanced and more rigorous in its control. And rigorous in how it is exposed so that it can serve as an investigation tool for other researchers. The aim is to facilitate comparisons across studies. Finally, concerning the tests, she thinks that simple paired-sample t-tests are adequate for the comparisons of results for two reasons: by correlational analysis focusing on the characteristics of two variables, and by analysis of the interaction between different variables.

Charlene J. Sato (1984), dealing with variation interlanguage phonology, points out that Tarone's "Chameleon Model" based on the "continuum paradigm" is based on Labov's idea of "observer's paradox". From her point of view IL has to be seen as a continuum of styles, understanding that the total attention is paid to the form of language. Her theory is that there is a variation in different stages of IL speech production, with two different situations in the continuum.

The first in the vernacular language, which is much systematised, has less attention paid to its formation because it is internalised. The second contains a phenomenon of "careful style", where speech is observed systematically and where it is obtained in formal situations such as those occurring in the classroom. It is in this TL that the variability is greatest. Tarone's idea is that the students usually learn a register, whether formal or

informal, at the beginning of the study of L2, in the TL and it is later when they expand their range of registers, thus attending to different communicative situations.

The analysis of the data extracted from the observation of these registers is what will allow the construction of a viable linguistic system, which serves as a model and that accentuates the IL performance. According to Tarone, the continuum paradigm predicts that while the structures of the TL will be approached from the careful style to the vernacular, in the structures of the IL there will be a gradual substitution in which those of the TL will end up imposing themselves. Tarone says that the L2 student adapts to the different linguistic registers by manipulating variables in their interlanguages. On the other hand, there is increasing unanimity in the influence of social contexts on the development of interlanguage. Thus, what Tarone calls "Chameleon Theory" is where she exposes that IL is chameleon-like in their ability to adapt to different communicative registers.

She explains her theory in "Interlanguage as chameleon" (1979). She understands language as a process of human interaction adapting to different communicative situations, as a chameleon would. From Adjemian's point of view, interlanguage is a natural language and therefore has to behave like other languages. However, this variable and adaptive aspect is forgotten when researching IL. Tarone draws on the five methodological axioms that lead to the central paradox reflected by Lavob in his work "The study of language in its social context" (1969). Lavob's "Observer's Paradox" consists of observing and describing how people speak in situations outside feature observation controls.

The first axiom is Style-Shifting. It says that every speaker has his or her style and that linguistic and phonetic shifts vary depending on the context in which the communication takes place and the topic at hand. Tarone defends the idea that IL also suffers from this style-shifting, and that it affects all kinds of aspects, both grammatical and phonological. Dickerson's studies in the 1970's support this view since they show that different systematic phonological variations occur in IL depending on the context where communication takes place. Tarone, therefore, concludes that IL manifests itself in different styles in which, if the situation changes, there is a change in linguistic and phonological characteristics.

The second axiom is Attention. It is based on the idea that it is possible to classify the styles of a speaker along a continuum by taking into account how much attention is paid to speech. And Tarone launches the hypothesis that IL is a natural language defined by the degree of attention paid to speech.

The third axiom is Vernacular. In this style, a minimum amount of attention is given to speech, and phonological and grammatical models appear as expected. There is not much variability in this vernacular style. Tarone hypothesises that vernacular is the most systematic style in IL and the least affected by the influence of NL or TL.

The fourth axiom is Formality. In this style, the speakers know they are being observed and their production is formal as they pay more attention than normal to their speech. Tarone thinks the axiom is almost always present, even in communicative situations that would seem informal but, from the moment the speaker feels observed, this aspect of formality appears.

And the last axiom is Good Data. It refers to the fact that the best method to obtain valid data is through a recording, which places the action in a formal context. The paradox here is that since the speaker has been focusing his or her attention on the speech, what is collected is not entirely "natural" information.

Tarone believes that all of these axioms influence the nature of IL, and it is necessary to reduce or avoid their effects. She believes it is possible to analyse the systematic nature of IL, but only if the researcher takes into account the chameleon-like nature of IL and the changes it may undergo, depending on the context. To do so, he or she has to specify the following variables: task, interlocutors, physical surroundings and topic.

Another aspect to consider is the use of Universal Rules (UR) that the linguists believe students use when building their IL, and that allows them to communicate with other students. For this reason, linguists try to establish what they are by analysing a concrete manifestation of communication. Student´s IL takes different variable forms since it is not a monolithic block. What is evident is that interlanguage is not an element of socially institutionalized behaviour and therefore, lacking regulated norms, is unstable. For this

reason, it only takes the TL language norms. Previously the phenomenon of "change" has been cited as an introduction to the concepts of variability and systematicity, focusing on it we can say that the theoretical problem that arises at the time of studying interlanguage is to establish the definition of "change", linguists do so by defining different successive phases in the "stable states" also known as "etat de langue".

This theory is generally valid but presents problems when it comes to defining changes that either happen very slowly or, vice versa, very quickly. Besides, for some linguists, it carries the difficulty of accepting the term "systematic" concerning this field. Corder (1982) solves this by theorising that the changes that take place one after the other do it like a chain, in which each link is connected to the previous one; they are not independent.

Again, Corder's studies in the written and oral areas stand out above all. He tries to describe the interlingua of the L2 speaker, which is governed by universal norms and which is constructed step by step through the formation of hypotheses that the student does in his or her learning process, Here L1 does not play a relevant role. What is relevant is the methodological rigour in analysing and explaining these errors, which the teacher has to identify, describe, classify and explain the error and see it as a positive starting point for the learning process.

This teacher´s role leads us to the methodology used to collect and analyse data. There is an increased interest in analysing the student's production in non-regulated contexts such as the classroom, for example in an informal communication situation. Besides, there is an attempt to isolate the student´s knowledge of any interference that may occur in the regulated classroom environment.

In the learning process the student can produce his or her data spontaneously or guided by the researcher if he or she wants to work on a particular aspect. It occurs when the researcher has not yet constructed a definitive hypothesis to prove, and it is connected with error analysis. For example, the student is learning the use of the past tenses and the teacher, instead, explains the rules for building the past tenses and he or she encourages him to practice through activities associated with the past. Then the student should reach

the knowledge of how the past tenses can be used and are built. The researcher has control because he or she has already created a preliminary hypothesis on a feature, and applies the methodology to collect and analyse the information.

In these two methods, the researcher has an "authoritative position interpretation" of the data provided by the student. It is important to point out that thanks to the use of elicitation techniques the problem of lack of spontaneity in the production of data can be solved and therefore make a more reliable analysis of student's interlanguage.

Taking up the issue of universal rules, we can say that if there are universal rules, there should be universal grammar (UG). The influence of UG in IL hypothesis was immediately recognised by most of the linguists. It is fundamental to the development of natural languages but is not so in interlanguage. Selinker's point of view is that interlanguage is not a natural language, hence the causes for the phenomena of fossilization and transfer. However, this idea is not shared by all linguists, so that Adjemian in 1976 put forward the hypothesis that interlanguage is a natural language related to UG. Its system of rules is permeable so that there is a transfer of them from L1 to L2. And the fossilization happens because students apply parameters from their mother tongue to the target language instead of learning and internalising those of the L2.

All this takes us back to the 1970s when Selinker developed the theory of interlanguage, this time paying attention to both mistakes and successes as he gives both the same value when it comes to learning an L2. Angelica Alexopoulou says:

> La Interlengua (IL), concebida como el dialecto transitorio del aprendiente, necesariamente sistemático, dinámico y en constante movimiento a través de un proceso creativo que evoluciona hacia estadíos cada vez más complejos, se erige en el eje vertebrador de los estudios de SLA [Spanish in the original] [The Interlanguage (IL), conceived as the learner's transitory dialect, necessarily systematic, dynamic and in constant movement through a creative process that evolves towards increasingly complex stages, stands as the central axis of SLA studies] (Alexopoulou, 2010:3).

Going back to the idea of interlanguage as a "dynamic system", Selinker's approach is based on Corder´s "transitional competence" and shared by some authors, like Nemser. However, there is another group of authors who cannot admit the idea of "dynamic system", among them we can include James, who in 1974, wrote that if the system varies it ceases to be a system. Similarly, neither Selinker nor authors such as Corder, the aforementioned Nemser or Richards in the 1970s did gather information or analysis on the possible increase in complexity or development of target language. Corder in 1982 believes that this was due to the belief in the strong influence of mother tongue in target language, which analysed the error as a starting point in the development of teaching techniques to avoid them.

However, it was Richards who realised that a certain complexity of the interlanguage continuum was present. He explains it through his hypothetical language students' strategy when he uses the term "simplification" which defines itself as "a way in which speakers of different languages can make a new language easier to learn and use" (Richards, 1974). He is the first to take the notion of "simplification" as a "learning strategy". However, Corder (1982), and previously, Widdowson in 1977, when speaking of "communication strategy", disagreed with this view by believing that more than a "learning strategy" is the "result of a strategy" or a "learning process".

The importance of learning strategies is emphasised in the studies of Brown (2007), who considers them the fundamental tool for the students to develop their autonomy. Quoting Wenden, "Learner strategies for learner autonomy" (1985), he considers that the most important task of a teacher is to facilitate the student's development of autonomy when learning a second language. To help the students identify their strengths and weaknesses, Brown proposes in his work *Strategies for Success* (2002), a self-help guide so that students can assess themselves and advance in their autonomy. At present, the most widely used tool in the world to identify students' strategies is the Oxford Strategy Inventory for Language Learning (SILL). The SILL consists of 50 items grouped into six categories representing six strategies, for example, the use of rhyme to memorise vocabulary. The

purpose of the SILL is for the student to use the strategies that best fit his or her style, and then begin to work with the new language.

For Corder, it is important to distinguish "strategies of learning/acquisition", which are mental processes. The student uses them in combination with the knowledge he or she has to elaborate the language system; and "strategies of communication" which relate with the instruments that they possess to be able to carry out satisfactorily or, as satisfactorily as possible, a communicative act. Firstly, if the student develops an interlanguage, it is because his or her strategies of communication are not successful enough; secondly, the student constructs his or her interlanguage through data produced by other subjects using strategies of communication, which is what happens in the children's learning process of his or her mother tongue.

Having analysed the previous hypothesis, Corder comes to the conclusion that it is better to talk about "interlanguage continuum" than to talk about "developmental continuum". It is evident that the native speaker or student is going to adapt their interlanguage to achieve better communication making use of all the resources and knowledge they have at their disposal, from shifting to a code of equal complexity to increasing or decreasing the degree of complexity.

Selinker's (1972) "strategies of communication" lies in the fact that these strategies, from his point of view, appear as a consequence of a communicative act on the part of the student that occurs spontaneously and without a sufficient knowledge base in the target language for it to be successfully produced. In other words, it is a systematic technique in which the student tries to express his or her feelings when communicative difficulties appear. On the other hand, it is necessary to point out that some authors present difficulty when they classified what is a strategy of communication and a strategy of learning. This is because both share the same group of data in the interlanguage of the student, which happens especially when there is an interference of the mother language. This situation of transfer from L1 to L2 begins a strategy of learning.

The communication strategies in a native speaker have a balance that produces success in the communicative task, however this does not happen in the case of a student whose linguistic resources do not allow him to express what he or she really wants and therefore this balance does not exist. The only thing they can do to proceed to what Corder calls "message adjustment strategies", that is to say, to adapt the message to their capacities and possibilities or, on the other hand, they can increase their resources in one way or another to achieve their goal, in which case they would be using resource expansion strategies.

In the development of IL, theory linguists have expressed the need to expand the study material with that from other fields. Concerning the material to be used Selinker, Lado, Garfinkel, and others see the need to use material from other fields, as they believe that they can enrich the study in their own field of study. Theories about the importance of CA, EA and IL have been evolving and are varied. It is necessary to keep in mind that the linguist goes through stages of study in which more importance is given to some fields than to others. Therefore, it follows the viewpoint of Lado who, in 1957, pointed out the need to "read" texts from other disciplines to be able, in the case of the IL and SLA, to advance concepts and ideas. He also agrees in this respect with Garfinkel who, following the same precept, reread texts from CA or IL, drawing on the same concepts, ideas and theories from other fields.

All this is known as the "intentional misreading technique", and from Selinker's point of view, there are six areas in which this technique of the founding texts is important, understanding that when talking about texts we also include those coming from different areas besides IL and CA. The above-mentioned areas are the following:

Contrastive Analysis.

Error Analysis.

Experimental Contrastive Analysis.

Theorical Linguistics.

Bilingualism.

Then, following Selinker, it can be said that both CA and IL started out from Fries´ works in the middle of the 20th century. Hewrotein his work *Teaching and Learning English as a Foreign Language*:

> The most efficient materials are those that are based upon a scientific description of the language to be learned, carefully compared with a parallel description of the native language of the learner (Fries, 1945:9).

It is here that the interrelationship between CA, IL and EA appears. The three aspects play a role in the study of a second language. Selinker (1957) explained the relationship between CA and EA and, together with data from IL, it should be noted that CA and IL data help to predict IL data in terms of possible interlingual identifications. Corder (1967) establishes the first relationship between EA/IL coinciding with Selinker's work; both consider that the transfer between languages is formed by the links between CA/EA and IL. In his work he explains that the existence of what he calls traditional units of linguistic description is not sufficient to fully explain the functioning of IL, so it is necessary to consider, as his counterpart has already explained, the relationship between the three fields, CA, EA and IL in order to satisfactorily explain the phenomena analysed.

As a conclusion to this chapter, it should be said that there are both supporters and opponents of Interlanguage Theory. The supporters have been explained in detail above. As for the detractors, it must be said that their criticism comes from the fact that some students will never master in L2, which is why authors such as Paul Lennon and Brown, amongst others, have criticised the model.

According to Paul Lennon (2008), amongst the criticisms that have been made of Interlanguage is the fact there is no single model within communicative competence since different sub-competencies can be established, such as linguistic, sociolinguistic, pragmatic, paralinguistic and strategic competence, amongst others. Therefore, depending on the context, the interlocutor and the type of communication the student will use have different communicative patterns.

Lennon (2008) agrees with Brown (2007) when he criticises the IL hypothesis because it considers that the student's competence is homogeneous. But it is believed that each student performs differently depending on the context in which he or she is, or the type of interlocutor he or she has.

Towell and Hawkins, in their *Approaches to Second Language Acquisition* (1994), explain why students never master a second language. They point out that one of the reasons why L2 students never achieve the same linguistic competence as a native speaker in some areas is mainly due to two phenomena, the first is fossilization, that is, in a particular aspect their knowledge remains fossilized, and the second is when the students themselves in their eagerness to solve learning problems make mistakes. This is supported by Chomsky´s idea that native speakers have a perfect competence in their own language because they have a deep knowledge of it, and then they should act in the same way in L2, but it´s not what happens. And this incapacity is the proof of their criticism.

Therefore, Interlanguage theory, as well as Contrastive Analysis Hypotheses, has valid aspects as well as others that are not valid as they do not fully explain why some students will be unable to have a performance in L2 near the native model. Socio-linguistic, psychological and environmental factors must be taken into account in the learning process of L2.Yet both IL and CAH have contributed to the development of SLA in a dramatic way. Their contributions have been, and are, very important to the teaching and learning of languages.

CHAPTER 5. METHODOLOGY.

5.1. METHODOLOGY.

5.1.1. THE HYPOTHESES.

The difficulty that native Spanish speakers have when speaking English is manifested primarily in the sounds that Spanish lacks or in those that are very similar but not equivalent. The Spanish speaker tends to strive to pronounce the words as close as possible to the native model. So, we accept that if a student makes some sounds close to the native model it is because he or she has a high degree of skill and therefore will pronounce all the sounds in the same range of correction.

This research aims to verify two hypotheses:

1. The 12 sound /m/, /ŋ/, /r/, /t/ /d/, /ʃ/, /tʃ/, /z/, /v/, /s/, the past and the plural are equally problematic for B1 Spanish learners of English.
2. Better performance of one of the 12 sounds selected allows us to predict which of the other 11 sounds will also be mastered.

Therefore, this research is based on two points. The first is to consider the degree of success of the native Spanish student when he or she wants to reproduce sounds that present difficulties. The second is to establish how the student´s interlanguage evolves (Selinker, 1972; Tarone, 2018) and how the student´s native language phonetic repertoire and phonology affect the phonological system of the L2 (Selinker, 1972; Olsen, 2012). This follows the theory of Blurt and Dulay (1970s), which does not exclude any possibility as the cause of the error and does not prioritise the transfer phoneme over any other.

As part of the process of verifying the hypotheses, the possible strategies that the student employs to avoid the error are analysed in this research. (Selinker, 1972; Corder, 1983). On the other hand, the variability of the error will be analysed in order to find out which of the two types of IL variability (systemic and non-systemic) is the one that happens in each case (Ellis, 1985).

To confirm the hypotheses the following English phonemes have been chosen: /m/, /ŋ/, /r/, /t/ /d/, /ʃ/, /tʃ/, /z/, /v/, /s/, in the past and the plural. The criteria applied for their selection has been to consider that they may be problematic to reproduce correctly for native Spanish speakers studying English as a second language (Lado, 1956; Whitley, 2002). Section 5.1.3 of this chapter will explain in detail the selection criteria for each of these sounds.

Part of the work to verify the hypotheses raised was based on analysing the relationship between the phonemes and if it was possible to observe different stages in the performance of these sounds (Corder, 1971; Brown, 2004). As the students had different levels of English, even though they belonged to a homogeneous group, I tried to find out if in the different phases of the learning process they presented different errors or mistakes.

5.1.2. THE STUDENTS.

The group of students submitted to the test meet the following criteria: All should have Spanish as their native language, have university studies not related to the Degrees of Philology, especially English Philology, be heterogeneous in their knowledge of the language and in the use they could make of it. In total there are 30 students of which 14 are male and 16 female. Of the total, two individuals were over 50 years old, the rest were in the range of 22 to 30 years old.

Regarding the first criterion, this was essential since the purpose of this study is to observe the problems that certain phonemes present in the learning of native Spanish speakers, it would have been very difficult to determine any possible influence of the native languages on the spoken English of multilingual students.

Of the 30 students analysed, for two of them, English was not their second language. The first one had a very elementary knowledge of English, more oriented towards written comprehension and expression than oral skills, and the second one has French as a second language. And the second had little or no exposure to it. Neither of them had used English as a working or study language. The remaining 28 students had studied English as one

more subject within the Primary and Secondary Education curriculum, but their skills in English varied significantly, especially in oral skills. In any case, they learned their mother tongue before having been introduced to English. This was to ensure that if the phenomenon of transfer exerted some influence on L2, it must have been originating from a solitary source that in this case is Spanish.

It was important to choose candidates with a university education of a different degree than the Philology degrees, this criterion was taken because in this way the students would not have a specific formation in languages and would better represent a sample of what is the average Spanish speaker at this level of study. The use they make of English, when they do, is basically for travel. Their studies do not require the reading of texts in English or the use of audios in this language so their exposure to the language is the normal day-to-day personal experiences, thanks to the audiovisual media that we find in the different fields of leisure for daily life.

5.1.3. PROCEDURE.

As previously stated, the English phonemes chosen to carry out this research and verify the hypotheses are: /m/, /ŋ/, /r/, /t/ /d/, /ʃ/, /tʃ/, /z/, /v/, /s/, in the past and the plural. And the criteria applied for their selection has been to consider that they may be problematic to reproduce correctly for native Spanish speakers studying English as a second language (Lado, 1956; Whitley, 2002).

The difficulty of these English phonemes can be established in five groups (Whitley, 2002). One group do not exist in Spanish and the student has to apply strategies to avoid the error (Corder, 1967; Strevens, 1969), as is the case of /ʃ/ corresponding to the spelling <sh>. Another group of sounds do not have the same placement in English as in Spanish; this is the case of the English sound /ŋ/ in the final word position that corresponds to the spelling <-ng>. The next group consists of sounds that exist Spanish, in a reduced number of words, in the final position as the /m/ sound that corresponds to the spelling <-m>. A fourth group would be formed by the <-ed> ending of past that has two phonic realisations in English, /d/ or /id/. And finally, the initial sounds of the word /r/ and /s/ which present

two different difficulties. The phoneme /r/ in the initial position exists in Spanish but is not phonically equivalent to the English phoneme, and the phoneme /s/, which grapheme is <s-> at the beginning of a word that cannot appear in Spanish in that position.

I will now detail individually each of these sounds, the nature of the difficulty attributed to them, which words in the texts contained these sounds and what criterion was used to select them:

1. /m/. This sound in the final position of the word is not very common in Spanish and therefore is difficult. The selection criterion was to choose some words ending in <-m> followed by another word beginning with a vowel to have a sharper perception of the sound. The words chosen for this sound are: "reclaim", "midterm", "home", "claim", "maximum", and "from".

2. / ŋ/. This sound does not exist in Spanish in the same position as in English. The criterion applied was that these sounds should be followed by a word starting with a vowel because this made recognition easier. The words chosen for this sound are: "closing", "embarking", "continuing", "pleading", "roaring", "tweeting", "moving" and "voting".

3. /r/. Both languages have the same grapheme but do not correspond to the same phoneme. Spanish /r/ is vibrating alveolar and the English /r/ as a postalveolar. The words chosen for this sound are: "rile", "racial", "reclaim", "recent", "rallies" "roiled", "reportedly", "roaring", "republicans" and "reprised".

4. /z/. This voiced sound is not in the Spanish phonological set. The words chosen for this sound are: "his", "president", "was", "days", "season", "anxiety", "is", "customers", "close", "changes" and "resolved".

5. /t/ /d/. These English sounds at the end of the word are very common but are not found in that position in Spanish. The criterion applied was to look for these sounds in combination with /n/ or /s/, forming consonant clusters not found in Spanish. The words chosen for this sound are: "argument", "president", "account", "restaurant", "event", "almost", "burst", "breakfast", "nearest", "brand", and "battleground".

6. /ʃ/. The difficulty of this phoneme is that it is not in the Spanish phonological set. The words chosen for this sound are: "elections", "established", "racial",

"leadership", "population", "pushed", "shop", "international", "fresh", "innovation" and "share".

7. / tʃ/. This sound in English is palato alveolar affricate, very close to the Spanish phoneme. The selection criterion was that this sound should be in the final word position, which in Spanish is not possible. The words chosen for this sound are: "approach", "which", "watch", "which" and "much".

8. Plural /iz/. This sound is difficult for native Spanish speakers because the rules governing plural in English and Spanish are different. The rule in Spanish is that the plural is /s/, while in English, it is /iz/. A student with a pronunciation far from the native model does not pronounce an extra syllable as in *branches*[ˈbrɑːntʃɪz] * [ˈbrɑːntʃ].The words chosen for this sound are: "arches", "beverages", "challenges", "changes", "prizes", and "branches".

9. Past /-d/ /-id/. This suffix has two types of phonic realisations. One, when the vowel sound falls, e.g. *arrived* /əˈraɪvd/, and the second when it is pronounced as /i/ as in *paint* /ˈpeɪntɪd/. I would like to test that there is a problem of overgeneralization of the error. This gives a difficulty for the native Spanish speakers who are far from the native model as they will tend to pronounce an extra syllable when the English native speakers only add the -d sound, as happens with the past of pushed [pʊʃ] *[pʊʃed]. The words chosen for this sound are: "appeared", "pushed", "stalled", "moved", "resoled", "delivered", "reported", "dented", "mounted", "awarded", "expected" and "tweeted".

10. /v/. This sound in English corresponds to a voiced labiodental fricative sound. This sound does not exist in Spanish, although, if it does the grapheme <v> that is pronounced the same as the grapheme <b>, both correspond to a voiced bilabial occlusive sound. In this sound the <nv>, <mv> and <-ve + vowel> sequences were studied. The criterion for choosing the context <nv>/<mv> is that the previous nasal consonant makes it easier to distinguish whether the student is pronouncing a /b/ or a /v/. And the criterion for <-ve + vowel> is the difficulties the students have to pronounce the linking of the words. The words chosen for this sound are: "invasion", "in Virginia", "from Viacom", "move appeared", "Steve Easterbrook", "curves of" and "have yet".

11. /s/. This sound at the beginning of a word is possible in English but not in Spanish because the Spanish rules of distribution restrictions do not allow it. The criterion for the selection of the words was that it was necessary to see how the student pronounced them according to the word that preceded them. If they were linked together or if a prothesis phenomenon was generated by adding a vowel sound before /s/. The words chosen for this sound are: "at stakes", "three-stop", "house speaker", "president spent", "now spread", "McDonalds´s still", "unprecedented steps", "suddenly stalled", "same-store", "especially strong" and "Ceo Steve".

The /ʧ/ and /m/ sounds share similar characteristics in Spanish but are not in the same position within the word as in English. I was interested in analysing how the students performed them. It is interesting to observe that from contrastive point of view students pronounce /ʧ/ better than /m/.

Once the study group was established and the words were selected according to the criteria mentioned above, the question arose as to how to select the most appropriate procedure for collecting speech data. Generally, this type of study has used the laboratory for data collection (Tarone, 1978). However, this practice has had the disadvantage of creating an artificial situation that ends up affecting the pronunciation of the candidates in L2 (Nemser, 1971). Taking the above into account, the methodology to be used to better study the interlanguage of each candidate was decided. Regarding interlanguage Selinker (1972) believes that data cannot be collected based on a conventional error of analysis and that the candidate's interlanguage utterances will be of great value. In any case, the type of data collection method will be an important factor in drawing conclusions (Nemser, 1971).

For all these reasons it was decided that the data collection would be carried out in the following way - first two texts written in English were chosen, then both texts were 3provided separately and with two weeks of difference to the students so they could carry out and record the reading of them. The first text is a newspaper article on American politics, and the second is a publicity article for a big fast-food company. Hence, the student was confronted with two different writing styles in their grammatical and lexical construction and distribution of information in paragraphs.

The students recorded their reading at home. They were the ones who managed the time and the conditions of the environment where the test was done. The intention was not to create an artificial laboratory situation that would inevitably have been limited in time and the number of times they could record and test in advance, which would have affected the final result of the tests.

From the total number of files uploaded to the platform, the 30 included in this study were selected. The audios with the deficient recording quality, those with technical problems, and those where the student did not read the whole texts were discarded. Neither were the audios of the students who performed only one of the two texts. The chosen audios were those in which the students had read both texts and with enough recording and audio quality to be able to extract the necessary data for this study.

Once the 60 texts equivalent to the 30 students were collected, the 100 words selected for the study were fragmented one by one. In the following page there is a table with the words and sounds. The total number of tracks edited and recorded with the sounds was 315. The aim was to isolate the sound as much as possible so it could be analysed without any interference. This also served to see the influence of the concomitant sounds to the sound studied when this happened (Carlisle, 2001). The programme used was Audacity, due to its versatility and ease of use.

The Audacity programme is an open and free software used to record and edit sounds. It is versatile and allows the researcher to record from different sources, copy over existing tracks, etc. I used it to import the students' audios from the platform, to select the parts containing the words with the sounds to be studied, to segment those words, to modify their playback speed, to create a separate file with each of them, and to export these files later with the selected cuts.

Once a cut of each sound was obtained and the file exported, it was listened to repeatedly varying the speed of reproduction in order to analyse more clearly the sound pronounced by the student. On many occasions, the students read very quickly, or the sound was unclear, so it was necessary to review it in the cut at different speeds to be sure which pronunciation was made. This task was difficult and took a considerable amount of time.

But it had the advantage that, when necessary, I could go to the selected segment and analyse it again, and then be more accurate in my work with the data extracted from it.

SELECTED WORDS FOR EACH SOUND

	/m/	/n/	/r/	/-t/ /-d/	/ʃ/	/tʃ/	/z/	/v/	/s-/	PAST	PLURAL
	RECLAIM (x2)	CLOSING (x2)	RILE	ARGUMENT	ELECTIONS	APPROACH	HIS (x2)	INVASION	AT STAKES	APPEARED	ARCHES
	MIDTERM (x2)	EMBARKING	RACIAL	PRESIDENT	ESTABLISHED	WHICH (x2)	PRESIDENT	IN VIRGINIA	THREE-STOP	PUSHED	BEVERAGES
	HOME	CONTINUING	RECLAIM	ACCOUNT	RACIAL	WATCH	WAS	THAN VOLUME	HOUSE SPEAKER	STALLED	CHALLENGES
	CLAIM	PLEADING	RECENT	RESTAURANT	LEADERSHIP	MUCH	DAYS	FROM VIACOM	PRESIDENT SPENT	MOVED	CHANGES
	MAXIMUM	ROARING	RALLIES	EVENT	POPULATION		SEASON	MOVE	NOW SPREAD	RESOLVED	PRIZES
	FROM	TWEETING	ROILED	ALMOST (x2)	PUSHED		ANXIETY	APPEARED	Mc.DONALD'S STILL	REPORTED	BRANCHES
		MOVING	REPORTEDLY	BREAKFAST	SHOP			STEVE EASTERBROOK	UNPRECEDENTED STEPS	DENTED	
		VOTING (x2)	ROARING	NEAREST	INTERNATIONAL			CURVES OF	SUDDENLY STALLED	MOUNTED	
			REPUBLICANS	BRAND	FRESH			HAVE YET	SAME-STORE	AWARDED	
			REPRISED	BATTLEGROUND	INNOVATION				ESPECIALLY STRONG	EXPECTED	
					SHARE				CEO STEVE	TWEETED	
TOTAL	8	10	10	12	11	5	7	9	11	11	6

Chart 3. Total words: 100 words

The spectrometer display was very helpful, both the waveform and spectrogram display. This tool was useful to see the intensity of the sound and to be able to differentiate when it started and ended in the continuous flow of the sentence. Then it was possible to listen more clearly to how the student pronounced the analysed sound so much inside the word as in another cut isolating it from the rest of the sounds enclosed in the word.

The possibility of importing cuts of the same sound belonging to different students and comparing them was a very useful tool especially when there were difficulties in establishing the most correct pattern of pronunciation that they were making. Being able to visualise all the spectrograms together and listen to them alternately as many times as necessary helped in this task.

Some problems made the study difficult. There were some cases in which the sounds were in an intermediate-range in which it was not possible to appreciate if their pronunciation had been adequate or not; this was due, among other factors, to the student's own diction, or to a lack of clarity of the sound recording at that particular moment. I chose to consider them as not correct as they generated a reasonable doubt.

Another situation that arose was when the student skipped the word that contained the sound; in this case the consideration was of nullity of the sound. Sometimes the students exchanged the word in the text for another one. Then I considered the replacement word as null if it did not contain the sound, and I valued the word if it contained the sound that was the object of the study. On the occasions when the student was self-correcting, an audio cut was made of each attempt and these were analysed in detail, always choosing the one closest to the native speaker's pronunciation.

I believe that these cases were due to situations outside the linguistic field; they were caused by the students' tension when they read and their insecurity regarding their oral skill. The experience of reading aloud a text in English generally generates stress in the students, and this has repercussions on their final result.

After the process described above, the data had to be transferred to the tables. When the sound was correct, it was given as valid in the data collection tables. When the sound was not pronounced correctly it was noted as non-valid. And where there was doubt about its pronunciation, it was considered non-valid.

Once I had drawn up the general tables mentioned before, I produced three tables by sound included in section 6.1 of the following chapter. In these tables, the data was analysed according to different criteria and for the same purpose, which was to validate or not the hypothesis.

Thus, in the first table, the individual results of each subject are shown. I placed the students in decreasing order with the percentage of valid pronunciation made in each sound. In the second table, I established the distribution of the group of 30 students in the three groups mentioned above: the group far from the native model, the mid group and the group near to the native model. In this table, I included in the first column the number of students in each group and in the second column the percentage they represented in the whole group. Finally, the third table shows the results of each sound by comparing the two extreme groups in this study (far from the native model and near to the native model). The results in each group could then be evaluated and compared to get data and verify the hypotheses.

Alongside these tables, I produced another one to analyse sound by sound the correlation between them to evaluate if it was possible to establish in which sounds the groups far and near the native model behave similarly and are in the same range. Table 37 in chapter 7, gives information of those sounds where the groups far and near the native model behave the same and their results are in the same range.

5.1.4. THE MATERIAL

The two texts provided to the students were "Trump makes final effort to rile his base using fear, division and racial anxiety", a journalistic text published in The Guardian. And "McDonald's Restaurants: advertising & marketing profile", a commercial text published

on the company's website. The previous section has explained in detail the sounds that were chosen, the criteria for choosing them and the words selected from each sound.

The students recorded the two texts on their own devices, so there were some problems with sound clarity and interference, yet the samples collected showed good overall quality. Once the audios were recorded, they were uploaded to the Campus Virtual online platform and then the process of analysing them began.

The reason I selected these texts is they included the sounds I wanted to study. Besides, the fact that all the students read the same words allowed me to study the results by comparing them to each other. My interest is that they concentrated on the pronunciation and reading of the texts which made them focus exclusively on that; this would not have been feasible in a spontaneous or semi-directed conversation.

It would have been interesting to see if they varied their pronunciation when they spoke spontaneously and looking at the grammar they used. I could not make such a comparison, and I focused on the students' more conscious or careful pronunciation.

The two texts are:

TEXT 1

TRUMP MAKES FINAL EFFORT TO RILE HIS BASE USING FEAR, DIVISION AND RACIAL ANXIETY

TRUMP'S PRESIDENCY MAY BE AT STAKE IF DEMOCRATS RECLAIM THE HOUSE IN THE MIDTERM ELECTIONS AND GAIN ABILITY TO THWART HIS AGENDA

Donald Trump delivered his closing argument on Monday, embarking on a three-stop tour of the Midwest before the most consequential midterm elections in a generation.

Continuing an approach established in recent weeks, the president used campaign rallies, his Twitter account and press interviews to warn of an "invasion" by a caravan of migrants approaching the southern border, and of the supposed threat posed by "left-wing mobs".

It was an effort to energize his conservative base in the final days of an election season roiled by fear, division and racial anxiety which reportedly left the House speaker, Paul Ryan, pleading with Trump to focus on the roaring economy instead. According to the website Politico, the president demurred.

Trump's presidency may be at stake. If Democrats reclaim the House, as they are favoured to do and party leadership has said it expects, they will be empowered to thwart his agenda. If Republicans maintain control of the House as well as the Senate, their expected prize, they could be emboldened to press home Trump's policies.

As Barack Obama delivered his own closing arguments against Trump – telling Democrats in Virginia "the character of this country is on the ballot, who we are is on the ballot" – the president spent Monday morning tweeting endorsements of Republicans, before moving on to rallies in Ohio, Indiana and Missouri. He also reprised his baseless claim of widespread voter fraud.

Law Enforcement has been strongly notified to watch closely for any ILLEGAL VOTING which may take place in Tuesday's Election (or Early Voting). Anyone caught will be subject to the Maximum Criminal Penalties allowed by law. Thank you!

TEXT 2.

MCDONALD'S RESTAURANTS: ADVERTISING & MARKETING PROFILE

The **McDonald's** brand is almost as universal as **Coke**. The group's 36,000th restaurant opened in 2014, and those golden arches now spread across 119 countries, welcoming some 69m customers every day. Not enough, the company still says. On any day McDonald's still only serves less than 1% of the world population, leaving plenty of room for growth. However profits fell dramatically in 2002 and the group took unprecedented steps to close under-performing outlets, even pulling out of a few markets altogether. That move appeared to have paid off by 2004, and McDonald's reported strong growth for much of the following decade, even in the face of an economic downturn. A key factor was the broadening of the menu with an enhanced range of breakfast items, healthier chicken and salad meals and premium beverages. The company also pushed aggressively into the coffee shop sector, in several key international markets as well as the US. However the reviving US economy brought fresh challenges from 2013 onwards. Domestic sales suddenly stalled, despite a frenetic burst of menu innovation, as customers moved away to less established rivals, while international performance was dented by a variety of different challenges in regional markets. Even after several changes of management, those troubles have yet to be fully resolved.

Recent stories from Ad brands Weekly Update:

Ad brands Weekly Update 25th Oct 2018: **McDonald's** did well in 3Q, but with reservations. The fast-feeder reported its 13th consecutive quarter of global same-store growth, up 4.2% year-on-year, well ahead of analysts' expectations. The best performance came from international markets, up 5.4% combined, with especially strong results from the UK, Australia and France. In the US, the company delivered 2.4%, fed almost entirely by higher prices rather than volume increases. CEO Steve Easterbrook said the domestic market remains challenging, especially in the breakfast day-part where the chain has lost share to rivals, especially Taco Bell. "It continues to be a battleground. It's a market-share fight on traffic and our teams are responding. We've got to do better at breakfast."

Ad brands Weekly Update 21st Jun 2018: **Cannes Lions 2018**. The first batch of winners were announced from Cannes Lions 2018. (See the full run-down, including all the Gold, Silver and Bronze winners at the Cannes Lions 2018 website). There were two Grand Prix winners in

Outdoor. Canadian agency **Cossette** was awarded multiple prizes for its brilliantly simple billboards for **McDonald's**, which used the curves of the instantly recognisable logo to provide directions for the nearest outlet. **Comedy Central**'s **Daily Show with Trevor Noah**, from **Viacom**, was the other winner with a savagely satirical commentary on the current US President's Twitter addiction. Under the title of The Donald J Trump Presidential Twitter Library, the channel mounted a three-day event in which all Trump's Tweets were framed for inspection.

Ad brands Weekly Update 31st May 2018: Ads of the Week: "Ramadan 2018". The world's biggest brands know full well the need to adapt to local sensitivities if they're aiming to stay big. McDonald's and Coca-Cola are among the several global players with new ads out now that acknowledge Ramadan. Here's a charming spot from **DDB Singapore** for **McDonald's**, also notable for its illustration of Delivery, an especially important strand to the fast-feeder's business throughout Asia. Here in the UK, we have yet to see a single such Delivery messenger; perhaps the ubiquity of McDonald's branches has something to do with that, and also the daunting size of those backpacks...

CHAPTER 6. DATA ANALYSIS.

In this chapter, I will analyse the data obtained from the analysis of the tests carried out by the 30 students who participated in them. The first hypothesis tries to know if the 12 sounds/m/, /ŋ/, /r/, /t/ /d/, /ʃ/, /tʃ/, /z/, /v/, /s/, the past and the plural are equally problematic for B1 Spanish learners of English. The second hypothesis proposes whether the better performance of one of the 12 sounds selected allows us to predict which of the other 11 sounds will also be mastered.

Data has been set out in 48 tables. In this group, 11 correspond to each sound analysed in relation to the others. Here the individual results of the students are organised in decreasing order by the score obtained. The rest of the tables (tables 1-33) are organised into three sub-sections. In the first section, the data extracted from the analysis of each sound are presented in three tables. The first table shows the results of each student of the sound being analysed.

In the second table, I established the distribution of the group of 30 students in the three according to their score:

- Group far from the native model with an average between 0.00 and 0.33.

- Group mid to the native model with an average between 0.34 and 0.66.

- Group near to the native model with an average between 0.67 and 1.00

In this table, the first column shows the number of students in each group, and the second column shows the percentage they achieved in the whole group. The groups that interest us in the analysis are the extreme groups, that is, the group far from the native model and the group near to the native model.

The third table displays the results of each sound in the two extreme groups and the data shows the difference between them. I set a reference value of 0.33 difference between both groups for each sound contained in the table to establish whether or not the sound ruling the table helps to predict the pronunciation of the other sounds. The reference value of 0.33 arises from dividing the students into three groups and is the minimum difference between

them. Then, with this reference value, I establish the criteria to determine if, based on how the student makes a sound, it is possible to predict how he will make the rest of the sounds.

If the difference is 0.33 or higher then it is significant, and we can think that how the sound that governs the table is pronounced predicts how the other sounds will be pronounced. But if the difference is lower than this value then no pronunciation forecast can be made for the remaining sounds. The data extracted from the three tables will help to verify or not the hypotheses that I propose in this work.

In Chapter 7, Table 37shows the sounds where the two extreme groups behave in a similar way:

- Sounds in which the groups far from the native model and near to the native model obtain an average between 0.00 and 0.33.

- Sounds in which the groups far from the native model and near to the native model get an average between 0.34 and 0.66.

- Sounds in which the groups far from the native model and near to the native model obtain an average between 0.67 and 1.00.

6.1. ANALYSIS OF THE TABLES.

6.1.1. Data extracted from the analysis of /m/.

TABLE 1

STUDENT 6	0.00
STUDENT 1	0.13
STUDENT 3	0.13
STUDENT 8	0.13
STUDENT 9	0.13
STUDENT 10	0.13
STUDENT 17	0.13
STUDENT 18	0.13
STUDENT 19	0.13
STUDENT 22	0.13
STUDENT 24	0.13
STUDENT 2	0.25
STUDENT 7	0.25
STUDENT 14	0.25
STUDENT 20	0.25
STUDENT 4	0.38
STUDENT 11	0.38
STUDENT 15	0.50
STUDENT 16	0.50
STUDENT 23	0.50
STUDENT 27	0.50
STUDENT 30	0.50
STUDENT 25	0.63
STUDENT 26	0.63
STUDENT 12	0.75
STUDENT13	0.75
STUDENT 29	0.75
STUDENT 21	0.88
STUDENT 5	1.00
STUDENT 28	1.00

TABLE 2

	STUDENTS	PERCENTAGE
FAR [0-33]	15	50%
MID [34-66]	9	30%
NEAR [67-100]	6	20%

From this data analysis, it is possible to deduce that 50% of the students are far from the native model of the pronunciation of the /m/ while 20% are near to it. Therefore, since 80% of participants were far from the native model and only 20% near to the native model, it can be concluded that the sound /m/ seems to present difficulty for half of the students who participated in this study with a minimum level of English B1.

TABLE 3

	/ŋ/	/r/	/t/ /d/	/ʃ/	/tʃ/	/z/	/v/	/s/	PAST	PLURAL
FAR [0-33]	0.38	0.13	0.31	0.21	0.83	0.03	0.38	0.18	0.60	0.41
NEAR [67-100]	0.07	0.05	0.44	0.45	0.83	0.00	0.29	0.15	0.62	0.69

When comparing sounds, we have to take into account for all analyses that six candidates pronounce /m/ near to the native model, and twenty-four far from the native model.

By analysing the data of the /m/ sound compared to the other sounds we can make the following deductions. These students show problems in the sounds /r/, /z/ and /s/ in the group far from the native model and in the group near to the native model. That shows that taking the /m/ sound as a reference, the students have similar behaviour in the above-mentioned sounds. The data shows that in /r/ sound the difference between the far and near to the native model groups is only 0.08, decreasing it in /z/ and /s/ sounds which is 0.03. The difference between both groups is below 0.33 which is what we would consider significant to be able to say that pronouncing the /m/ far or near to the native model helps to predict how they would be pronounced in the rest of the compared sounds.

Comparing the /tʃ/ sound data shows that the students have pronounced it very closely to the native model. The groups near and far from the native model have an average of 0.83. There is no difference between the two groups, and it indicates that the pronunciation of /m/ near or far from the native model cannot be predicted as will be in the pronunciation of the /tʃ/ sound.

The above concerning the more extreme groups, the group far from the native model has a ranking between 0-33, and near to the native model, with a ranking between 67 -100. In the following sounds: /ŋ/, /t/ /d/, /ʃ/, /v/ and the plural, the groups that come into comparison with /m/ are the group mid the native model, with a ranking between 34-66, and the groups far or near to the native model.

Concerning the /ŋ/ sound, we observe that the group far from the native model has an average of 0.38. It is in a range superior to 0.33, which would be the farthest group, while the group near to the native model obtains a worse average with 0.07. Between both groups, however, there is a difference of 0.31. That leads us to think that how /m/ is pronounced is not a factor in predicting how /ŋ/ will be pronounced, although it seems that those who pronounce it farther away from the native model have less trouble pronouncing this sound.

Comparing the /t//d/ sound, the data we obtained shows that the group far from the native model gets an average of 0.31, and the group near to the native model gets 0.44. A difference of 0.13 is established between the two groups. That suggests that how /m/ is pronounced is not a factor in predicting how /t//d/ will be pronounced, although it seems that those who pronounce it closer to the native model have less difficulty pronouncing it.

When we compare it with the /ʃ/ sound, the data shows that the group far from the native model has an average of 0.21, and the group near to the native model gets 0.45. Between the two groups there is a difference of 0.24. This leads us to conclude that how /m/ is pronounced is not a factor that helps in predicting how the students will pronounce /ʃ/.

Concerning the /v/ sound, we observe that the group far from the native model has an average of 0.38. It is in a range superior to 0.33, which would be the farthest group, while

the group near to the native model gained an average of 0.29. Between both groups, however, there is a difference of only 0.09, and it means that both groups´ performances are very similar. That leads us to think that how /m/ is pronounced is not a factor in predicting how /v/ will be pronounced.

In relation to the plural sound, we can observe that the group far from the native model obtains an average of 0.41, which sets this group in an intermediate-range. And the group near to the native model has an average of 0.69, giving a difference between them of 0.28. We still cannot predict how the students will perform the plural sound from how they perform the /m/ sound, but it shows that the students still have problems in their performance, although they belong to the mid group.

In the pronunciation of the past sound, the students are in an intermediate range of pronunciation concerning the /m/ sound. The group that is far from the native model gets an average of 0.60 and the group near to the native model gets 0.62. The difference between the two is 0.02. Because it is below 0.33 we can deduce after the analysis of the data that we cannot use the pronunciation of /m/ to predict what the pronunciation of past sound will be like.

Comparing the results of the group far from the native model and the group near to the native model some of them should be noted. Both groups behave the same in the pronunciation of the sound /tʃ/ since both have the same result of 0.83. This means that it is not a problematic sound for the students included in this study.

Students in the group far from the native model present better results in the sounds /ŋ/, /v/, the past and the plural. Their performance is in an intermediate range, between 0.34 and 0.66. On the other hand, the students included in the group near to the native model have in the three first sounds a poor average below 0.33. They show more difficulties than the other group when what we expected was the opposite. The expectation was they would have better results, even though the differences between the groups are not very big.

In conclusion, we can infer from this data analysis that the pronunciation of /m/ is not useful to predict how the students will behave when pronouncing the other sounds we have analysed in this table.

Other conclusions that can be drawn from the data collected are that students who pronounce /m/ near to the native model do not stand out in the pronunciation of the other sounds except in /ʧ/ and the plural sound. Concerning past pronunciation, whose average is 0.62, we can say it is very close to 0.66. Therefore, this sound does not show a strong correlation with other sounds, and there's only a weak correlation with /sh/, /ng/ and the plural. However, it's surprising that a near native pronunciation of /m/ predicts a slightly better performance of /sh/ and the plural, but it predicts a slightly worse performance of /ng/.

6.1.2. Data extracted from the analysis of /ŋ/.

TABLE 4

STUDENT 12	0.00
STUDENT13	0.00
STUDENT 15	0.00
STUDENT 18	0.00
STUDENT 20	0.00
STUDENT 25	0.00
STUDENT 26	0.00
STUDENT 28	0.00
STUDENT 29	0.00
STUDENT 3	0.10
STUDENT 16	0.10
STUDENT 27	0.10
STUDENT 2	0.20
STUDENT 5	0.20
STUDENT 11	0.20
STUDENT 14	0.20
STUDENT 17	0.20
STUDENT 21	0.20
STUDENT 23	0.20
STUDENT 30	0.30
STUDENT 6	0.40
STUDENT 1	0.50
STUDENT 7	0.50
STUDENT 9	0.50
STUDENT 10	0.50
STUDENT 22	0.50
STUDENT 24	0.60
STUDENT 4	0.70
STUDENT 19	0.70
STUDENT 8	0.80

TABLE 5

	STUDENTS	PERCENTAGE
FAR [0-33]	20	66.7%
MID [34-66]	7	23.3%
NEAR [67-100]	3	10%

From this data analysis, it is possible to deduce that 66.7% of the students are far from the native model of the pronunciation of the /ŋ/ while 10% are near to it. Therefore, since 90% of participants were far from the native model and only 10% near to the native model, it can be concluded that the sound /ŋ/ seems to present a high level of difficulty for those who participated in this study with a minimum level of English B1.

TABLE 6

	/m/	/r/	/t/ /d/	/ʃ/	/tʃ/	/z/	/v/	/s/	PAST	PLURAL
FAR [0-33]	0.52	0.07	0.40	0.35	0.82	0.01	0.35	0.23	0.66	0.51
NEAR [67-100]	0.21	0.13	0.39	0.36	1.00	0.00	0.38	0.18	0.83	0.33

When comparing sounds, we have to take into account for all analyses that three candidates pronounce /ŋ/ near to the native model and it is not possible to extrapolate the results, although it is indicative of the trend in this group of students.

By analysing the data of the /ŋ/ sound compared to the other sounds we can make the following deductions. These students show problems in the sounds /r/, /z/ and /s/ in both the group far from the native model and the group near to the native model. That shows that taking the /ŋ/ sound as a reference, the students have similar behaviour in the above-mentioned sounds. The differences between the groups are as follows: 0.06 in /r/ sound; 0.05 in /s/ sound; and 0.01 in /z/ sound. It is observed that the differences are very small so we can deduce that both groups behave very similarly when they pronounce the sounds described above. And because the difference between both groups is below 0.33 we can conclude that the sound /ŋ/ does not help to predict how the students will pronounce the rest of the compared sounds.

About the /tʃ/ sound, data shows that the students have pronounced it very close to the native model. The group far from the native model has an average of 0.82 and the group near to the native model has an average of 1.00. The difference between them is 0.18 still under the 0.33 we take as reference. Then the pronunciation of /ŋ/ near or far from the native model cannot be predicted as in the pronunciation of the /tʃ/ sound.

The above is concerning the more extreme groups; the group far from the native model has a ranking between 0-33, and near to the native model, with a ranking between 67 - 100. In the following sounds: /m/, the past and the plural, the groups that come into comparison with /ŋ/ are the group mid to the native model, with a ranking between 34 - 66, and the groups far or near to the native model.

Concerning the /-m / sound, we observe that the group far from the native model has an average of 0.52. It is in a range superior to 0.33, which would be the furthest group, while the group near to the native model has a worse average with 0.21. Between both groups, however, there is a difference of 0.31. That leads us to consider that how /ŋ/ is pronounced is not a factor in predicting how /m/ will be pronounced, although it seems that those who pronounce it farther away from the native model have less trouble in the performance of this sound.

Comparing the past sound, the data we obtained shows that the group far from the native model gets 0.66 and the group near to the native model gets 0.83, a difference of 0.17 is established between the two groups. That suggests that how /ŋ/ is pronounced is not a factor in predicting how past sound will be pronounced, although it seems that those who pronounce it is above what was expected.

Data shows that in the plural sound the group far from the native model obtains an average of 0.51, which sets this group in an intermediate-range. The average of the group near to the native model is 0.33. There is a difference between both groups of 0.18. We still cannot predict how they will perform the plural sound from how they perform the /ŋ/ sound, but it shows that the group near to the native model presents a better performance than the group far from the native model.

When we compare the /ʃ/, /t//d/, /v/ sounds, the data shows that both groups are very close in their results, all over 0.33 and under 0.67. It means that the students belong to the mid group that represents 23.3% of the total number of the students. The differences between groups are very small being of 0.01 in the sounds /ʃ/ and /t//d/, and of 0.02 in the sound /v/. That leads us to think that how /ŋ/ is pronounced is not a factor in predicting how /ʃ/, /t//d/ and /v/ sounds will be pronounced.

Comparing the groups' results, some of them should be noted. Students in the group far from the native model have better averages in the sounds /m/, /t//d/, /z/, /s/ and the plural. The biggest difference is in the sound /m/ which is 0.31, still below 0.33, which is our reference value. The other differences are too small, between 0.01 and 0.18, and it shows the two groups behave very similarly when they perform these sounds, suggesting they have the same difficulties when pronouncing them.

Both groups are above 0.67 in sound /tʃ/ which shows that they are close to the native model. Although, it should be noted again, that there are only three students in this group so the results cannot be extrapolated.

The behaviour of both groups is very similar in the sounds /r/ and, /v/ because the differences between them is very small, 0.06 in /r/ and 0.02 in /v/. It leads us to think that both groups have similar difficulties.

Finally, the data shows that the group far from the native model when pronouncing past sound has a result of 0.66 showing that their pronunciation is closer to the native model.

In conclusion, we can infer from this data analysis that the pronunciation of /ŋ/ is not useful in predicting how the students will behave when pronouncing the other sounds we have analysed in this table.

It can be deduced from the data collected that students who pronounce /ŋ/ near to the native model do not stand out in the pronunciation of the other sounds except in /ʧ/ and the past sound. If we analyse the results of the sounds /t//d/, /ʃ/ and /v/ which are in an intermediate-range (0.34-0.66) we note that they are all very far apart at 0.66. Therefore,

this /ŋ/ sound does not show a strong correlation with other sounds, and there's only a weak correlation with /m/. However, it is surprising that the group near the native model has a worse performance than the group far from the native model.

6.1.3. Data extracted from the analysis of /r/.

TABLE 7

STUDENT 6	0.00
STUDENT 9	0.00
STUDENT 10	0.00
STUDENT 12	0.00
STUDENT13	0.00
STUDENT 14	0.00
STUDENT 15	0.00
STUDENT 16	0.00
STUDENT 17	0.00
STUDENT 18	0.00
STUDENT 19	0.00
STUDENT 22	0.00
STUDENT 23	0.00
STUDENT 24	0.00
STUDENT 25	0.00
STUDENT 28	0.00
STUDENT 29	0.00
STUDENT 30	0.00
STUDENT 8	0.10
STUDENT 11	0.10
STUDENT 20	0.10
STUDENT 21	0.10
STUDENT 26	0.10
STUDENT 27	0.10
STUDENT 3	0.20
STUDENT 5	0.20
STUDENT 4	0.30
STUDENT 7	0.30
STUDENT 2	0.50
STUDENT 1	0.80

TABLE 8

	STUDENTS	PERCENTAGE
FAR [0-33]	28	93.4%
MID [34-66]	1	3.3%
NEAR [67-100]	1	3.3%

From this data analysis, it is possible to deduce that 93.4% of the students are far from the native model of the pronunciation of /r/ while 3.3% are near to it. Therefore, since 96.7% of participants were far from the native model and only 3.3% near to the native model, it can be concluded that the sound /r/ seems to present a high level of difficulty for those who participated in this study with a minimum level of English B1.

TABLE 9

	/m/	/ŋ/	/t/ /d/	/ʃ/	/tʃ/	/z/	/v/	/s/	PAST	PLURAL
FAR [0-33]	0.41	0.25	0.40	0.32	0.85	0.02	0.37	0.21	0.64	0.46
NEAR [67-100]	0.13	0.50	0.08	0.18	1.00	0.00	0.25	0.09	0.42	1.00

When comparing sounds, we have to take into account for all analyses that when only one candidate pronounces /r/ near to the native model it is not possible to extrapolate the results although it is indicative of the trend in this group of students.

By analysing the data of the /r/ sound compared to the other sounds we can make the following deductions. These students show problems in the sounds /ʃ/, /z/ and /s/ in both the group far from the native model and the group near to the native model. That shows that taking the /r/ sound as a reference, the students have similar behaviour in the above-mentioned sounds. The data shows that in the /z/ sound the difference between the far and near to the native model groups is only 0.02, increasing it in the /ʃ/ sound which is 0.14 and /s/ which is 0.12. Even so, the difference between both groups is below 0.33 which is what we would consider significant to be able to say that pronouncing /r/ far or near to the native model helps to predict how they would be pronounced in the rest of the compared sounds.

Comparing the /r/ sound with the /tʃ/ sound shows that the students have pronounced the latter very close to the native model. The group near to the native model has an average of 0.85 and the far group of the native model has 1.00. The difference between the two groups is 0.15, which is very low, and indicates that the pronunciation of /r/ near of far from the native model cannot be predicted as it will in the pronunciation of the /tʃ/ sound.

The above is concerning in the more extreme groups, the group far from the native model has a ranking between 0 - 33, and near to the native model, with a ranking between 67 - 100. In the following sounds: /m/, /ŋ/, /t//d/, /v/ and the plural, the groups that come into comparison with /r/ are the group mid to the native model, with a ranking between 34 - 66 and the groups far or near to the native model.

In relation to the /m/ sound, we observe that there are students who pronounce /r/ far from the native model obtaining an average of 0.41, that is to say, in a range superior to 0.33 which would be the furthest group, while the group near to the native model obtained a lower average with 0.13. Between both groups, however, there is a difference of 0.28. That leads us to consider that how /r/ is pronounced is not a factor in predicting how /m/ will be pronounced, although it seems that those who pronounce it farther away from the native model have less trouble pronouncing this sound.

The comparison of the sounds /r/ and /ŋ/ gives the data that the students far from the native model with /r/ also get a poor average when pronouncing /ŋ/, this average is 0.25. The percentage improves with the group far from the native model reaching 0.50. Between both groups the difference is 0.25. This leads us to consider that the way /r/ is pronounced is not a factor in predicting how they will pronounce /ŋ/ although it seems that those who pronounce it closer to the native model have less trouble pronouncing it.

When comparing the /t/ and /d/ sounds with the /r/ sound, the data we obtained shows that the group far from the native model in /r/ gets better averages in the pronunciation of /t/ and /d/ with 0.40, than the group in /r/ near to the native model that only gets 0.08. A difference of 0.32 is established between the two groups. This suggests that how /r/ is pronounced is not a factor in predicting how /t/ and /d/ will be pronounced, although it

seems that those who pronounce it further away from the native model have less difficulty pronouncing these sounds.

With respect to the /v/ sound compared to /r/, the data shows that the group far from the native model has better averages, 0.37, than the group near to the native model, which only gets 0.25. Between the two groups there is a very small difference of 0.12. This leads us to conclude that how /r/ is pronounced is not a factor that helps in predicting how they will pronounce /v/, although it seems that those who pronounce it farther away from the native model have less difficulty pronouncing this sound.

In the pronunciation of the past sound, the candidates are in an intermediate range of pronunciation concerning the /r/ sound. The group that is far from the native model gets a better average, which is 0.64, than the group that pronounces /r/ near to the native model, which is 0.42. The difference between the two is 0.22. Therefore, we can deduce after the analysis of the data that, although we cannot use the pronunciation of /r/ to predict what the pronunciation of past sound will be like, we can affirm that the group far from the native model has a better facility of the pronunciation of the past sound than the other group.

The last comparison is between the pronunciation of /r/ and the pronunciation of the plural. There is a notorious difference between the far and near groups of 0.54, the highest of all the sounds analysed. The group far from the native model has an average of 0.46 while the group near to the native model has an average of 1.00. We still cannot predict how they will perform this plural sound from how they perform the /r/ sound but it shows that the group near to the native model with the sound /r/ presents no problem in performing the plural sound.

Comparing far and near the native groups' results, some of them should be noted. The major difference between the groups corresponds to the plural. The group far from the native model pronounces the plural sound better than the other group. Between both groups, there is a difference of 0.54 over 0.33, which we have marked as significant. Compared to other sounds the difference is smaller, the data reflects that the group far from the native model when they pronounce the sound /t//d/ gets a better result than when they pronounce /r/ as there is a difference between the groups of 0.32. The same is valid

with the /v/ sound where the difference is 0.12; with the past sound, the difference is a little over 0.22. In these last two cases, the difference is below 0.33, our reference number.

It is important to note that the results are less reliable because the group near to the native model with the /r/ sound is made up of only one student. And this student is below average in the pronunciation of six of the sounds: /m/, /t//d/, /ʃ/, /z/, /v/ and /s/.

In conclusion, we can infer from this data analysis that the pronunciation of /r/ could help us predict how the student will pronounce the plural sound. Also relevant is the 0.32 difference between the two groups in the sound /t//d/. Although it is less than 0.33, it is a tenth of a difference, so we might consider taking the pronunciation of /r/ as predictable from that of the /t//d/ sound. But it is not useful to predict how the students will behave when pronouncing the other sounds we have analysed in this table.

Another deduction that can be drawn from the data collected is that students who pronounce /r/ near to the native model do not stand out in the pronunciation of the other sounds except in /ʧ/ and the plural sound. If we analyse the results of the sounds that have been pronounced in an intermediate range, we can observe that the one closest to 0.66 is the sound /ŋ/ whose average is 0.50, even so it is not relevant enough. With respect to the past sound, its result of 0.42 places it closer to the group far from the native model, so it is not significant either. Therefore, this sound /r/does not show a strong correlation with other sounds, and there's only a weak correlation with /m/, /ŋ/, /t//d/, the past, and the plural. However, it's surprising that a near-native pronunciation of /r/ predicts a slightly better performance of the plural, but it predicts a slightly worse performance of /ŋ/ in the past, and a poor performance of /m/ and /t//d/.

6.1.4. Data extracted from the analysis of /t//d/.

TABLE 10

STUDENT 6	0.00
STUDENT 8	0.00
STUDENT 29	0.00
STUDENT 1	0.08
STUDENT 15	0.16
STUDENT 18	0.16
STUDENT 24	0.16
STUDENT 25	0.16
STUDENT 19	0.25
STUDENT 20	0.25
STUDENT 12	0.33
STUDENT 14	0.33
STUDENT 23	0.33
STUDENT 26	0.33
STUDENT 3	0.33
STUDENT 5	0.33
STUDENT 7	0.33
STUDENT 17	0.41
STUDENT 2	0.50
STUDENT 11	0.50
STUDENT13	0.50
STUDENT 30	0.50
STUDENT 9	0.58
STUDENT 16	0.66
STUDENT 22	0.66
STUDENT 10	0.67
STUDENT 21	0.75
STUDENT 27	0.75
STUDENT 28	0.75
STUDENT 4	0.92

TABLE 11

	STUDENTS	PERCENTAGE
FAR [0-33]	17	56.6%
MID [34-66]	8	26.7%
NEAR [67-100]	5	16.7%

From this data analysis, it is possible to deduce that 56.6% of the students are far from the native model of the pronunciation of the/t//d/ while 16.7% are near to it. Therefore, since 83.3% of participants were far from the native model and only 16.7% near to the native model, it can be concluded that the sounds /t//d/ seem to present a high level of difficulty for those who participated in this study with a minimum level of English B1.

TABLE 12

	/m/	/ŋ/	/r/	/ʃ/	/tʃ/	/z/	/v/	/s/	PAST	PLURAL
FAR [0-33]	0.37	0.25	0.11	0.24	0.80	0.00	0.34	0.17	0.64	0.38
NEAR [67-100]	0.58	0.30	0.10	0.51	1.00	0.02	0.35	0.23	0.72	0.87

It is important to note that there are five students in the group near to the native pronunciation and seventeen far from the native pronunciation. This will affect the extrapolation of the results, and it is indicative of the trend in this group of students.

By analysing the data of the /t//d/ sounds compared to the other sounds, we can make the following deductions. Those students from the group far from the native model and the group near to the native model show problems in the sounds /ŋ/, /r/, /z/ and /s/. Taking /t//d/ sounds as a reference that shows the students have similar responses in the above-mentioned sounds. Data shows that in the /ŋ/ sound the difference between the far and near to the native model groups is only 0.05, in /r/it is 0.01, in /z/ it is 0.02, and in /s/ it is 0.06. The difference between both groups is below 0.33, which is what we would consider significant to predict how the students could pronounce the rest of these sounds.

Comparing the /t//d/ sounds with the /tʃ/ sound, data shows that the students have pronounced the latter very close to the native model. The group near to the native model

has an average of 1.00 and the group far from the native model has 0.80; between both there is only a difference of 0.20. This difference is very low, and indicates that the pronunciation of /t//d/ far or near to the native model cannot be predicted as it will in the pronunciation of the /tʃ/ sound.

The above is concerning the more extreme groups, the group far from the native model ranks between 0 - 33, and the group near to the native model has a ranking of 67 - 100. In the following sounds: /ʃ/, /v/, the past and the plural, the groups that come into comparison with /t//d/ are the group mid the native model, with a ranking between 34 - 66, and the groups far or near to the native model.

We note two sub-groups here. In the first, the group far from the native model gets an average over 0.33 and it places the students in the mid group. About past sound, the group far from the native model has an average of 0.64. We can deduce that in this group the pronunciation of this sound does not present great difficulties. The group near to the native model obtains an average of 0.72, the difference between both groups being 0.08. That shows the two groups are very close in their results, and their performance of this sound is very similar.

The situation is different with the pronunciation of the plural sound, the situation. The group far from the native model has an average of 0.38, which places it in the mid group as it is higher than 0.33. And the group near to the native model has a result of 0.87. The difference between both groups is 0.49, which is lower than the 0.33 that we take as significant reference to predict whether or not the pronunciation of /t//d/ influences how this sound is pronounced.

In the second sub-group sounds, /ʃ/ and /v/, the group far from the native model has an average of below 0.33 and the group near to the native model does not exceed 0.67. The difference between the two groups in the /v/ sound is 0.02, and while in the /ʃ/ sound it rises to 0.27. It is still below our reference value of 0.33. That means we cannot use the students' pronunciation in /t//d/ to predict how they will pronounce /ʃ/ and /v/.

Concerning the /m/ sound, we observe that the two groups of students present a pronunciation in an intermediate range. The group far from the native model has an average of 0.37, and the group near to the native model has an average of 0.58. A difference of 0.21 is established between the two groups, leading us to think that how /t//d/ are pronounced is not a factor in predicting how /m/ will be pronounced.

Comparing the groups' results, some outcomes should be noted. Both groups are above the reference value of 0.66 in the sound /ʧ/, with a difference between them of 0.20. So it can be said that this sound does not present great difficulty for the students. In the groups /ŋ/, /r/, /z/ and /s/ the results of the two groups are below 0.33, and the difference between them as explained above is very small, between 0.01 and 0.06. We can, therefore, deduce that both groups have similar difficulties when pronouncing these sounds.

The past and the plural pronunciation shows better results for the group far from the native model, as it is higher than 0.33, and the pronunciation of the group near to the native model is higher than 0.66. That means that neither group presents many difficulties in the pronunciation of the sounds, although the difference of 0.49 between them in the plural sound should be noted because it shows better performance in the group near to the native model.

The difference between both groups of students in /r/ is 0.01; the difference is 0.01 in favour of the group far from the native model. It leads us to think that the difficulties in the performance of this sound in both groups are nearly the same.

Finally, the sound /m/ gives results in both groups between 0.34 and 0.66, and although its difference is only 0.21 we can note that the two groups are very close to each other and that they present a similar level of performance.

It is important to highlight there are five students in the group near to the native pronunciation. And this makes the results difficult to extrapolate to other situations.

In conclusion, we can infer from this data analysis that the pronunciation of /t//d/ is not useful in predicting how the students will behave when pronouncing the other sounds we have analysed in this table.

Other conclusions that can be drawn from the data collected are that students who pronounce /t//d/ near to the native model do not stand out in the pronunciation of the other sounds except in /ʧ/, the past and the plural. If we analyse the results of the sounds that have been pronounced in an intermediate range, we can observe that the one closest to 0.66 is the sound /m/, the average is 0.58, and the sound /ʃ/, average is 0.51, even so it is not relevant enough. Concerning /v/, averaging 0.35, places it very close to the group far from the native model. Therefore, this /t//d/ sound does not show a strong correlation with other sounds, and there is only a weak correlation with /m/, /ŋ/, /ʃ/, /ʧ/, and the plural. However, it's surprising that a near native pronunciation of /t//d/ predicts a slightly better performance of the plural and /ʧ/ but it predicts a slightly worse performance of /m/ and /ʃ/.

6.1.5. Data extracted from the analysis of /ʃ/.

TABLE 13

STUDENT 6	0.00
STUDENT 9	0.00
STUDENT 15	0.00
STUDENT 20	0.00
STUDENT 14	0.09
STUDENT 17	0.09
STUDENT 23	0.09
STUDENT 8	0.09
STUDENT 10	0.09
STUDENT 16	0.18
STUDENT 24	0.18
STUDENT 29	0.18
STUDENT 1	0.18
STUDENT 5	0.18
STUDENT 18	0.27
STUDENT 3	0.27
STUDENT 19	0.36
STUDENT 21	0.36
STUDENT 22	0.36
STUDENT 25	0.36
STUDENT 26	0.36
STUDENT 30	0.36
STUDENT 2	0.45
STUDENT 28	0.54
STUDENT13	0.63
STUDENT 4	0.64
STUDENT 7	0.64
STUDENT 12	0.81
STUDENT 11	0.90
STUDENT 27	0.90

TABLE 14

	STUDENTS	PERCENTAGE
FAR [0-33]	16	53.3%
MID [34-66]	11	36.7%
NEAR [67-100]	3	10%

The data provided by the analysis of the percentages in the sound /ʃ/ shows that 53.3% of the students are far from the native model of pronunciation, while 10% are near to it. As 90% of students are far from the native model and only 10% are close to it, it can be concluded that /ʃ/ seems to be a very problematic sound for the students who have participated in this study with a minimum level of English B1.

TABLE 15

	/m/	/ŋ/	/r/	/t/ /d/	/tʃ/	/z/	/v/	/s/	PAST	PLURAL
FAR [0-33]	0.30	0.27	0.09	0.28	0.81	0.01	0.38	0.15	0.62	0.43
NEAR [67-100]	0.54	0.10	0.07	0.53	0.93	0.03	0.42	0.48	0.78	0.61

When comparing sounds, we have to take into account for all analyses that as only three candidates pronounce /ʃ/ near to the native model it is not possible to extrapolate the results although it is indicative of the trend in this group of students.

By analysing the data of the /ʃ/ sound compared to the other sounds we can make the following deductions. These students show problems with the sounds /ŋ/, /r/ and /z/ in the group far from the native model and the group near to the native model. That shows that taking the /ʃ/ sound as a reference, the students show similar behaviour in these sounds. The data shows that in /r/ and /z/ sounds the difference between the groups far and near to the native model is only 0.02, increasing in the /ŋ/ sound to 0.17. The differences between both groups are below 0.33 which is what we would consider significant to be able to say that how /ʃ/ is pronounced, far or near to the native model, helps to predict how the rest of the compared sounds will be pronounced.

Comparing /ʃ/ and /ʧ/ sounds data shows that the students have pronounced the latter very close to the native model. The group near to the native model has an average of 0.81 and the far group of the native model has 0.93, between both there is only a difference of 0.12. This difference is very low, and indicates that the pronunciation of /ʃ/ near of far from the native model cannot be used to predict how the students will perform the /ʧ / sound.

The above is concerning the more extreme groups, the group far from the native model has a ranking between 0-33, and near to the native model has a ranking between 67 -100. In the following sounds: /m/, /t//d/, /s/ and the past the groups that come into comparison with /ʃ/ are the group mid to the native model with a ranking between 34-66, and the groups far and near to the native model. Here we have again two sub-groups, the first one in /m/, /t//d/ and /s/ where the group near to the native model has an average under 0.67. And there is a second sub-group with the past sound where the group far from the native model has an average over 0.33.

Concerning the /m/ sound, we observe that there are students who pronounce /ʃ/ far from the native model obtaining an average of 0.30, and the group near to the native model obtains a better average with 0.54. Between both groups however, there is a difference of 0.24. That leads us to consider that how /ʃ/ is pronounced is not a factor in predicting how /m/ will be pronounced, although it seems that those who pronounce it closer to the native model have less trouble pronouncing this sound.

The comparison of the sounds /ʃ/ and /t//d/ gives the data that the students far from the native get an average of 0.28. The percentage improves with the group far from the native model reaching 0.53. Between both groups the difference is 0.25, below the 0.33 we have as a significant reference to predict how the sounds will be pronounced. This leads us to think that the way /ʃ/ is pronounced is not a factor in predicting how they will pronounce /t//d/ although it seems that those who pronounce it closer to the native model have less trouble in its performance.

When comparing /s/ with /ʃ/ sound, the data we obtained shows that the group far from the native model gets an average of 0.15, and the group near to the native model 0.48. A difference of 0.33 is established between the two groups. Again, that suggests that how /ʃ/

is pronounced is not a factor in predicting how /s/ will be pronounced. The difference of 0.33 is the highest between /ʃ/ and the rest of the sounds in this table.

Data shows in the second sub-group, with the past sound, that the group far from the native model has an average of 0.62, very close to 0.66 that we have as a reference for a pronunciation near to the native model. And the group near to the native model has an average of 0.78, giving a difference between the groups of 0.16. It is under 0.33 and we cannot predict how they will perform the past sound from how they perform /ʃ/.

Concerning the /v/ and the plural sounds, data shows that both groups are in a mid group. The group far from the native model has an average over 0.33; 0.38 in the /v/ sound; and 0.43 in the plural sound. On the other hand, the group near to the native model gets an average below 0.67 and this puts it in an intermediate position, in the mid group which average is between 0.34 and 0.66. Between two groups there is a difference of 0.18 in the pronunciation of the plural, and 0.02 in the pronunciation of /v/. This leads us to conclude that how /ʃ/ is pronounced is not a factor that helps in predicting how they will pronounce /v/ and the past sounds. It seems that both groups have a close performance of these sounds and have very similar difficulties.

Comparing the far and near native groups' results, some of them should be noted. In /v/ and the plural sounds, there are no significant differences between the two as they are both in an intermediate-range or mid group. The sound /ʧ/ shows again a high degree of performance in the two groups, above 0.67. And because the difference between them is 0.12 it leads us to think that the students behave similarly when performing /ʧ/.

In the past sound, in general, the two groups are over 0.34, although the group near to the native model shows fewer problems in its performance. And the sounds that present more difficulties for the two groups of students are /ŋ/ and /r/ since they do not exceed 0.33 and are very far from the 0.33 that we take as a significant reference. Beside this information data shows that the group far from the native model gets better results in both sounds. These results are not very big but show that this group is doing better than the group near to the native model.

It is important to note that the results are less reliable because the group near to the native model with /ʃ/ sound is made up of only three students and it is difficult to extrapolate the results to the other groups.

In conclusion, we can infer from this data analysis that the pronunciation of /ʃ/ is not useful to predict how the students will behave when pronouncing the other sounds we have analysed in this table.

Another inference that can be drawn from the data collected is that students who pronounce /ʃ/ near to the native model do not stand out in the pronunciation of the other sounds except in /ʧ/ and past sound. If we analyse the results of the sounds that have been pronounced in an intermediate range, we can observe that the one closest to 0.66 is the past sound, averaging0.61; even so it is not relevant enough. The rest of the sounds whose average is in that intermediate band are further away from 0.66, and therefore the /m/ averages 0.54; /t//d/ averages 0.53; /s/ averages 0.48 and /v/ averages 0.42, even though they are in that intermediate band and stand out as the plural sound they are not totally significant. Therefore, this /ʃ/ sound does not show a strong correlation with other sounds, and there's only a weak correlation with /m/, /t//d/ and /s/. However, it's surprising that a near native pronunciation of /ʃ/ predicts a slightly better performance of /m/ and /t//d/, but it predicts a slightly worse performance of /s/.

6.1.6. Data extracted from the analysis of /ʧ/.

TABLE 16

STUDENT 18	0.00
STUDENT 5	0.40
STUDENT 26	0.40
STUDENT 3	0.60
STUDENT 17	0.60
STUDENT 22	0.60
STUDENT 24	0.60
STUDENT 12	0.80
STUDENT13	0.80
STUDENT 23	0.80
STUDENT 1	1.00
STUDENT 2	1.00
STUDENT 4	1.00
STUDENT 6	1.00
STUDENT 7	1.00
STUDENT 8	1.00
STUDENT 9	1.00
STUDENT 10	1.00
STUDENT 11	1.00
STUDENT 14	1.00
STUDENT 15	1.00
STUDENT 16	1.00
STUDENT 19	1.00
STUDENT 20	1.00
STUDENT 21	1.00
STUDENT 25	1.00
STUDENT 27	1.00
STUDENT 28	1.00
STUDENT 29	1.00
STUDENT 30	1.00

TABLE 17

	STUDENTS	PERCENTAGE
FAR [0-33]	1	3.3%
MID [34-66]	6	20%
NEAR [67-100]	23	76.7%

The data provided by the analysis of the percentages in the sound /ʧ/ shows that 3.3% of the students are far from the native model of pronunciation while 76.7% are near it. As there are 23.3% students who are far from the native model and 76.7% who are close to it, it can be concluded that /ʧ/ does not seem to be a problematic sound for the students who participated in this study with a minimum level of English B1.

TABLE 18

	/m/	/ŋ/	/r/	/t/ /d/	/ʃ/	/z/	/v/	/s/	PAST	PLURAL
FAR [0-33]	0.13	0.00	0.00	0.16	0.27	0.00	0.38	0.09	0.41	0.16
NEAR [67-100]	0.42	0.27	0.10	0.40	0.34	0.01	0.34	0.20	0.61	0.49

When comparing sounds, we have to take into account for all analyses that twenty-three candidates pronounce /ʧ/ near to the native model, the highest number in this study.

By analysing the data of /ʧ/ sound compared to the other sounds we can make the following deductions. Although the students show a very high degree of performance in this sound, with an average of 76.7, nevertheless they do not reach a rate higher than 0.66 in the rest of the sounds included in this study.

The greatest difficulty for the students included in this study is presented by the sounds /ŋ/, /r/, /z/ and /s/. Both groups are below 0.33. In the /ŋ/ sound, the difference between both groups is 0.27, the highest is in the/s/ sound where the difference is 0.11, in the /r/ sound it is 0.10 and finally the smallest difference is in the /z/ sound which is 0.01. This allows us to say that the performance of the sounds of both groups is very similar and we can deduce that they face the same problems in their realisation.

With the /m/, /t//d/, /ʃ/ and the plural sounds, we observe that the group far from the native model has an average below 0.33, and the group near to the native model is in an intermediate band since it does not exceed 0.66. The differences between the groups are below 0.33 which we take as a reference to consider if, through the pronunciation of /ʧ/, you can predict how the rest of the sounds will be pronounced.

In the/m/ sound the far from the native model group gets an average of 0.13 while the near to the native model group has 0.42. The difference between the two is 0.29. For the sound /t//d/ the group far from the native model has 0.16 and the group near to the native model has 0.40, the difference between the two is more significant at 0.24. The sound /ʃ/ has a difference between groups of only 0.07 since the far from the native model group gets an average of 0.27 and the near to the native model group gets 0.34.

The plural sound has a difference between groups of 0.33, the highest difference between both groups. And this is because the group far from the native model has an average of 0.16 and the group near the native model has 0.49. In this case, as the difference between groups coincides with our reference value 0.33, we could consider the pronunciation of/ʧ/ as a factor to predict how the student will pronounce the plural sound.

In the rest of cases, the differences between groups are less than 0.33 which we take as a significant difference to predict the pronunciation of these sounds from the pronunciation of /ʧ/.

There is a last case to point out that the groups far and near to the native model show results higher than 0.33 and lower than 0.67 in the performance of /v/ and past sounds, that is why both groups are in an intermediate range, in other words, the students are in the mid group. It should be noted that while the difference between the two groups in the /v/ sound is very small, only 0.04, in past the difference is greater, 0.20. They are therefore still far below the 0.66 reference value.

In the realisation of the /v/ sound although both groups are located in that mid group, however, the group far from the native model gets a better result than the group near to the

native model. But this does not indicate a significant difference from the former with respect to the latter in the realisation of this sound.

In conclusion, we can infer from this data analysis that the pronunciation of /ʧ/ can help to predict how the student will pronounce the plural sound. But it is not useful in predicting how the students will behave when pronouncing the other sounds we have analysed in this table. Therefore, this /ʧ/ sound does not show a strong correlation with other sounds, and there's only a weak correlation with /m/, /ŋ/, /t//d/, the past, and the plural. However, it's surprising that a near native pronunciation of /ʧ/ predicts a slightly better performance of the past, but it predicts a slightly worse performance of the plural, /m/, /t//d/ and /ŋ/.

6.1.7. Data extracted from the analysis of /z/.

TABLE 19

STUDENT 1	0.00
STUDENT 2	0.00
STUDENT 3	0.00
STUDENT 4	0.00
STUDENT 5	0.00
STUDENT 6	0.00
STUDENT 7	0.00
STUDENT 8	0.00
STUDENT 9	0.00
STUDENT 10	0.00
STUDENT 11	0.00
STUDENT 12	0.00
STUDENT13	0.00
STUDENT 14	0.00
STUDENT 15	0.00
STUDENT 16	0.00
STUDENT 17	0.00
STUDENT 18	0.00
STUDENT 19	0.00
STUDENT 20	0.00
STUDENT 21	0.00
STUDENT 24	0.00
STUDENT 25	0.00
STUDENT 26	0.00
STUDENT 28	0.00
STUDENT 29	0.00
STUDENT 30	0.00
STUDENT 23	0.08
STUDENT 27	0.08
STUDENT 22	0.50

TABLE 20

	STUDENTS	PERCENTAGE
FAR [0-33]	29	96.7%
MID [34-66]	1	3.3%
NEAR [67-100]	0	0%

The data provided by the analysis of the percentages in the sound /z/ shows that 96.7% of the students are far from the native model of pronunciation while 0% are near it. As 100% of students are far from the native model and 0% is close to it, it can be concluded that /z/ is a very problematic sound for the students who have participated in this study with a minimum level of English B1.

TABLE 21

	/m/	/ŋ/	/r/	/t/ /d/	/ʃ/	/tʃ/	/v/	/s/	PAST	PLURAL
FAR [0-33]	0.41	0.25	0.10	0.38	0.32	0.86	0.36	0.19	0.63	0.48
NEAR [67-100]	X	X	X	X	X	X	X	X	X	X

In this case, it should be noted that only one student, who was closest to the native model, did so with an average of 0.50, well below the 0.67 minimum of the group close to the native model. This student would be included in the group mid to the native model. No student was included in the group near to the native model in any of the sounds analysed in this study.

Data shows that for the students the most difficult sounds were /ŋ/, /r/, /ʃ/ and /s/. On the other hand, the sound /tʃ/ presents a result of 0.86 in the group far from the native model, and this leads us to deduce that it is not a sound that presents great difficulties to the students.

With the rest of the sounds, /m/, /t//d/, /v/, the past, and the plural, the average of the students would be in the mid group as their average is above 0.33 and below 0.67. The past sound is the closest to the native model with a result of 0.63. This leads us to deduce that despite being in the group far from the native model the past sound presents a medium

difficulty to these students. The plural sound has an average of 0.48, and the /t//d/ and /v/ sounds have a result of 0.38 and 0.36 respectively. We can, therefore, deduce that the difficulty in its pronunciation is higher than that of the previous sound /ʧ/ analysed in this study.

As a conclusion, we can say that the /z/ sound presents a great difficulty for the students included in this study. This difficulty may be due to the absence of the /z/ sound in Spanish. On the other hand, it should be noted that the students submitted to this test achieved a result higher than 0.33 in six of the sounds whose data we have analysed and therefore are in an intermediate range of pronunciation concerning them.

It is not possible to make a comparison of sounds because there are no students in the group close to the native model in any of them. Therefore, the only conclusion that can be reached through the analysis of data is how the students pronounce /z/ does not predict how they will pronounce the rest of the sounds.

A consequence we can draw from the analysis of the data is that although no student has performed the /z/ sound in the group near to the native model, and therefore all students are included in the group far from the native model, it is interesting as mentioned above, to note that they have a high average of 0.86 in the /ʧ/ sound. The result is similar to the data given in the other tables for this sound. And although its average is higher than 0.66 as no student could have been in the group near to the native model it is not significant for the study. No predictions can be made with /z/ sound as there are no results in the group near to the native model.

6.1.8. Data extracted from the analysis of /v/.

TABLE 22

STUDENT 21	0.00
STUDENT 23	0.13
STUDENT 1	0.25
STUDENT 6	0.25
STUDENT 7	0.25
STUDENT 15	0.25
STUDENT 19	0.25
STUDENT 20	0.25
STUDENT 28	0.25
STUDENT 30	0.25
STUDENT 2	0.38
STUDENT 5	0.38
STUDENT 8	0.38
STUDENT 12	0.38
STUDENT13	0.38
STUDENT 17	0.38
STUDENT 18	0.38
STUDENT 24	0.38
STUDENT 25	0.38
STUDENT 27	0.38
STUDENT 29	0.38
STUDENT 3	0.50
STUDENT 4	0.50
STUDENT 9	0.50
STUDENT 11	0.50
STUDENT 14	0.50
STUDENT 16	0.50
STUDENT 22	0.50
STUDENT 26	0.50
STUDENT 10	0.63

TABLE 23

	STUDENTS	PERCENTAGE
FAR [0-33]	10	33.3%
MID [34-66]	20	66.7%
NEAR [67-100]	0	0%

The data provided by the analysis of the percentages in the sound /v/ shows that 33.3% of the students are far from the native model of pronunciation while 0% is near it. As there are 100% of students who are far from the native model and 0% who are close to it, it can be concluded that /v/ is a very problematic sound for the students who have participated in this study with a minimum level of English B1.

TABLE 24

	/m/	/ŋ/	/r/	/t/ /d/	/ʃ/	/tʃ/	/z/	/s/	PAST	PLURAL
FAR [0-33]	0.41	0.28	0.13	0.34	0.25	0.98	0.01	0.20	0.53	0.48
NEAR [67-100]	X	X	X	X	X	X	X	X	X	X

In this case, it should be noted that ten students performed far from the native model, and twenty did so with an average of 0.50, that is significantly below the minimum 0.67 of the group near to the native model. Therefore, they are included in the group mid to the native model.

Within the group far from the native model, the students show different results since in the sounds /ŋ/, /r/, /ʃ/, /z/ and /s/ the results are below 0.33, in /tʃ/ sound the average is 0.98. This is a very high average, which shows that all of the students in this study were very close to the native model. For the remaining sounds, /m/, /t//d/, the past, and the plural their average is between 0.34 and 0.66, which places the students in the group mid to the native model. 66.7% of the students are located in this mid group.

The sound /z/ has the lowest average at 0.01. The sound /r/ has an average of 0.13, followed by the sound /s/ with 0.20, the sound /ʃ/ with an average of 0.25 and finally the sound /ŋ/ with an average of 0.28.

However, this group of students did obtain averages higher than 0.33 which placed them in the mid group for the sounds past with 0.53, the plural with 0.48, /m/ with 0.41 and /t//d/ with an average of 0.34. This leads us to think that despite being in the group far from the native model in /v/ the above-mentioned sounds present a medium difficulty for these students.

The difficulty that the students show in this sound could be because in Spanish the voiced labiodental fricative sound /v/ does not exist, and the Spanish speaker tends to pronounce it the same as the Spanish /b/, which is an occlusive bilabial sound.

It is not possible to make a comparison of sounds because there are no students in the group close to the native model in any of them. Therefore, the only conclusion that can be reached through the analysis of data is how the students pronounce /v/ does not predict how they will pronounce the rest of the sounds.

The /v/ sound presents the same situation as the previous sound as no student has performed the /v/ sound correctly, and therefore all students are included in the group far from the native model, it is interesting as mentioned above, to note that they have a high average of 0.98 in the /ʧ/ sound. The result is similar to the data given in the other tables for this sound. And although its average is higher than 0.66 as no student could have been in the group near to the native model it is not significant for the study. No predictions can be made with /v/ as there are no results in the group near to the native model.

6.1.9. Data extracted from the analysis of /s/.

TABLE 25

STUDENT 7	0.00
STUDENT 9	0.00
STUDENT 23	0.00
STUDENT 24	0.00
STUDENT 26	0.00
STUDENT 28	0.00
STUDENT 29	0.00
STUDENT 1	0.09
STUDENT 2	0.09
STUDENT 5	0.09
STUDENT 6	0.09
STUDENT 8	0.09
STUDENT13	0.09
STUDENT 14	0.09
STUDENT 16	0.09
STUDENT 18	0.09
STUDENT 19	0.09
STUDENT 21	0.09
STUDENT 10	0.18
STUDENT 17	0.18
STUDENT 11	0.27
STUDENT 15	0.27
STUDENT 25	0.27
STUDENT 4	0.36
STUDENT 3	0.54
STUDENT 22	0.54
STUDENT 27	0.54
STUDENT 12	0.63
STUDENT 20	0.63
STUDENT 30	0.72

TABLE 26

	STUDENTS	PERCENTAGE
FAR [0-33]	23	76.7%
MID [34-66]	6	20%
NEAR [67-100]	1	3.3%

The data provided by the analysis of the percentages in the sound /s/ shows that 76.7% of the students are far from the native model of pronunciation while 3.3% are near it. As 96.7% of students are far from the native model and 3.3% are close to it, it can be concluded that /s/ is a very problematic sound for the students who have participated in this study with a minimum level of English B1.

TABLE 27

	/m/	/ŋ/	/r/	/t/ /d/	/ʃ/	/tʃ/	/z/	/v/	PAST	PLURAL
FAR [0-33]	0.40	0.26	0.10	0.35	0.27	0.85	0.00	0.35	0.61	0.43
NEAR [67-100]	0.50	0.30	0.00	0.50	0.36	1.00	0.00	0.25	0.41	0.50

When comparing sounds, we have to take into account for all analyses that as only one candidate pronounces /s/ near to the native model it is not possible to extrapolate the results, although, it is indicative of the trend in this group of students.

By analysing the data of the /s/ sound compared to the other sounds, we can make the following deductions. The students in both groups have problems with the sounds /ŋ/, /r/ and /z/. That shows that taking the/s/ sounds as a reference, the students show similar behaviour in the above-mentioned sounds. The data shows that in the /ŋ/ sound the difference between the groups far and near to the native model is only 0.04, increasing in the /r/ sound to 0.10, and /z/ where there is no difference. Even so, the difference between both groups is below 0.33, which is what we would consider significant to be able to say that how the students pronounce /s/ far or near to the native model helps to predict how they would pronounce these sounds.

Comparing the/s/ and /ʧ/ sounds data shows that the students have pronounced the latter very close to the native model. The group near to the native model has an average of 1.00 and the far group of the native model has 0.85, between both there is only a difference of 0.15. That difference is below the reference value of 0.33, and indicates that the pronunciation of /s/ near or far from the native model cannot be predicted as it will in the pronunciation of the /ʧ/ sound.

The above is concerning the more extreme groups, the group far from the native model has a ranking between 0 - 33, and near to the native model, with a ranking between 67 - 100. There is another case with the sound /ʃ/ where the group far from the native model has an average of 0.27 but the group near to the native model has an average in an intermediate ranking of 0.36. The differences between both groups are 0.09. For this reason, we can say that the students in these two groups have a very similar performance with this sound. And again, data shows that we cannot predict the performance of /ʃ/ from how the students perform /s/.

The sound /v/ represents another situation because the students in the group far from the native model have a result of 0.35 and the group near to the native model gets 0.25. It means that the first group has a better average in the sound /v/ and is closer to the native model. The difference between them is 0.15 and shows that the group near to the native model has more difficulties when performing this sound. This leads us to conclude that how /s/ is pronounced is not a factor that helps in predicting how they will pronounce /v/ although it seems that those who pronounce it farther away from the native model have less difficulty pronouncing this sound.

In the rest of the sounds: /m/, /t//d/, the past, and the plural, both groups are in an intermediate range. The biggest difference between them is in the past sound where it is 0.20. Following on /t//d/ that is 0.15; in the sound /m/ it is 0.10; and in the plural sound is 0.07. All are below 0.33, so we have to consider the pronunciation of /-s/, predictable of how the students will pronounce these sounds. This leads us to conclude that how /s/ is pronounced is not a factor that helps in predicting how they will pronounce /m/, /t//d/, the past, and the plural.

Comparing the groups' results, some of them should be noted. The biggest difference between the groups correspond to the past sound. The group far from the native model has a higher average in the sounds /v/and /r/ than the group near to the native model. Between both groups, the difference is far from the 0.33 we have marked as significant to predict the pronunciation of these sounds. The sound /z/ presents the same result in both groups; none of the students performed it near the native model. The average is 0.00, and it leads us to think that this is the most problematic sound in this table, and each of the students included in this study have the same average performance.

Also, it is interesting to note that the data shows that in the past sound, the group far from the native model has an average of 0.61, and the group near to the native model is 0.41. It means that the performance of the first group is better and closer to the native model than the performance of the second group.

It is important to note that the results are less reliable because the group near to the native model with the /s/ sound is made up of only one student, with an average of 0.72. And this student is below average in the pronunciation of the rest of the sounds included in this table.

In conclusion, we can infer from this data analysis that the pronunciation of /s/ is not useful to predict how the students will behave when pronouncing the other sounds we have analysed in this table.

Other conclusions that can be drawn from the data collected are that students who pronounce /s/ near to the native model do not stand out in the pronunciation of any other sound. Although in /m/, /t//d/, and the plural sound their average is 0.50 but although it stands out it is not totally significant. The same is the case with the following sounds which are in that intermediate range but further away from 0.66: the past sound averaged 0.41, and /ʃ/ averaged 0.36. Neither of these last two sounds is significant despite being in the intermediate range. Therefore, this /s/ sound does not show a strong correlation with other sounds, and there's only a weak correlation with the past. However, it's surprising that a near-native pronunciation of the /s/ sound has a worse performance than the group far from the native model.

6.1.10. Data extracted from the analysis of Past sound.

TABLE 28

STUDENT 7	0.17
STUDENT 9	0.17
STUDENT 6	0.33
STUDENT13	0.41
STUDENT 18	0.41
STUDENT 20	0.41
STUDENT 30	0.41
STUDENT 1	0.42
STUDENT 8	0.50
STUDENT 21	0.50
STUDENT 28	0.50
STUDENT 16	0.58
STUDENT 5	0.66
STUDENT 25	0.66
STUDENT 26	0.66
STUDENT 2	0.75
STUDENT 11	0.75
STUDENT 14	0.75
STUDENT 15	0.75
STUDENT 22	0.75
STUDENT 27	0.75
STUDENT 12	0.83
STUDENT 17	0.83
STUDENT 23	0.83
STUDENT 24	0.83
STUDENT 29	0.83
STUDENT 3	0.83
STUDENT 10	0.83
STUDENT 4	1.00
STUDENT 19	1.00

TABLE 29

	STUDENTS	PERCENTAGE
FAR [0-33]	3	10%
MID [34-66]	12	40%
NEAR [67-100]	15	50%

The data provided by the analysis of the percentages in the past sound shows that 10% of the students are far from the native model of pronunciation, while 50% are near it. As 50% of students are far from the native model and 50% are close to it, it can be concluded that this sound is problematic only for half of the students who have participated in this study with a minimum level of English B1.

TABLE 30

	/m/	/ŋ/	/r/	/t/ /d/	/ʃ/	/tʃ/	/z/	/v/	/s/	PLURAL
FAR [0-33]	0.13	0.47	0.10	0.31	0.21	1.00	0.00	0.33	0.03	0.23
NEAR [67-100]	0.33	0.28	0.08	0.42	0.36	0.87	0.04	0.40	0.25	0.49

By analysing the data of the past sound compared to the other sounds we can make the following deductions. Concerning the sound /tʃ/, the group far from the native model has a result of 1.00, better than the 0.87 reached by the group near to the native model. The difference between groups is 0.13, and it means that the performance of both groups is very similar. Therefore, we can deduce that how students pronounce the past sound cannot predict how they will pronounce /tʃ/.

These students in both groups, far and near to the native model, have problems in the sounds /m/, /r/, /z/ and /s/. It shows that taking the past sound as a reference, the students show similar behaviour when they perform them. The data shows that in the /r/ sound the difference between the groups far and near to the native model is 0.02, and the group far from the native model has a better average than the other group. On the other hand, the average with the rest of sounds shows that the results in the group far from the native model are worse than the ones in the group near to the native model. The difference is: 0.04 in /z/; 0.20 in /m/; and 0.22 in /s/ being the biggest one in this group. Because all the

differences are below 0.33 we can deduce that the way in which the past sound is performed does not show how the students will do in the rest of the sounds.

The sounds /t//d/, /ʃ/, /v/, and the plural show that the group far from the native model has an average below 0.33, and the group near to the native model has an average between 0.34 and 0.66, in an intermediate range. The biggest difference between groups is 0.26 in the plural sound. The difference in /ʃ/ is 0.15; in /t//d/ sound is 0.09; and in /v/ is 0.07. It means that the way the students perform the past sound predicts how they will do in the rest of sounds included in this paragraph.

The sound /ŋ/ has a better result in the group far from the native model, its average is 0.47, than the group near to the native model that gets 0.28. The difference between them is 0.19, and it leads us to conclude that how the past sound is pronounced is not a factor that helps in predicting how they will pronounce /ŋ/, although, it seems that those who pronounce it farther away from the native model have less difficulty pronouncing this sound.

Comparing the groups' results, some of them should be noted. In the sounds /ʧ/, /ŋ/, /r/ the group far from the native model has better results than the group near to the native model. Although the difference is below 0.33 they are not relevant for the prediction of how students could perform these sounds. Only in the sound /ʧ/ have both groups a performance close to the native model. But in the rest of the sounds included in this table the average of the students is below 0.67.

Although the results show that 50% of the students included in this study are in the group close to the native model, the data cannot yet be fully extrapolated and generalised.

In conclusion, we can infer from this data analysis that the pronunciation of the past sound is not useful to predict how the students will behave when pronouncing the other sounds we have analysed in this table. The differences between groups are below 0.33, and it stands out as the plural sound is not significant to predict how the rest of the sounds will be performed.

It is possible to infer from the data collected that students who pronounce the past near to the native model do not stand out in the pronunciation of the other sounds except in /ʧ/. Analysing the results of the sounds that have been pronounced in an intermediate range we note that none are near 0.66. The plural sound averages 0.49; /t//d/ averages 0.42; /v/ averages 0.40; and /ʃ/ averages 0.36 so are not significant for our study and are in that intermediate band. Therefore, the past sound does not show a strong correlation with other sounds, and there's only a weak correlation with /m/, /s/ and the plural. However, it's surprising that a near native pronunciation of the past predicts a slightly better performance of the plural, but it predicts a slightly worse performance of /s/ and /m/.

6.1.11. Data extracted from the analysis of Plural sound.

TABLE 31

STUDENT 8	0.00
STUDENT 15	0.00
STUDENT 16	0.00
STUDENT 19	0.00
STUDENT 12	0.16
STUDENT 18	0.16
STUDENT 23	0.16
STUDENT 24	0.16
STUDENT 6	0.17
STUDENT 9	0.17
STUDENT 25	0.33
STUDENT 26	0.33
STUDENT 2	0.34
STUDENT 7	0.34
STUDENT13	0.50
STUDENT 14	0.50
STUDENT 17	0.50
STUDENT 22	0.50
STUDENT 30	0.50
STUDENT 27	0.66
STUDENT 3	0.67
STUDENT 20	0.83
STUDENT 21	0.83
STUDENT 29	0.83
STUDENT 5	0.84
STUDENT 10	0.84
STUDENT 1	1.00
STUDENT 4	1.00
STUDENT 11	1.00
STUDENT 28	1.00

TABLE 32

	STUDENTS	PERCENTAGE
FAR [0-33]	12	40%
MID [34-66]	8	26.7%
NEAR [67-100]	10	33.3%

The data provided by the analysis of the percentages in the past sound shows that 40% of the students are far from the native model of pronunciation while 33.3% are near it. As 66.7% of students are far from the native model and 33.3% are close to it, it can be concluded that this sound is problematic for two thirds of the students who have participated in this study with a minimum level of English B1.

TABLE 33

	/m/	/ŋ/	/r/	/t/ /d/	/ʃ/	/tʃ/	/z/	/v/	/s/	PAST
FAR [0-33]	0.35	0.28	0.02	0.26	0.23	0.80	0.01	0.36	0.14	0.63
NEAR [67-100]	0.50	0.24	0.18	0.46	0.33	0.90	0.00	0.36	0.23	0.67

When comparing sounds, we have to take into account for all analyses that one-third of the students pronounce the plural near to the native model, and it is not possible to extrapolate the results but it is indicative of the trend in this group of students.

By analysing the data, we make the following deductions. These students show problems in the sounds /ŋ/, /r/, /ʃ/, /z/ and /s/ in both groups and show that taking the plural sound as a reference; the students behave similarly in the above-mentioned sounds. The data shows that in the plural sound the difference between the groups far and near to the native model in the /z/ sound is 0.01; the /ŋ/ sound is 0.04; the/s/sound is 0.09; the/ʃ/ sound is 0.10 and the /r/ sound difference goes up to 0.16. In all these sounds the difference between both groups is below 0.33 which is what we would consider significant to be able to say that pronouncing the plural far or near to the native model helps to predict how the students would pronounce the rest of the sounds included in this study.

Comparing the plural sound with the /ʧ/ sound, data shows that the students have pronounced the latter very closely to the native model. The average of the group near to the native model is 0.90, and the group far from the native model is 0.80, between both there is only a difference of 0.10. The difference between the two groups is very low, and indicates that how the plural sound is pronounced does not help predict how /ʧ/ will be pronounced by students in both groups.

The above information concerns the more extreme groups, the group far from the native model has a ranking between 0 - 33, and near to the native model, with a range between 67 -100. In the following sounds: /t//d/ and the past, the groups that come into comparison with the plural sound are the group mid to the native model, with a ranking between 34 -66 and the group far or near to the native model.

When comparing the /t//d/ sound with the plural sound, the data we obtained shows that the group far from the native model gets an average of 0.26, and the group near to the native model gets 0.46. A difference of 0.20 is established between the two groups, and it indicates that students from both groups have similar performances. That suggests that how the plural sound is pronounced is not a factor in predicting how /t//d/ will be pronounced.

When we compare the groups in the past sound, we find that the group far from the native model has an average of 0.63, and the group near to the native model has 0.67. The first group is in an intermediate-range with only a difference of 0.04 with the second group. It means that the students from both groups have similar performances, and again this suggests that how the plural sound is pronounced is not a factor in predicting how the past sound is pronounced.

Concerning the /m/ and /v/ sounds, we observe that both groups are in an intermediate range, between 0.34 and 0.66. In /m/ the average of the students in the group far from the native model is 0.35, and the one in the group near to the native model is 0.50. Between them, there is a difference of 0.15 which it below the 0.33 that we take as a reference to predict the pronunciation of sounds. There is another situation in the sound /v/, because both groups are in an intermediate range and have the same average of 0.36. It means that the performance of the students in the two groups is the same. Therefore, we cannot

consider how they pronounce the plural sound or to predict how they will do with /m/ and /-v/.

Comparing the groups' results, some of them should be noted. There are no big differences between the groups in any sound - the highest one is 0.20. In the sound /v/ they have the same result 0.36. And that only in the past sound and /ʧ/ the group near to the native model is over 0.67; in the rest of the sounds the performance of this group is below it. But again, the differences between groups are below 0.33, and it means that we cannot consider how they pronounce the plural sound to predict how they will do with these sounds.

Also, data gives the information that in the sounds /ŋ/ and /z/ the group far from the native model reaches a better average than the group near to the native model. In both cases, the difference is very small, and it indicates that students from both groups have a very similar performance.

In conclusion, we can infer from this data analysis that the pronunciation of past sound is not useful to predict how the students will behave when pronouncing the other sounds we have analysed in this table.

Another deduction that can be drawn from the data collected is that students who pronounce the plural near to the native model do not stand out in the pronunciation of the other sounds except in the /ʧ/ and the past sound. Only three sounds have been pronounced in the intermediate range, but are far from 0.66. These sounds are /m/, average 0.50; /t//d/, average 0.46; and /v/, average 0.36, none of which are significant to the study. Therefore, the sound does not show a strong correlation with other sounds, and there's only a weak correlation with /t//d/.

6.2. PREDICTABILITY OF THE PERFORMANCE OF THE SOUNDS.

The second hypotheses of this work considers whether a better performance of one of the 12 sounds selected allows us to predict which of the other 11 sounds will also be mastered. The following table establishes which sounds are those that students in the group near the native model managed to master and the relationship between them. Taking the first file as

an example, we note that those students who perform /m/ near the native model also do so in the sounds /ʧ/ and plural. However, if we take the sound /ʧ/ as a reference, we find that students who perform the sound /ʧ/ near the native model do not do so with sound /m/. And the same happens with the plural sound when it is the reference that one of the students who perform it near the native model does not do so with the /m/ sound.

REFERENCE SOUNDS	PREDICTABILITY OF NEAR NATIVE PERFORMANCE										
	/m/	/ŋ/	/r/	/t//d/	/ʃ/	/ʧ/	/z/	/v/	/s/	Past	Plural
/m/						X					X
/ŋ/						X				X	
/r/						X					X
/t//d/						X				X	X
/ʃ/						X				X	
/ʧ/											
/z/											
/v/											
/s/						X					
Past						X					
Plural						X				X	

Table 34. Relationship between sounds.

The data obtained from Table 34 show there are three common features shared by this group of students: /ʧ/ past sound, and plural sound. It is possible to establish a hierarchy in which the sound /ʧ/ would take first place as it is the feature they all have in common. The second most common feature would be the past sound, and the third would be the plural sound. This suggests that among these three elements, the one that students learn first is the sound /ʧ/ since they all mastered it and, therefore, it would be at a more initial stage in the development of the student's interlanguage.

On the other hand, we can observe that those who pronounce the sound /ŋ/ in the group near the native model have a good performance in the past sound. Although, when they pronounce the past sound their pronunciation of /ŋ/ is not near the native model. This allows us to deduce that the students learn the past sound before the velar sound /ŋ/. That would show that both are at different stages of learning English.

Students who pronounce /t//d/ near the native model also do so with the past sound. However, we can observe that not all of those who pronounce the past sound near the native model pronounce /t//d/ in the same way. We can therefore deduce that the learning

of the past sound is at a stage before that of /t//d/. The same is valid for the plural sound because the students who pronounce /t//d/ correctly also pronounce the plural sound correctly. However, students who pronounce the plural sound near the native model do not pronounce /t//d/ in the same way. Again we can deduce that in the learning process, the plural sound is at a stage before the /t//d/ sound.

Analysing data of the plural sound, we find that those who pronounce it near the native model do so also when pronouncing the past sound. However, students who pronounce the past near the native model do not pronounce the plural with the same degree of accuracy. This leads us to conclude that the past sound is at an earlier stage in learning than the plural sound.

In relation to the third feature the students have in common, the plural sound, we can deduce from the data that those students who pronounce it near the native model also pronounce the past sound near the native model. But this is not reciprocal since those who pronounce the past sound near the native model do not pronounce the plural sound in the same way. Thus it is possible to deduce that in the learning process, the student develops the learning of the past sound in a stage previous to the plural sound.

Analysing all the other sounds in detail, we deduce information that supports the above. In Tables 3 and 18 of this work, we note that those students who pronounce /m/ near the native model obtained an average of 0.62 when pronouncing the past sound. This is also the case with the /ʧ/ sound as students get an average of 0.61, very close to the 0.66 we took as a reference. That would support the proposition that the past sound is a sound that is at a second stage in the development of English language learning.

In Table 15, the /r/ sound, we note that the group near the native model has an average of 0.61 when pronouncing the plural sound, which is close to 0.66, which is our reference. This information, together with that in Table 34, supports the argument that the process of plural sound learning would be in a third stage. Likewise, in Table 27, the /s/ sound, students in the group close to the native model reached an average of 0.50, and in Table 30, the past sound, the average is 0.49 in the pronunciation of the plural sound. Although

this is far from the 0.66 of reference, it is significant and would support the fact that the acquisition of the plural sound would be at a later stage in the learning process.

Summarising, we can say it is possible to state that the sound /ʧ/ would be in an initial stage of learning since all the students pronounce it near the native model, while the past sound would be in the next stage of learning and the plural sound would be at a later stage. The rest of the sounds are autonomous in the sense that each student learns them at different stages from each other. Also, we observe that while the /ʧ/, past, and plural sounds belong to the initial stages of learning, the /z/ and /v/ sounds will be at the later stage of learning since no student can make them near the native model, as shown in Tables 21 and 24 of this study.

POSSIBLE STAGES OF THE SOUNDS IN THE PROCESS OF THE LEARNING DEVELOPMENT	
1º stage	**/ʧ/**
2º stage	**past sound**
4º stage	**plural sound**
5º and following stages	**/m/ /ŋ/ /r/ /t//d/ /ʃ/ /s/**
Last stage	**/v/ /z/**

Chart 4. Possible learning stages of the sounds.

Also, I analysed the results of those sounds that had a difference of at least 0.20 when taking the dominance of a sound as a reference. Table 35 does not show in which sounds students dominate when they also dominate a reference sound but shows the difference between sounds of at least 0.20 that I consider being a modesty significant difference. This table helps us to draw the conclusion which shows the difference in the performance of each sound grouping the students according for an individual sound. For example, taking sound /m/ as a reference, the first file groups the students according to the pronunciation of /m/ and shows the sounds when both groups have a modesty significant difference above 0.20. The reference of 0.20 is established as a minimum indicator of the differences between the groups far and near the native model. A positive number indicates that those students have a better pronunciation of the relevant sound. And a negative number

indicates that those students that have a pronunciation of /m/ far from the native model have better pronunciation of the relevant sound.

REFERENCE SOUNDS	PREDICTABILITY OF LEARNIG ACQUISITION PROGRESION										
	/m/	/ŋ/	/r/	/t//d/	/ʃ/	/tʃ/	/z/	/v/	/s/	Past	Plural
/m/		-0.31			+0.24						+0.28
/ŋ/	-0.31										
/r/	-0.28	+0.25		-0.32						-0.22	+0.54
/t//d/	+0.21				+0.27	+0.20					+0.49
/ʃ/	+0.24			+0.25					+0.33		
/tʃ/	+0.29	+0.27		+0.24						+0.20	+0.33
/z/											
/v/											
/s/										-0.20	
Past	+0.20								+0.22		+0.26
Plural				+0.20							

Table 35. Predictability of learning acquisition progression.

This data allows us to draw conclusions, although with caution, and establish learning stages. In general, it is possible to observe that there is no strong correlation between the sounds, although weak correlations can be established. I will now present them individually.

The data shows that pronouncing /m/ near to the native model is related to a slightly better pronunciation of /ŋ/, /ʃ/, and the plural sound. But there are some differences. If we check the data in the reference sound /ŋ/ we notice that it coincides with /m/ with a value of -0.31. In this case, it is the group far from the native model that progresses in both sounds before the group near to the native model.That is an unexpected result as the mastery of sound /m/ predicts a worse performance of /ŋ/. Similarly, the performance near to the native model of /ŋ/ predicts a worse performance in the pronunciation of /m/. Carrying out the same process with the sound /ʃ/ we note the same situation, in this case, the coincidence value is +0.24. Here, it is the group near to the native model that progresses in both sounds. And we can deduce that students progress at the same time in the acquisition of /m/ and /ʃ/. However, when we check the plural sound, we can see that those who pronounce /m/ near to the native model also do so in the relevant sound, but when the reference sound is the plural no student performs /m/ near to the native model. Then it is possible to propose that students progress first in learning the plural sound before learning /m/.

The reference sound /r/ shows a slightly better pronunciation in the sounds /m/, /ŋ/, /t//d/, the past, and the plural. The sounds /m/, /t//d/, and the past have negative values, which means that it is the group far from the native model that progresses in these sounds before the group near to the native model. The /m/ sound has an index of -0.28, the/t//d/ sound -0.32 and the past -0.22. Again, that is an unexpected result as the mastery of the sound /r/ predicts a poorer performance in the sounds /m/, /t//d/ and the past. On the other hand, those who perform/r/ near to the native model also do so with the sounds /ŋ/ and the plural; the first has an index of +0.25and the second+0.54, which is the highest value in the table. However, students who pronounce the plural near to the native model do not pronounce the /r/ in the same range. And students who pronounce /ŋ/ near to the native model do not pronounce /r/ in the same way. So we can deduce that in the learning process students acquire /ŋ/ and the plural sound earlier than the /r/ sound.

Analysing /t//d/ as the reference sound, we observe that the students have a better pronunciation of the relevant /m/, /ʃ/, /ʧ/ and the plural sounds. In this case, the plural sound with the highest index of +0.49 stands out, then with more modesty significant differences in the sounds /ʃ/ +0.27, /m/ +0.21, and /ʧ/ +0.20. If we analyse these sounds as reference sounds, we can see that those who pronounce /m/ do not reach +0.20 when pronouncing /t//d/. The /ʃ/ sound has a result of +0.25 when pronouncing/t//d/, the /ʧ/ has a result of +0.24 in the /t//d/ sound, and the plural +0.20 when pronouncing/t//d/. The conclusion we can draw is that the /m/ sound is learned before the /t//d/ sound. And students would progress with /ʃ/, /ʧ/ and the plural in the learning process at the same time. Pointing out that the plural with +0.49 would show that for students it involves less difficulty than the /t//d/ sound.

Analysing the sound /ʃ/ as the reference sound, we observe that it shows in the relevant sounds /m/ +0.24, /t//d/ +0.25, and /s/ + 0.33. Analysing the data by taking /ʃ/ as the relevant sound in relation to the other sounds, we note that when /m/ is the reference sound /ʃ/ has a value of +0.24, with /t//d/ as the reference sound the value of /ʃ/ is +0.20, and with the reference sound /s/ there is no value. We could state with this data that in the learning process the /s/ sound is acquired before the /ʃ/ sound and that the /m/ and /t//d/ sounds would be acquired almost at the same time as the /ʃ/ sound.

The sound /ʧ/ shows the following correlation with the relevant sounds /m/ +0.29, /ŋ/ +0.27, /t//d/ +0.24, the past +0.20, and the plural +0.33. The most notable is the plural sound, with a value of +0.33. That shows that its performance is a little better than the other sounds mentioned above. When analysing the sounds /m/, /ŋ/, /t//d/, the past, and the plural as the reference sounds we observe that there is only one positive value that corresponds to the sound /t//d/ by having /ʧ/ +0.20. And with the other sounds, it does not show any value. This data could lead us to consider that in the learning process the sounds /ʧ/ and /t//d/ would be acquired at the same time, but that in this process the sounds /m/, /ŋ/, past and plural would be acquired before the sound /ʧ/.

Analysing the sound /s/, we can observe that the group far from the native model has a better performance in the past sound since its index is -0.20. That is an unexpected result as the mastery of sound /s/ predicts a worse performance in the past sound. We could think from this data that /s/ sound is a difficult sound for the Spanish students, and it is acquired in the latest stages in the process of learning.

The past sound shows positive data in the relevant sounds /m/ +0.20, /s/ +0.22, and the plural +0.26. However, when analysing data for /m/ and the plural sounds we note that past sound does not obtain values. And that with the /s/ sound it gets the value of -0.20, which means that it is the group far from the native model that has the best performance in this sound as was explained above. With this data, we could deduce that in the learning process the /m/ and plural sounds are acquired before the past sound. Concerning the /s/ sound, no conclusions can be drawn because the result belongs to the group far from the native model.

In the analysis of the plural sound data, we find that the relevant sound /t//d/ obtains a result +0.20. If we analyse the data of the sound /t//d/ we can see that the plural sound has a value of +0.49. From this information, we could deduce that both sounds are acquired at the same time or almost at the same time in the learning process. And because the value of the plural is +0.49 it appears that most students can learn this sound more easily.

All this data can help us to establish a hierarchy in the learning process of the sounds studied because there seems to be an order in which the students learn the sounds.

The information provided by the results with positive and negative values is also relevant. Positive values help us to discern that hierarchy in the progress of sound learning and negative numbers provide unexpected information because mastering one sound predicts a worse performance in another. That may be due to the representativeness of the data but also to different factors that would be interesting to explore in further studies.

CHAPTER 7. CONCLUSIONS.

The purpose of this chapter is to summarise the findings of the study and their interpretations. This chapter concludes with an overview of the limitation of the study, as well as suggestions for future research in this field. This study has analysed the pronunciation of 12 English sounds /m/, /ŋ/, /r/, /t//d/, /ʃ/, /tʃ/, /z/, /v/, /s/, the past and the plural with Spanish speakers. The aim was to verify the difficulty they had with these sounds and the strategies used by the students to avoid the mistake. Also, the students´ interlanguage was analysed to understand if it is relevant in the students´ learning process and if it has different stages.

7.1. INTERPRETATION OF THE FINDINGS AND THEIR RELATION TO THE HYPOTHESES.

First of all, it has to be stated that the current research has been able to verify the first hypotheses exposed at the beginning of the study but not the second one with complete certainty. Two hypotheses have been proposed in this study:

1. The 12 sounds /m/, /ŋ/, /r/, /t//d/, /ʃ/, /tʃ/, /z/, /v/, /s/, the past and the plural are equally problematic for B1 Spanish learners of English.
2. Better performance of one of the 12 sounds selected does allow us to predict which of the other 11 sounds will also be mastered.

Before explaining the results related to the hypotheses, I will summarise the difficulties and strategies that each studied sound has presented in this <u>analysis</u>. It was observed in this research that the students showed the three phonological processes of insertion, omission, and substitution.

Insertion is a phonological process that has three subgroups: prosthesis, epenthesis, and paragoge. All of them appeared in the samples collected. A prosthesis process occurred when subjects added an /e/ before /s/ as in the case of /sprɛd/> */esprɛd/. Only one student was in the group close to the native model (0.67-1.00). His percentage was 3.3% of the total subjects in this study. The process of epenthesis was less frequent. Student 13 added a sound in *continuing* by pronouncing */ kənsˈtɪnjʊŋ/. And there were also cases of paragoge as that made by Subject 1 in *push* */ˈpʊʃt/.

Among the results I found several cases of omission. Some students pronounced *reclaim* as */ˈkleɪm/, the consequence of an apheresis process. There were cases of apocope at the end of a word, for example students deleted the sound /m/ in *midterm* * /ˈmɪdˈtɜː/, and the sound /nt/ of *president* */presidi/.

I met cases in which the students used the Spanish sound instead of the English sound. This phenomenon happened mostly with the <r> and with the English /z/, for example, they pronounced days */deɪs/. Sound changes were also frequent, as in the case of the pronunciation of *established* */ɪˈstablɪtʃ/.

When the English and Spanish words were spelled the same or almost the same, some students pronounced the Spanish word; this is the case of *international>internacional*. Some students pronounced the words as they were written, for example, *delivered**/delivered/. Finally, I observed that there was a substitution of the word in the text for another, for example *roaring* as *boring*.

Focusing on the 12 sounds studied /m/, /ŋ/, /r/, /t//d/, /ʃ/, /tʃ/, /z/, /v/, /s/, the past and the plural in relation to the first hypothesis proposed, the following conclusions can be drawn.

All of the sounds presented a level of difficulty, including the sound /tʃ/ which had the best results. 76.7% of the students have done it near to the native model, and only 23.3% have done it in an intermediate-range or far from the native model.

It has been possible to observe that interference from L1 to L2 occurs. Spanish students tended to transfer the phonological rules and sounds of their mother tongue to pronounce those English sounds that do not exist in Spanish, that they did not know, or that they thought were the same, by establishing a false equivalence between them. They did this by following different strategies that have already been mentioned in Chapter 4, and resulted in errors in their performance (Carlisle, 2001).

Analysing the results of the tests, the following results appeared. The /m/ sound was changed to /n/ which in Spanish is more frequent in the final word position. Therefore, it is reasonable to think that there was an influence of Spanish on English. The rules of

distribution restrictions do not admit the nasal velar sound /ŋ/ in the final position in Spanish, so /ŋ/ was simplified to the sound /n/ for the students. Concerning /r/, both languages have the same grapheme <r> but do not correspond to the same phoneme. The Spanish /r/ is a vibrating alveolar and the English /r/ is a postalveolar (Navarro Tomás, 2004; Gimson, 1970). The Spanish students reproduced them as if they were equivalent sounds transferring the sounds from their native language to English.

Regarding the problem of pronouncing the English sonorous sound /z/, which does not exist in Spanish, the students chose to substitute it by pronouncing the Spanish voiceless /s/. This resulted in another case of transfer from Spanish to English.

The /t//d/ sounds that are in the final word endings <-nt>, <-st>, <-nd> in English and which in Spanish do not exist in that final position made the students choose to eliminate the last /t//d/ sound. It is feasible to think that it was also due to transfer from Spanish to English due to the rules of distribution restrictions. With the sound /ʃ/, whose grapheme is <sh> and which is not in the Spanish phonological set, the students chose to assimilate this English sound to the Spanish voiceless alveolar fricative phoneme /s/ or the palatal affricate phoneme /tʃ/.

The sound that posed the least problem to the students was /tʃ/. This sound in English is palatoalveolar affricate, very close to the Spanish postalveolar affricate. In this case, it was not possible to discern whether there was an influence of Spanish on English as both are very close to each other. It has been observed that when the students pronounced the suffix <-es> with phonic realisation /-iz/ they choose to change /z/ for /s/ and omit the vowel or pronounce /s/ but making a vowel change from /i/ to /e/.In this case, it is not entirely clear that there is an influence of Spanish on English. These strategies may be due to other reasons, such as the student making his own hypotheses about the sound.

The difficulty of pronouncing /d/ /-id/ grapheme <-ed> in the regular past of verbs and some adjectives was also solved by applying Spanish rules to English as the student opted to eliminate it or to pronounce it by assimilating the vowel to the Spanish vowel /e/.The English labiodental fricative /v/ sound is not in the Spanish phonological set. But both languages have the grapheme <v>. In Spanish it is pronounced the same as the grapheme

<b>, both correspond to a bilabial occlusive sound. In this case the Spanish student made no distinction between the two so it can be considered that the transfer from Spanish to English took place.

There was a phenomenon of prothesis with the sound /s/ grapheme <s->. The Spanish student tended to generate a prosthetic /e/ sound when pronounced. The English syllabic structure /sC(C)-/ is the reason for an epenthesis when the native Spanish speaker inserts /e/ by phonological rules (Carlisle, 2001).

Let's consider the results obtained for the two hypotheses set out at the beginning. The following table (Table 36) shows the percentage of the results of each sound. The students are grouped into two groups (far and near to the native model). The students in the mid group are considered to be in the far from the native model group. Table 36 has been organised from highest to lowest difficulty of pronunciation and taking the near to the native model group as a reference.

	DIFFICULTY FOR B1 STUDENTS	
	NEAR TO THE NATIVE MODEL	**FAR FROM THE NATIVE MODEL**
/z/	0%	100%
/v/	0%	100%
/r/	3.3%	96.7%
/s/	3.3%	96.7%
/ŋ/	10%	90%
/ʃ/	10%	90%
/t//d/	16.7%	73.3%
/m/	20%	80%
Plural	33.3%	66.7%
Past	50%	50%
/ʧ/	76.7%	23.3%

Table 36: Difficulty of sounds in relation with each bothers.

From the data analysed and taking as a reference the group near to the native model, we could deduce that the sounds that presented most difficulty for the students were /z/ and /v/ with a percentage of 0%. The next sounds in order of difficulty were /r/ and /s/ with a percentage of 3.3%. The sounds /ŋ/ and /ʃ/ had a percentage of 10%. The /t//d/ sound scored a little better at 16.7% in that group. And the /m/ sound gets the better score of 20%. The plural obtained 33.3%, still presenting a high level of difficulty. That leads us to conclude that this group of sounds is the most difficult for Spanish speakers.

The result of the past, 50% shows that the difficulty is only for half of the students participating in this study. And the sound that obtains the best results is /ʧ/ with a percentage of 76.7%, showing it is the one that presents the least difficulty for Spanish students.

The data in Table 36 indicates that not all sounds present the same difficulty for students of the chosen level. This contradicts hypothesis 1 which stated that all sounds are equally difficult for students. The sound /ʧ/ is learned in the first stage of the learning development as 76.7% of the students perform it correctly. The past sound is learned in the second stage since only 50% can perform it correctly, and finally, the plural is learned in a third stage since 33.3% of the students can perform it near to the native model. The rest of the sounds can be interpreted as being learned more arbitrarily since it would seem that each student does it at his or her own tempo and order.

Concerning hypothesis 2, taking table 36 as a picture of the state of the interlanguage in which the B1 level students are as a group, we can say which sounds still need to be acquired (v, z), which sounds are halfway (past and plural) and which sounds have already been acquired by the majority (ch).The predictability factor of the mastered performance of some sounds over others cannot be established with total certainty.

The information provided in table 36 is limited because it is only percentages and averages of the group. That is why I have created different tables that offer further information about which sounds are more problematic and whether they are organised by stages. Analysing the results extracted from the Tables 1 to 33, section 6.1, we have observed that in some sounds the groups far and near to the native model behave in the same way. The

result for both groups coincides in the same range. Table 37providesinformation of the sounds that the groups far and near to the native model performance in the same range. The causes of these should be studied in further studies, as they cannot be covered in this paper.

SOUNDS IN WHICH THE GROUPS FAR AND NEAR THE NATIVE MODEL HAVE THE SAME OUTCOME			
Sounds	**Sounds in groups 1&3 between 0-33**	**Sounds in groups 1 & 3 between 34-66**	**Sounds groups 1 & 3 between 67-100**
/m/	/r/ /z/ /s/	past	/ʧ/
/ŋ/	/r/ /z/ /s/	/t//d/ /v/ /ʃ/	/ʧ/
/r/	/ʃ/ /z/ /s/	past	/ʧ/
/t//d/	/ŋ/ /r/ /z/ /s/	/m/	/ʧ/
/ʃ/	/ŋ/ /r/ /z/	/v/ plural	/ʧ/
/ʧ/	/ŋ/ /r/ /z/ /s/	/v/ past	
/z/			/ʧ/
/v/			/ʧ/
/s/	/m/ /r/ /z/ /s/	/m/ /t//d/ past plural	/ʧ/
Past/	/m/ /r/ /z/ /s/	----	/ʧ/
Plural	/ŋ/ /r/ /ʃ/ /z/ /s/	/m/ /v/	/ʧ/
Group 1. Group far from the native model.			
Group 3. Group near to the native model.			

Table 37. Sounds in which the groups far and near the native model obtain the same results.

Some conclusions drew from the data in Table 37shows the sounds in which the groups far and near to the native model are in the same range. This result is interesting to note because it would be expected that there would be no convergence in the results for both groups. We can see that the sound /ʧ/ is the only one that is in both groups between 0.67-100. This leads us to think that this sound offers little difficulty for students. If we cross this data with those of Table 36 we observe that the students who perform /ʧ/ near to the native model represent 76.7% of the total number of students, and this gives us the information that this sound is learned in the first stage of the learning process.

Both groups obtain results in the range of0.34 – 0.66 in the sounds /t//d/, /v/, /ʃ/, /m/, past, and plural. The group far from the native model gives a slightly better result than would be expected and the group near to the native model does not achieve a good performance of the sounds. If we cross the data with Table 36 where the past is pronounced near to the native model by 50% of the students and the plural sound by 33.3%, we could think that both sounds in the development of learning are at a later stage than the sound /ʧ/. And finally, both groups in the sounds /r/, /z/, /s/, /ʃ/, /ŋ/ and /m/ have a very similar behaviour, placing the results in the range between 0-33. The /m/ sound is repeated in the ranges 0 – 0.33 and 0.34 – 0.66, and if we cross the data in Table 36, we can see that 80% of the students do not achieve a performance close to the native model. Table 2, section 6.1, shows that 30% of the students are in the mid to the native model group, in the range 0.34 – 0.66, and 50% in the far from the native model group, in the range 0 – 0.33. The same applies to the sound /ʃ/ which is found in both groups, 90% of the students cannot perform near the native mode. In Table 14, section 6.1, the data shows that 53.3% of students are in the far from the native model group and 36.7% in the mid group.

All of this data leads us to think that the/m/, /ŋ/, /r/, /t//d/, /ʃ/, /z/, /v/, /s/ sounds are the ones that are learned at more advanced stages of the learning process, except for the past sound and the plural sound that would be placed in some learning stages immediately after the sound /ʧ/.With this data, it can be stated that hypothesis 1 of this research is not valid since, for example, the sound /ʧ/ is in the range of 0.67 - 1.00. This shows that for the students its level of difficulty is not the same as that of the sounds /r/, /z/, /s/, and /ŋ/ which

are in the range between 0 - 0.33, showing they are more difficult for students to learn than /ʧ/.

By comparing the results of Tables 36 and 37 some data can be confirmed. For example, the sound /ʧ/ is what most students perform near to the native model. In Table 36 it shows a percentage of 76.7% and in Table 37 it is the only sound that the groups far and near the native model perform in the highest range (0.67 - 1.00). The plural and past sounds in Table 36 have percentages of 50% and 33.3% respectively. They are in an intermediate-range (0.34 - 0.66) and at a later learning stage than the sound /ʧ/. In Table 37 they are also in the intermediate range, between 0.34 and 0.66. And finally, the rest of the sounds in Table 36 show very low percentages ranging from 20% to 0%, which places them at a later stage in the learning process. That is corroborated by the data in Table 37, which places them in the lowest range (0 - 0.33).

With the analysis of all the data we can conclude about hypothesis 1 and hypothesis 2 the following points:

Hypothesis 1: The 12 sounds /m/, /ŋ/, /r/, /t//d/, /ʃ/, /ʧ/, /z/, /v/, /s/, the past and the plural are equally problematic for B1 Spanish students of English. Taking the data into account, we can affirm that this is not confirmed since it has been possible to establish a hierarchy in the order of learning of the sounds. The /ʧ/, past, and plural sounds are reached at earlier stages of learning, while the /z/ and /v/ sounds are reached at more advanced stages, thus demonstrating their difficulty for the students.

Table 36 shows that the sound /ʧ/ is performed near the native model by 76.7% of students, the past by 50% and the plural by 33.3%. That helps us to establish a hierarchy in which the sound /ʧ/ would be learned first, the plural sound would be in a second learning stage and the past sound in a third learning stage. The following sounds in the learning stages would be /m/, only 20% of the students performance it correctly, /t//d/ 16.7%, /ʃ/ and /ŋ/ 10%, and /s/ and /r/ 3.3%. The percentage of students who perform these sounds correctly is very small, and it would be necessary to elaborate more tests to know the hierarchy among them. And finally, sounds /z/ and /v/ would be at a final stage of learning since their

percentages are 0%. That shows that the students have difficulty in their learning and would learn them in the last stage.

To support this conclusion, I compare data from Tables 34 and 36. Then it is possible to deduce that a hierarchy is established in the learning of sounds, which is linked to their greater or lesser difficulty given the percentages of students who do it near to the native model. Crossing the data extracted from Table 35 with the data from Tables 34 and 36 we can observe that the sound the students would first learn is /ʧ/, data from Table 36 shows that 76.7% of students perform it near to the native model. Data in Table 34 shows that for all sounds, except /z/ and /v/, students mastering the sound /ʧ/. It is also necessary to point out that the sound /ʧ/ presents a peculiar situation due to the high number of students who perform it correctly which, as has been said, is 76.7%. It could be deduced that the second sound to be learned would be the past; Table 36 shows that 50% of the students performed it near to the native model. Table 34 shows that those who perform near to the native model /ŋ/, /-t//-d/, /ʃ/, and plural sounds also perform the past sound near to the native model. And the third sound they would learn would be the plural sound. Data in Table 36 shows that the plural sound performance is near to the native model by 33.3% of the students. Table 34 shows that those who pronounce /m/, /r/, and /-t//-d/ near to the native model also do so in the plural sound. That would establish a hierarchy in which the first sound that students perform near to the native model would be /ʧ/, the second the plural, and the third the past. The rest of the sounds would be in later stages.

Hypothesis 2: Mastering one of the 12 sounds selected does allow us to confidently predict which of the other 11 sounds will also be mastered. This hypothesis could not be tested with complete certainty due to the limitations of the results. It is possible to say that there does seem to be a possible predictive factor, but it would be necessary to test with other tests to be able to give an accurate response.

To support this statement, I analyse the data extracted from Table 35 where it can be observed that pronouncing /m/ near to the native model predicts that /ʃ/ will also be pronounced near to the native model and vice versa. Furthermore, as the index is the same +0.24 we can deduce that both sounds are in the same learning stage.

By analysing the sound /t//d// data show that students who pronounce this sound correctly also do so when they pronounce /ʃ/, /ʧ/ and the plural. And this happens reciprocally with these sounds and with the /t//d/ sound. Their indices are very similar except for the plural, which is +0.49. We can therefore deduce that, except for the plural, the other sounds are at the same learning stage, and we can think that a prediction of their performance can be done.

The results for the other sounds do not show any possible predictions because they do not show reciprocity. In other words, pronouncing the reference sound well does not mean that the students pronounce some of the other sounds well.

- Students who pronounce /m/ near the native model also pronounce the plural (+0.28) near the native model. But students who pronounce the plural near the native model do not pronounce /m/ in the same way.

- Students who pronounce /r/ near the native model also pronounce /ŋ/ (+0.25) and the plural (+0.54) near the native model. But students who pronounce /ŋ/ and the plural near the native model do not perform /r/ in the same way.

- Students who pronounce /ʃ/ near the native model also pronounce /s/ (+0.33) near the native model. But students who perform /s/ near the native model do not perform /ʃ/ in the same way.

- Students who pronounce /ʧ/ near the native model also pronounce /m/ (+0.29), /ŋ/ (+0.27), /t//d/ (+0.24), the past (+0.20), and the plural (+0.33) near the native model. But if we take as reference sounds /m/, /ŋ/, /t//d/, the past, and the plural we can observe that /ʧ/ is not pronounced near the native model.

- Students who pronounce the past near the native model also pronounce the plural (+0.26) near the native model. But students who perform the plural near the native model do not perform the past near the native model.

The negative indices show a surprising situation, as it seems that pronouncing one sound well predicts the poor performance of another. For example, a student who pronounces /s/

near the native model pronounces the past badly (-0.20). This aspect is not taking into account in Hypothesis 2. This should be developed in further studies.

7.2. LIMITATIONS OF THE STUDY.

This study has some limitations that need to be taken into account in subsequent research. With some sounds, it is difficult to extrapolate the results because the number of students in the far or near to the native model groups is very small. The most notorious example is the /r/ sound where only one student was in the group near to the native model.

The data extracted from this study can be extended and improved in various ways. The corpus of analysis could be expanded by adding the /w/, /ø/ or /ʒ/, vowel sounds, diphthongs and triphthongs. That would enrich the study of the phonological difficulties that Spanish students have when learning English. Also, it could provide interesting data from a pedagogical point of view that would allow developing teaching strategies aimed at eliminating these language barriers.

Difficulties in accurately measuring students' pronunciation have been noted. For this reason, it would be interesting to be able to carry out an inter-annotator agreement study in which a team of teachers could verify and contrast the results.

It would be useful to make more recordings with more texts as they would give more examples of the sounds to be studied, which would also increase the reliability of the results.

And finally, in this research there have been some unusual results that may be interesting to analyse more deeply. The information extracted from Table 35 could be significant from a pedagogical point of view. The negative numbers are surprising, as they indicate that dominating one sound predicts a worse performance in another. That is unexpected and may be due to the representativeness of the data. But it is a fact that deserves to be explored for confirmation, as it could show an unexpected pattern of learning.

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APPENDIX I

The tables in this Appendix I are the matrix tables from which the rest of the tables in this thesis have been developed. Each sound is analysed individually in two tables. The first contains the individual information of the 30 students who have participated in this research, in decreasing order in relation to the results obtained in the reference sound. The second table summarises the results of the two extreme groups in terms of the reference sound in each table. For this reason, the reference sound does not reflect any information in this table.

The data provided in the first table is, on the one hand, the number of students and their individual values in the three groups in which they are distributed. The students whose results are between 0-0.33 are in the group far from the native model and this group is marked in yellow. The students whose results are between 0.67-1.00 are in the group near to the native model and this group is marked in blue. And finally, the students whose results are between 0.33-0.66 belong to the mid group and this group is marked in green. The second table, as explained above, contains the overall data of the two extreme groups analysed in this research.

TABLE 1. DATA ANALYSIS /-m/

	/-m/	/ŋ/	/r/	/-t/ /-d/	/ʃ/	/tʃ/	/z/	/v/	/s-/	PAST	PLURAL
STUDENT 6	0.00	0.40	0.00	0.00	0.00	1.00	0.00	0.25	0.09	0.33	0.17
STUDENT 1	0.13	0.50	0.80	0.08	0.18	1.00	0.00	0.25	0.09	0.42	1.00
STUDENT 3	0.13	0.10	0.20	0.33	0.27	0.60	0.00	0.50	0.54	0.83	0.67
STUDENT 8	0.13	0.80	0.10	0.00	0.09	1.00	0.00	0.38	0.09	0.50	0.00
STUDENT 9	0.13	0.50	0.00	0.58	0.00	1.00	0.00	0.50	0.00	0.17	0.17
STUDENT 10	0.13	0.50	0.00	0.67	0.09	1.00	0.00	0.63	0.18	0.83	0.84
STUDENT 17	0.13	0.20	0.00	0.41	0.09	0.60	0.00	0.38	0.18	0.83	0.50
STUDENT 18	0.13	0.00	0.00	0.16	0.27	0.00	0.00	0.38	0.09	0.41	0.16
STUDENT 19	0.13	0.70	0.00	0.25	0.36	1.00	0.00	0.25	0.09	1.00	0.00
STUDENT 22	0.13	0.50	0.00	0.66	0.36	0.60	0.50	0.50	0.54	0.75	0.50
STUDENT 24	0.13	0.60	0.00	0.16	0.18	0.60	0.00	0.38	0.00	0.83	0.16
STUDENT 2	0.25	0.20	0.50	0.50	0.45	1.00	0.00	0.38	0.09	0.75	0.34
STUDENT 7	0.25	0.50	0.30	0.33	0.64	1.00	0.00	0.25	0.00	0.17	0.34
STUDENT 14	0.25	0.20	0.00	0.33	0.09	1.00	0.00	0.50	0.09	0.75	0.50
STUDENT 20	0.25	0.00	0.10	0.25	0.00	1.00	0.00	0.25	0.63	0.41	0.83
STUDENT 4	0.38	0.70	0.30	0.92	0.64	1.00	0.00	0.50	0.36	1.00	1.00
STUDENT 11	0.38	0.20	0.10	0.50	0.90	1.00	0.00	0.50	0.27	0.75	1.00
STUDENT 15	0.50	0.00	0.00	0.16	0.00	1.00	0.00	0.25	0.27	0.75	0.00
STUDENT 16	0.50	0.10	0.00	0.66	0.18	1.00	0.00	0.50	0.09	0.58	0.00
STUDENT 23	0.50	0.20	0.00	0.33	0.09	0.80	0.08	0.13	0.00	0.83	0.16
STUDENT 27	0.50	0.10	0.10	0.75	0.90	1.00	0.08	0.38	0.54	0.75	0.66
STUDENT 30	0.50	0.30	0.00	0.50	0.36	1.00	0.00	0.25	0.72	0.41	0.50
STUDENT 25	0.63	0.00	0.00	0.16	0.36	1.00	0.00	0.38	0.27	0.66	0.33
STUDENT 26	0.63	0.00	0.10	0.33	0.36	0.40	0.00	0.50	0.00	0.66	0.33
STUDENT 12	0.75	0.00	0.00	0.33	0.81	0.80	0.00	0.38	0.63	0.83	0.16
STUDENT13	0.75	0.00	0.00	0.50	0.63	0.80	0.00	0.38	0.09	0.41	0.50
STUDENT 29	0.75	0.00	0.00	0.00	0.18	1.00	0.00	0.38	0.00	0.83	0.83
STUDENT 21	0.88	0.20	0.10	0.75	0.36	1.00	0.00	0.00	0.09	0.50	0.83
STUDENT 5	1.00	0.20	0.20	0.33	0.18	0.40	0.00	0.38	0.09	0.66	0.84
STUDENT 28	1.00	0.00	0.00	0.75	0.54	1.00	0.00	0.25	0.00	0.50	1.00

	/-m/	/ŋ/	/r/	/-t/ /-d/	/ʃ/	/tʃ/	/z/	/v/	/s-/	PAST	PLURAL
FAR [0-33]		0.38	0.13	0.31	0.21	0.83	0.03	0.38	0.18	0.60	0.41
NEAR [67-100]		0.07	0.05	0.44	0.45	0.83	0.00	0.29	0.15	0.62	0.69

TABLE 2. DATA ANALYSIS /-ŋ/

	/-m/	/ŋ/	/r/	/-t/ /-d/	/ʃ/	/tʃ/	/z/	/v/	/s-/	PAST	PLURAL
STUDENT 12	0.75	0.00	0.00	0.33	0.81	0.80	0.00	0.38	0.63	0.83	0.16
STUDENT13	0.75	0.00	0.00	0.50	0.63	0.80	0.00	0.38	0.09	0.41	0.50
STUDENT 15	0.50	0.00	0.00	0.16	0.00	1.00	0.00	0.25	0.27	0.75	0.00
STUDENT 18	0.13	0.00	0.00	0.16	0.27	0.00	0.00	0.38	0.09	0.41	0.16
STUDENT 20	0.25	0.00	0.10	0.25	0.00	1.00	0.00	0.25	0.63	0.41	0.83
STUDENT 25	0.63	0.00	0.00	0.16	0.36	1.00	0.00	0.38	0.27	0.66	0.33
STUDENT 26	0.63	0.00	0.10	0.33	0.36	0.40	0.00	0.50	0.00	0.66	0.33
STUDENT 28	1.00	0.00	0.00	0.75	0.54	1.00	0.00	0.25	0.00	0.50	1.00
STUDENT 29	0.75	0.00	0.00	0.00	0.18	1.00	0.00	0.38	0.00	0.83	0.83
STUDENT 3	0.13	0.10	0.20	0.33	0.27	0.60	0.00	0.50	0.54	0.83	0.67
STUDENT 16	0.50	0.10	0.00	0.66	0.18	1.00	0.00	0.50	0.09	0.58	0.00
STUDENT 27	0.50	0.10	0.10	0.75	0.90	1.00	0.08	0.38	0.54	0.75	0.66
STUDENT 2	0.25	0.20	0.50	0.50	0.45	1.00	0.00	0.38	0.09	0.75	0.34
STUDENT 5	1.00	0.20	0.20	0.33	0.18	0.40	0.00	0.38	0.09	0.66	0.84
STUDENT 11	0.38	0.20	0.10	0.50	0.90	1.00	0.00	0.50	0.27	0.75	1.00
STUDENT 14	0.25	0.20	0.00	0.33	0.09	1.00	0.00	0.50	0.09	0.75	0.50
STUDENT 17	0.13	0.20	0.00	0.41	0.09	0.60	0.00	0.38	0.18	0.83	0.50
STUDENT 21	0.88	0.20	0.10	0.75	0.36	1.00	0.00	0.00	0.09	0.50	0.83
STUDENT 23	0.50	0.20	0.00	0.33	0.09	0.80	0.08	0.13	0.00	0.83	0.16
STUDENT 30	0.50	0.30	0.00	0.50	0.36	1.00	0.00	0.25	0.72	0.41	0.50
STUDENT 6	0.00	0.40	0.00	0.00	0.00	1.00	0.00	0.25	0.09	0.33	0.17
STUDENT 1	0.13	0.50	0.80	0.08	0.18	1.00	0.00	0.25	0.09	0.42	1.00
STUDENT 7	0.25	0.50	0.30	0.33	0.64	1.00	0.00	0.25	0.00	0.17	0.34
STUDENT 9	0.13	0.50	0.00	0.58	0.00	1.00	0.00	0.50	0.00	0.17	0.17
STUDENT 10	0.13	0.50	0.00	0.67	0.09	1.00	0.00	0.63	0.18	0.83	0.84
STUDENT 22	0.13	0.50	0.00	0.66	0.36	0.60	0.50	0.50	0.54	0.75	0.50
STUDENT 24	0.13	0.60	0.00	0.16	0.18	0.60	0.00	0.38	0.00	0.83	0.16
STUDENT 4	0.38	0.70	0.30	0.92	0.64	1.00	0.00	0.50	0.36	1.00	1.00
STUDENT 19	0.13	0.70	0.00	0.25	0.36	1.00	0.00	0.25	0.09	1.00	0.00
STUDENT 8	0.13	0.80	0.10	0.00	0.09	1.00	0.00	0.38	0.09	0.50	0.00

	/-m/	/ŋ/	/r/	/-t/ /-d/	/ʃ/	/tʃ/	/z/	/v/	/s-/	PAST	PLURAL
FAR [0-33]	0.52		0.07	0.40	0.35	0.82	0.01	0.35	0.23	0.66	0.51
NEAR [67-100]	0.21		0.13	0.39	0.36	1.00	0.00	0.38	0.18	0.83	0.33

TABLE 3. DATA ANALYSIS /r-/

	/-m/	/ŋ/	/r-/	/-t/ /-d/	/ʃ/	/tʃ/	/z/	/v/	/s-/	PAST	PLURAL
STUDENT 6	0.00	0.40	0.00	0.00	0.00	1.00	0.00	0.25	0.09	0.33	0.17
STUDENT 9	0.13	0.50	0.00	0.58	0.00	1.00	0.00	0.50	0.00	0.17	0.17
STUDENT 10	0.13	0.50	0.00	0.67	0.09	1.00	0.00	0.63	0.18	0.83	0.84
STUDENT 12	0.75	0.00	0.00	0.33	0.81	0.80	0.00	0.38	0.63	0.83	0.16
STUDENT13	0.75	0.00	0.00	0.50	0.63	0.80	0.00	0.38	0.09	0.41	0.50
STUDENT 14	0.25	0.20	0.00	0.33	0.09	1.00	0.00	0.50	0.09	0.75	0.50
STUDENT 15	0.50	0.00	0.00	0.16	0.00	1.00	0.00	0.25	0.27	0.75	0.00
STUDENT 16	0.50	0.10	0.00	0.66	0.18	1.00	0.00	0.50	0.09	0.58	0.00
STUDENT 17	0.13	0.20	0.00	0.41	0.09	0.60	0.00	0.38	0.18	0.83	0.50
STUDENT 18	0.13	0.00	0.00	0.16	0.27	0.00	0.00	0.38	0.09	0.41	0.16
STUDENT 19	0.13	0.70	0.00	0.25	0.36	1.00	0.00	0.25	0.09	1.00	0.00
STUDENT 22	0.13	0.50	0.00	0.66	0.36	0.60	0.50	0.50	0.54	0.75	0.50
STUDENT 23	0.50	0.20	0.00	0.33	0.09	0.80	0.08	0.13	0.00	0.83	0.16
STUDENT 24	0.13	0.60	0.00	0.16	0.18	0.60	0.00	0.38	0.00	0.83	0.16
STUDENT 25	0.63	0.00	0.00	0.16	0.36	1.00	0.00	0.38	0.27	0.66	0.33
STUDENT 28	1.00	0.00	0.00	0.75	0.54	1.00	0.00	0.25	0.00	0.50	1.00
STUDENT 29	0.75	0.00	0.00	0.00	0.18	1.00	0.00	0.38	0.00	0.83	0.83
STUDENT 30	0.50	0.30	0.00	0.50	0.36	1.00	0.00	0.25	0.72	0.41	0.50
STUDENT 8	0.13	0.80	0.10	0.00	0.09	1.00	0.00	0.38	0.09	0.50	0.00
STUDENT 11	0.38	0.20	0.10	0.50	0.90	1.00	0.00	0.50	0.27	0.75	1.00
STUDENT 20	0.25	0.00	0.10	0.25	0.00	1.00	0.00	0.25	0.63	0.41	0.83
STUDENT 21	0.88	0.20	0.10	0.75	0.36	1.00	0.00	0.00	0.09	0.50	0.83
STUDENT 26	0.63	0.00	0.10	0.33	0.36	0.40	0.00	0.50	0.00	0.66	0.33
STUDENT 27	0.50	0.10	0.10	0.75	0.90	1.00	0.08	0.38	0.54	0.75	0.66
STUDENT 3	0.13	0.10	0.20	0.33	0.27	0.60	0.00	0.50	0.54	0.83	0.67
STUDENT 5	1.00	0.20	0.20	0.33	0.18	0.40	0.00	0.38	0.09	0.66	0.84
STUDENT 4	0.38	0.70	0.30	0.92	0.64	1.00	0.00	0.50	0.36	1.00	1.00
STUDENT 7	0.25	0.50	0.30	0.33	0.64	1.00	0.00	0.25	0.00	0.17	0.34
STUDENT 2	0.25	0.20	0.50	0.50	0.45	1.00	0.00	0.38	0.09	0.75	0.34
STUDENT 1	0.13	0.50	0.80	0.08	0.18	1.00	0.00	0.25	0.09	0.42	1.00

	/-m/	/ŋ/	/r-/	/-t/ /-d/	/ʃ/	/tʃ/	/z/	/v/	/s-/	PAST	PLURAL
FAR [0-33]	0.41	0.25		0.40	0.32	0.84	0.02	0.37	0.21	0.64	0.46
NEAR [67-100]	0.13	0.50		0.08	0.18	1.00	0.00	0.25	0.09	0.42	1.00

TABLE 4. DATA ANALYSIS /-t/ /-d/

	/-m/	/ŋ/	/r/	/-t/ /-d/	/ʃ/	/tʃ/	/z/	/v/	/s-/	PAST	PLURAL
STUDENT 6	0.00	0.40	0.00	0.00	0.00	1.00	0.00	0.25	0.09	0.33	0.17
STUDENT 8	0.13	0.80	0.10	0.00	0.09	1.00	0.00	0.38	0.09	0.50	0.00
STUDENT 29	0.75	0.00	0.00	0.00	0.18	1.00	0.00	0.38	0.00	0.83	0.83
STUDENT 1	0.13	0.50	0.80	0.08	0.18	1.00	0.00	0.25	0.09	0.42	1.00
STUDENT 15	0.50	0.00	0.00	0.16	0.00	1.00	0.00	0.25	0.27	0.75	0.00
STUDENT 18	0.13	0.00	0.00	0.16	0.27	0.00	0.00	0.38	0.09	0.41	0.16
STUDENT 24	0.13	0.60	0.00	0.16	0.18	0.60	0.00	0.38	0.00	0.83	0.16
STUDENT 25	0.63	0.00	0.00	0.16	0.36	1.00	0.00	0.38	0.27	0.66	0.33
STUDENT 19	0.13	0.70	0.00	0.25	0.36	1.00	0.00	0.25	0.09	1.00	0.00
STUDENT 20	0.25	0.00	0.10	0.25	0.00	1.00	0.00	0.25	0.63	0.41	0.83
STUDENT 12	0.75	0.00	0.00	0.33	0.81	0.80	0.00	0.38	0.63	0.83	0.16
STUDENT 14	0.25	0.20	0.00	0.33	0.09	1.00	0.00	0.50	0.09	0.75	0.50
STUDENT 23	0.50	0.20	0.00	0.33	0.09	0.80	0.08	0.13	0.00	0.83	0.16
STUDENT 26	0.63	0.00	0.10	0.33	0.36	0.40	0.00	0.50	0.00	0.66	0.33
STUDENT 3	0.13	0.10	0.20	0.33	0.27	0.60	0.00	0.50	0.54	0.83	0.67
STUDENT 5	1.00	0.20	0.20	0.33	0.18	0.40	0.00	0.38	0.09	0.66	0.84
STUDENT 7	0.25	0.50	0.30	0.33	0.64	1.00	0.00	0.25	0.00	0.17	0.34
STUDENT 17	0.13	0.20	0.00	0.41	0.09	0.60	0.00	0.38	0.18	0.83	0.50
STUDENT 2	0.25	0.20	0.50	0.50	0.45	1.00	0.00	0.38	0.09	0.75	0.34
STUDENT 11	0.38	0.20	0.10	0.50	0.90	1.00	0.00	0.50	0.27	0.75	1.00
STUDENT 13	0.75	0.00	0.00	0.50	0.63	0.80	0.00	0.38	0.09	0.41	0.50
STUDENT 30	0.50	0.30	0.00	0.50	0.36	1.00	0.00	0.25	0.72	0.41	0.50
STUDENT 9	0.13	0.50	0.00	0.58	0.00	1.00	0.00	0.50	0.00	0.17	0.17
STUDENT 16	0.50	0.10	0.00	0.66	0.18	1.00	0.00	0.50	0.09	0.58	0.00
STUDENT 22	0.13	0.50	0.00	0.66	0.36	0.60	0.50	0.50	0.54	0.75	0.50
STUDENT 10	0.13	0.50	0.00	0.67	0.09	1.00	0.00	0.63	0.18	0.83	0.84
STUDENT 21	0.88	0.20	0.10	0.75	0.36	1.00	0.00	0.00	0.09	0.50	0.83
STUDENT 27	0.50	0.10	0.10	0.75	0.90	1.00	0.08	0.38	0.54	0.75	0.66
STUDENT 28	1.00	0.00	0.00	0.75	0.54	1.00	0.00	0.25	0.00	0.50	1.00
STUDENT 4	0.38	0.70	0.30	0.92	0.64	1.00	0.00	0.50	0.36	1.00	1.00

	/-m/	/ŋ/	/r/	/-t/ /-d/	/ʃ/	/tʃ/	/z/	/v/	/s-/	PAST	PLURAL
FAR [0-33]	0.37	0.25	0.11		0.24	0.80	0.00	0.33	0.17	0.64	0.38
NEAR [67-100]	0.58	0.30	0.10		0.51	1.00	0.02	0.35	0.23	0.72	0.87

TABLE 5. DATA ANALYSIS /ʃ/

	/-m/	/ŋ/	/r/	/-t/ /-d/	/ʃ/	/tʃ/	/z/	/v/	/s-/	PAST	PLURAL
STUDENT 6	0.00	0.40	0.00	0.00	0.00	1.00	0.00	0.25	0.09	0.33	0.17
STUDENT 9	0.13	0.50	0.00	0.58	0.00	1.00	0.00	0.50	0.00	0.17	0.17
STUDENT 15	0.50	0.00	0.00	0.16	0.00	1.00	0.00	0.25	0.27	0.75	0.00
STUDENT 20	0.25	0.00	0.10	0.25	0.00	1.00	0.00	0.25	0.63	0.41	0.83
STUDENT 14	0.25	0.20	0.00	0.33	0.09	1.00	0.00	0.50	0.09	0.75	0.50
STUDENT 17	0.13	0.20	0.00	0.41	0.09	0.60	0.00	0.38	0.18	0.83	0.50
STUDENT 23	0.50	0.20	0.00	0.33	0.09	0.80	0.08	0.13	0.00	0.83	0.16
STUDENT 8	0.13	0.80	0.10	0.00	0.09	1.00	0.00	0.38	0.09	0.50	0.00
STUDENT 10	0.13	0.50	0.00	0.67	0.09	1.00	0.00	0.63	0.18	0.83	0.84
STUDENT 16	0.50	0.10	0.00	0.66	0.18	1.00	0.00	0.50	0.09	0.58	0.00
STUDENT 24	0.13	0.60	0.00	0.16	0.18	0.60	0.00	0.38	0.00	0.83	0.16
STUDENT 29	0.75	0.00	0.00	0.00	0.18	1.00	0.00	0.38	0.00	0.83	0.83
STUDENT 1	0.13	0.50	0.80	0.08	0.18	1.00	0.00	0.25	0.09	0.42	1.00
STUDENT 5	1.00	0.20	0.20	0.33	0.18	0.40	0.00	0.38	0.09	0.66	0.84
STUDENT 18	0.13	0.00	0.00	0.16	0.27	0.00	0.00	0.38	0.09	0.41	0.16
STUDENT 3	0.13	0.10	0.20	0.33	0.27	0.60	0.00	0.50	0.54	0.83	0.67
STUDENT 19	0.13	0.70	0.00	0.25	0.36	1.00	0.00	0.25	0.09	1.00	0.00
STUDENT 21	0.88	0.20	0.10	0.75	0.36	1.00	0.00	0.00	0.09	0.50	0.83
STUDENT 22	0.13	0.50	0.00	0.66	0.36	0.60	0.50	0.50	0.54	0.75	0.50
STUDENT 25	0.63	0.00	0.00	0.16	0.36	1.00	0.00	0.38	0.27	0.66	0.33
STUDENT 26	0.63	0.00	0.10	0.33	0.36	0.40	0.00	0.50	0.00	0.66	0.33
STUDENT 30	0.50	0.30	0.00	0.50	0.36	1.00	0.00	0.25	0.72	0.41	0.50
STUDENT 2	0.25	0.20	0.50	0.50	0.45	1.00	0.00	0.38	0.09	0.75	0.34
STUDENT 28	1.00	0.00	0.00	0.75	0.54	1.00	0.00	0.25	0.00	0.50	1.00
STUDENT 13	0.75	0.00	0.00	0.50	0.63	0.80	0.00	0.38	0.09	0.41	0.50
STUDENT 4	0.38	0.70	0.30	0.92	0.64	1.00	0.00	0.50	0.36	1.00	1.00
STUDENT 7	0.25	0.50	0.30	0.33	0.64	1.00	0.00	0.25	0.00	0.17	0.34
STUDENT 12	0.75	0.00	0.00	0.33	0.81	0.80	0.00	0.38	0.63	0.83	0.16
STUDENT 11	0.38	0.20	0.10	0.50	0.90	1.00	0.00	0.50	0.27	0.75	1.00
STUDENT 27	0.50	0.10	0.10	0.75	0.90	1.00	0.08	0.38	0.54	0.75	0.66

	/-m/	/ŋ/	/r/	/-t/ /-d/	/ʃ/	/tʃ/	/z/	/v/	/s-/	PAST	PLURAL
FAR [0-33]	0.30	0.27	0.09	0.28		0.81	0.01	0.38	0.15	0.62	0.43
NEAR [67-100]	0.54	0.10	0.07	0.53		0.93	0.03	0.42	0.48	0.78	0.61

TABLE 6. DATA ANALYSIS /tʃ/

	/-m/	/ŋ/	/r/	/-t/ /-d/	/ʃ/	/tʃ/	/z/	/v/	/s-/	PAST	PLURAL
STUDENT 18	0.13	0.00	0.00	0.16	0.27	0.00	0.00	0.38	0.09	0.41	0.16
STUDENT 5	1.00	0.20	0.20	0.33	0.18	0.40	0.00	0.38	0.09	0.66	0.84
STUDENT 26	0.63	0.00	0.10	0.33	0.36	0.40	0.00	0.50	0.00	0.66	0.33
STUDENT 3	0.13	0.10	0.20	0.33	0.27	0.60	0.00	0.50	0.54	0.83	0.67
STUDENT 17	0.13	0.20	0.00	0.41	0.09	0.60	0.00	0.38	0.18	0.83	0.50
STUDENT 22	0.13	0.50	0.00	0.66	0.36	0.60	0.50	0.50	0.54	0.75	0.50
STUDENT 24	0.13	0.60	0.00	0.16	0.18	0.60	0.00	0.38	0.00	0.83	0.16
STUDENT 12	0.75	0.00	0.00	0.33	0.81	0.80	0.00	0.38	0.63	0.83	0.16
STUDENT13	0.75	0.00	0.00	0.50	0.63	0.80	0.00	0.38	0.09	0.41	0.50
STUDENT 23	0.50	0.20	0.00	0.33	0.09	0.80	0.08	0.13	0.00	0.83	0.16
STUDENT 1	0.13	0.50	0.80	0.08	0.18	1.00	0.00	0.25	0.09	0.42	1.00
STUDENT 2	0.25	0.20	0.50	0.50	0.45	1.00	0.00	0.38	0.09	0.75	0.34
STUDENT 4	0.38	0.70	0.30	0.92	0.64	1.00	0.00	0.50	0.36	1.00	1.00
STUDENT 6	0.00	0.40	0.00	0.00	0.00	1.00	0.00	0.25	0.09	0.33	0.17
STUDENT 7	0.25	0.50	0.30	0.33	0.64	1.00	0.00	0.25	0.00	0.17	0.34
STUDENT 8	0.13	0.80	0.10	0.00	0.09	1.00	0.00	0.38	0.09	0.50	0.00
STUDENT 9	0.13	0.50	0.00	0.58	0.00	1.00	0.00	0.50	0.00	0.17	0.17
STUDENT 10	0.13	0.50	0.00	0.67	0.09	1.00	0.00	0.63	0.18	0.83	0.84
STUDENT 11	0.38	0.20	0.10	0.50	0.90	1.00	0.00	0.50	0.27	0.75	1.00
STUDENT 14	0.25	0.20	0.00	0.33	0.09	1.00	0.00	0.50	0.09	0.75	0.50
STUDENT 15	0.50	0.00	0.00	0.16	0.00	1.00	0.00	0.25	0.27	0.75	0.00
STUDENT 16	0.50	0.10	0.00	0.66	0.18	1.00	0.00	0.50	0.09	0.58	0.00
STUDENT 19	0.13	0.70	0.00	0.25	0.36	1.00	0.00	0.25	0.09	1.00	0.00
STUDENT 20	0.25	0.00	0.10	0.25	0.00	1.00	0.00	0.25	0.63	0.41	0.83
STUDENT 21	0.88	0.20	0.10	0.75	0.36	1.00	0.00	0.00	0.09	0.50	0.83
STUDENT 25	0.63	0.00	0.00	0.16	0.36	1.00	0.00	0.38	0.27	0.66	0.33
STUDENT 27	0.50	0.10	0.10	0.75	0.90	1.00	0.08	0.38	0.54	0.75	0.66
STUDENT 28	1.00	0.00	0.00	0.75	0.54	1.00	0.00	0.25	0.00	0.50	1.00
STUDENT 29	0.75	0.00	0.00	0.00	0.18	1.00	0.00	0.38	0.00	0.83	0.83
STUDENT 30	0.50	0.30	0.00	0.50	0.36	1.00	0.00	0.25	0.72	0.41	0.50

	/-m/	/ŋ/	/r/	/-t/ /-d/	/ʃ/	/tʃ/	/z/	/v/	/s-/	PAST	PLURAL
FAR [0-33]	0.13	0.00	0.00	0.16	0.27		0.00	0.38	0.09	0.41	0.16
NEAR [67-100]	0.42	0.27	0.10	0.40	0.34		0.01	0.34	0.20	0.61	0.49

TABLE 7. DATA ANALYSIS /z/

	/-m/	/ŋ/	/r/	/-t/ /-d/	/ʃ/	/tʃ/	/z/	/v/	/s-/	PAST	PLURAL
STUDENT 1	0.13	0.50	0.80	0.08	0.18	1.00	0.00	0.25	0.09	0.42	1.00
STUDENT 2	0.25	0.20	0.50	0.50	0.45	1.00	0.00	0.38	0.09	0.75	0.34
STUDENT 3	0.13	0.10	0.20	0.33	0.27	0.60	0.00	0.50	0.54	0.83	0.67
STUDENT 4	0.38	0.70	0.30	0.92	0.64	1.00	0.00	0.50	0.36	1.00	1.00
STUDENT 5	1.00	0.20	0.20	0.33	0.18	0.40	0.00	0.38	0.09	0.66	0.84
STUDENT 6	0.00	0.40	0.00	0.00	0.00	1.00	0.00	0.25	0.09	0.33	0.17
STUDENT 7	0.25	0.50	0.30	0.33	0.64	1.00	0.00	0.25	0.00	0.17	0.34
STUDENT 8	0.13	0.80	0.10	0.00	0.09	1.00	0.00	0.38	0.09	0.50	0.00
STUDENT 9	0.13	0.50	0.00	0.58	0.00	1.00	0.00	0.50	0.00	0.17	0.17
STUDENT 10	0.13	0.50	0.00	0.67	0.09	1.00	0.00	0.63	0.18	0.83	0.84
STUDENT 11	0.38	0.20	0.10	0.50	0.90	1.00	0.00	0.50	0.27	0.75	1.00
STUDENT 12	0.75	0.00	0.00	0.33	0.81	0.80	0.00	0.38	0.63	0.83	0.16
STUDENT13	0.75	0.00	0.00	0.50	0.63	0.80	0.00	0.38	0.09	0.41	0.50
STUDENT 14	0.25	0.20	0.00	0.33	0.09	1.00	0.00	0.50	0.09	0.75	0.50
STUDENT 15	0.50	0.00	0.00	0.16	0.00	1.00	0.00	0.25	0.27	0.75	0.00
STUDENT 16	0.50	0.10	0.00	0.66	0.18	1.00	0.00	0.50	0.09	0.58	0.00
STUDENT 17	0.13	0.20	0.00	0.41	0.09	0.60	0.00	0.38	0.18	0.83	0.50
STUDENT 18	0.13	0.00	0.00	0.16	0.27	0.00	0.00	0.38	0.09	0.41	0.16
STUDENT 19	0.13	0.70	0.00	0.25	0.36	1.00	0.00	0.25	0.09	1.00	0.00
STUDENT 20	0.25	0.00	0.10	0.25	0.00	1.00	0.00	0.25	0.63	0.41	0.83
STUDENT 21	0.88	0.20	0.10	0.75	0.36	1.00	0.00	0.00	0.09	0.50	0.83
STUDENT 24	0.13	0.60	0.00	0.16	0.18	0.60	0.00	0.38	0.00	0.83	0.16
STUDENT 25	0.63	0.00	0.00	0.16	0.36	1.00	0.00	0.38	0.27	0.66	0.33
STUDENT 26	0.63	0.00	0.10	0.33	0.36	0.40	0.00	0.50	0.00	0.66	0.33
STUDENT 28	1.00	0.00	0.00	0.75	0.54	1.00	0.00	0.25	0.00	0.50	1.00
STUDENT 29	0.75	0.00	0.00	0.00	0.18	1.00	0.00	0.38	0.00	0.83	0.83
STUDENT 30	0.50	0.30	0.00	0.50	0.36	1.00	0.00	0.25	0.72	0.41	0.50
STUDENT 23	0.50	0.20	0.00	0.33	0.09	0.80	0.08	0.13	0.00	0.83	0.16
STUDENT 27	0.50	0.10	0.10	0.75	0.90	1.00	0.08	0.38	0.54	0.75	0.66
STUDENT 22	0.13	0.50	0.00	0.66	0.36	0.60	0.50	0.50	0.54	0.75	0.50

	/-m/	/ŋ/	/r/	/-t/ /-d/	/ʃ/	/tʃ/	/z/	/v/	/s-/	PAST	PLURAL
FAR [0-33]	0.41	0.25	0.10	0.38	0.32	0.86		0.36	0.19	0.63	0.48
NEAR [67-100]	X	X	X	X	X	X	X	X	X	X	X

TABLE 8. DATA ANALYSIS /v/

	/-m/	/ŋ/	/r/	/-t/ /-d/	/ʃ/	/tʃ/	/z/	/v/	/s-/	PAST	PLURAL
STUDENT 21	0.88	0.20	0.10	0.75	0.36	1.00	0.00	0.00	0.09	0.50	0.83
STUDENT 23	0.50	0.20	0.00	0.33	0.09	0.80	0.08	0.13	0.00	0.83	0.16
STUDENT 1	0.13	0.50	0.80	0.08	0.18	1.00	0.00	0.25	0.09	0.42	1.00
STUDENT 6	0.00	0.40	0.00	0.00	0.00	1.00	0.00	0.25	0.09	0.33	0.17
STUDENT 7	0.25	0.50	0.30	0.33	0.64	1.00	0.00	0.25	0.00	0.17	0.34
STUDENT 15	0.50	0.00	0.00	0.16	0.00	1.00	0.00	0.25	0.27	0.75	0.00
STUDENT 19	0.13	0.70	0.00	0.25	0.36	1.00	0.00	0.25	0.09	1.00	0.00
STUDENT 20	0.25	0.00	0.10	0.25	0.00	1.00	0.00	0.25	0.63	0.41	0.83
STUDENT 28	1.00	0.00	0.00	0.75	0.54	1.00	0.00	0.25	0.00	0.50	1.00
STUDENT 30	0.50	0.30	0.00	0.50	0.36	1.00	0.00	0.25	0.72	0.41	0.50
STUDENT 2	0.25	0.20	0.50	0.50	0.45	1.00	0.00	0.38	0.09	0.75	0.34
STUDENT 5	1.00	0.20	0.20	0.33	0.18	0.40	0.00	0.38	0.09	0.66	0.84
STUDENT 8	0.13	0.80	0.10	0.00	0.09	1.00	0.00	0.38	0.09	0.50	0.00
STUDENT 12	0.75	0.00	0.00	0.33	0.81	0.80	0.00	0.38	0.63	0.83	0.16
STUDENT13	0.75	0.00	0.00	0.50	0.63	0.80	0.00	0.38	0.09	0.41	0.50
STUDENT 17	0.13	0.20	0.00	0.41	0.09	0.60	0.00	0.38	0.18	0.83	0.50
STUDENT 18	0.13	0.00	0.00	0.16	0.27	0.00	0.00	0.38	0.09	0.41	0.16
STUDENT 24	0.13	0.60	0.00	0.16	0.18	0.60	0.00	0.38	0.00	0.83	0.16
STUDENT 25	0.63	0.00	0.00	0.16	0.36	1.00	0.00	0.38	0.27	0.66	0.33
STUDENT 27	0.50	0.10	0.10	0.75	0.90	1.00	0.08	0.38	0.54	0.75	0.66
STUDENT 29	0.75	0.00	0.00	0.00	0.18	1.00	0.00	0.38	0.00	0.83	0.83
STUDENT 3	0.13	0.10	0.20	0.33	0.27	0.60	0.00	0.50	0.54	0.83	0.67
STUDENT 4	0.38	0.70	0.30	0.92	0.64	1.00	0.00	0.50	0.36	1.00	1.00
STUDENT 9	0.13	0.50	0.00	0.58	0.00	1.00	0.00	0.50	0.00	0.17	0.17
STUDENT 11	0.38	0.20	0.10	0.50	0.90	1.00	0.00	0.50	0.27	0.75	1.00
STUDENT 14	0.25	0.20	0.00	0.33	0.09	1.00	0.00	0.50	0.09	0.75	0.50
STUDENT 16	0.50	0.10	0.00	0.66	0.18	1.00	0.00	0.50	0.09	0.58	0.00
STUDENT 22	0.13	0.50	0.00	0.66	0.36	0.60	0.50	0.50	0.54	0.75	0.50
STUDENT 26	0.63	0.00	0.10	0.33	0.36	0.40	0.00	0.50	0.00	0.66	0.33
STUDENT 10	0.13	0.50	0.00	0.67	0.09	1.00	0.00	0.63	0.18	0.83	0.84

	/-m/	/ŋ/	/r/	/-t/ /-d/	/ʃ/	/tʃ/	/z/	/v/	/s-/	PAST	PLURAL
FAR [0-33]	0.41	0.28	0.13	0.34	0.25	0.98	0.01		0.20	0.53	0.48
NEAR [67-100]	X	X	X	X	X	X	X		X	X	X

TABLE 9. DATA ANALYSIS /s-/

	/-m/	/ŋ/	/r/	/-t/ /-d/	/ʃ/	/tʃ/	/z/	/v/	/s-/	PAST	PLURAL
STUDENT 7	0.25	0.50	0.30	0.33	0.64	1.00	0.00	0.25	0.00	0.17	0.34
STUDENT 9	0.13	0.50	0.00	0.58	0.00	1.00	0.00	0.50	0.00	0.17	0.17
STUDENT 23	0.50	0.20	0.00	0.33	0.09	0.80	0.08	0.13	0.00	0.83	0.16
STUDENT 24	0.13	0.60	0.00	0.16	0.18	0.60	0.00	0.38	0.00	0.83	0.16
STUDENT 26	0.63	0.00	0.10	0.33	0.36	0.40	0.00	0.50	0.00	0.66	0.33
STUDENT 28	1.00	0.00	0.00	0.75	0.54	1.00	0.00	0.25	0.00	0.50	1.00
STUDENT 29	0.75	0.00	0.00	0.00	0.18	1.00	0.00	0.38	0.00	0.83	0.83
STUDENT 1	0.13	0.50	0.80	0.08	0.18	1.00	0.00	0.25	0.09	0.42	1.00
STUDENT 2	0.25	0.20	0.50	0.50	0.45	1.00	0.00	0.38	0.09	0.75	0.34
STUDENT 5	1.00	0.20	0.20	0.33	0.18	0.40	0.00	0.38	0.09	0.66	0.84
STUDENT 6	0.00	0.40	0.00	0.00	0.00	1.00	0.00	0.25	0.09	0.33	0.17
STUDENT 8	0.13	0.80	0.10	0.00	0.09	1.00	0.00	0.38	0.09	0.50	0.00
STUDENT13	0.75	0.00	0.00	0.50	0.63	0.80	0.00	0.38	0.09	0.41	0.50
STUDENT 14	0.25	0.20	0.00	0.33	0.09	1.00	0.00	0.50	0.09	0.75	0.50
STUDENT 16	0.50	0.10	0.00	0.66	0.18	1.00	0.00	0.50	0.09	0.58	0.00
STUDENT 18	0.13	0.00	0.00	0.16	0.27	0.00	0.00	0.38	0.09	0.41	0.16
STUDENT 19	0.13	0.70	0.00	0.25	0.36	1.00	0.00	0.25	0.09	1.00	0.00
STUDENT 21	0.88	0.20	0.10	0.75	0.36	1.00	0.00	0.00	0.09	0.50	0.83
STUDENT 10	0.13	0.50	0.00	0.67	0.09	1.00	0.00	0.63	0.18	0.83	0.84
STUDENT 17	0.13	0.20	0.00	0.41	0.09	0.60	0.00	0.38	0.18	0.83	0.50
STUDENT 11	0.38	0.20	0.10	0.50	0.90	1.00	0.00	0.50	0.27	0.75	1.00
STUDENT 15	0.50	0.00	0.00	0.16	0.00	1.00	0.00	0.25	0.27	0.75	0.00
STUDENT 25	0.63	0.00	0.00	0.16	0.36	1.00	0.00	0.38	0.27	0.66	0.33
STUDENT 4	0.38	0.70	0.30	0.92	0.64	1.00	0.00	0.50	0.36	1.00	1.00
STUDENT 3	0.13	0.10	0.20	0.33	0.27	0.60	0.00	0.50	0.54	0.83	0.67
STUDENT 22	0.13	0.50	0.00	0.66	0.36	0.60	0.50	0.50	0.54	0.75	0.50
STUDENT 27	0.50	0.10	0.10	0.75	0.90	1.00	0.08	0.38	0.54	0.75	0.66
STUDENT 12	0.75	0.00	0.00	0.33	0.81	0.80	0.00	0.38	0.63	0.83	0.16
STUDENT 20	0.25	0.00	0.10	0.25	0.00	1.00	0.00	0.25	0.63	0.41	0.83
STUDENT 30	0.50	0.30	0.00	0.50	0.36	1.00	0.00	0.25	0.72	0.41	0.50

	/-m/	/ŋ/	/r/	/-t/ /-d/	/ʃ/	/tʃ/	/z/	/v/	/s-/	PAST	PLURAL
FAR [0-33]	0.40	0.26	0.10	0.35	0.27	0.85	0.00	0.35		0.61	0.43
NEAR [67-100]	0.50	0.30	0.00	0.50	0.36	1.00	0.00	0.25		0.41	0.50

TABLE 10. DATA ANALYSIS PAST

	/-m/	/ŋ/	/r/	/-t/ /-d/	/ʃ/	/tʃ/	/z/	/v/	/s-/	PAST	PLURAL
STUDENT 7	0.25	0.50	0.30	0.33	0.64	1.00	0.00	0.25	0.00	0.17	0.34
STUDENT 9	0.13	0.50	0.00	0.58	0.00	1.00	0.00	0.50	0.00	0.17	0.17
STUDENT 6	0.00	0.40	0.00	0.00	0.00	1.00	0.00	0.25	0.09	0.33	0.17
STUDENT13	0.75	0.00	0.00	0.50	0.63	0.80	0.00	0.38	0.09	0.41	0.50
STUDENT 18	0.13	0.00	0.00	0.16	0.27	0.00	0.00	0.38	0.09	0.41	0.16
STUDENT 20	0.25	0.00	0.10	0.25	0.00	1.00	0.00	0.25	0.63	0.41	0.83
STUDENT 30	0.50	0.30	0.00	0.50	0.36	1.00	0.00	0.25	0.72	0.41	0.50
STUDENT 1	0.13	0.50	0.80	0.08	0.18	1.00	0.00	0.25	0.09	0.42	1.00
STUDENT 8	0.13	0.80	0.10	0.00	0.09	1.00	0.00	0.38	0.09	0.50	0.00
STUDENT 21	0.88	0.20	0.10	0.75	0.36	1.00	0.00	0.00	0.09	0.50	0.83
STUDENT 28	1.00	0.00	0.00	0.75	0.54	1.00	0.00	0.25	0.00	0.50	1.00
STUDENT 16	0.50	0.10	0.00	0.66	0.18	1.00	0.00	0.50	0.09	0.58	0.00
STUDENT 5	1.00	0.20	0.20	0.33	0.18	0.40	0.00	0.38	0.09	0.66	0.84
STUDENT 25	0.63	0.00	0.00	0.16	0.36	1.00	0.00	0.38	0.27	0.66	0.33
STUDENT 26	0.63	0.00	0.10	0.33	0.36	0.40	0.00	0.50	0.00	0.66	0.33
STUDENT 2	0.25	0.20	0.50	0.50	0.45	1.00	0.00	0.38	0.09	0.75	0.34
STUDENT 11	0.38	0.20	0.10	0.50	0.90	1.00	0.00	0.50	0.27	0.75	1.00
STUDENT 14	0.25	0.20	0.00	0.33	0.09	1.00	0.00	0.50	0.09	0.75	0.50
STUDENT 15	0.50	0.00	0.00	0.16	0.00	1.00	0.00	0.25	0.27	0.75	0.00
STUDENT 22	0.13	0.50	0.00	0.66	0.36	0.60	0.50	0.50	0.54	0.75	0.50
STUDENT 27	0.50	0.10	0.10	0.75	0.90	1.00	0.08	0.38	0.54	0.75	0.66
STUDENT 12	0.75	0.00	0.00	0.33	0.81	0.80	0.00	0.38	0.63	0.83	0.16
STUDENT 17	0.13	0.20	0.00	0.41	0.09	0.60	0.00	0.38	0.18	0.83	0.50
STUDENT 23	0.50	0.20	0.00	0.33	0.09	0.80	0.08	0.13	0.00	0.83	0.16
STUDENT 24	0.13	0.60	0.00	0.16	0.18	0.60	0.00	0.38	0.00	0.83	0.16
STUDENT 29	0.75	0.00	0.00	0.00	0.18	1.00	0.00	0.38	0.00	0.83	0.83
STUDENT 3	0.13	0.10	0.20	0.33	0.27	0.60	0.00	0.50	0.54	0.83	0.67
STUDENT 10	0.13	0.50	0.00	0.67	0.09	1.00	0.00	0.63	0.18	0.83	0.84
STUDENT 4	0.38	0.70	0.30	0.92	0.64	1.00	0.00	0.50	0.36	1.00	1.00
STUDENT 19	0.13	0.70	0.00	0.25	0.36	1.00	0.00	0.25	0.09	1.00	0.00

	/-m/	/ŋ/	/r/	/-t/ /-d/	/ʃ/	/tʃ/	/z/	/v/	/s-/	PAST	PLURAL
FAR [0-33]	0.13	0.47	0.10	0.31	0.21	1.00	0.00	0.33	0.03		0.23
NEAR [67-100]	0.33	0.28	0.08	0.42	0.36	0.87	0.04	0.40	0.25		0.49

TABLE 11. DATA ANALYSIS PLURAL

	/-m/	/ŋ/	/r/	/-t/ /-d/	/ʃ/	/tʃ/	/z/	/v/	/s~/	PAST	PLURAL
STUDENT 8	0.13	0.80	0.10	0.00	0.09	1.00	0.00	0.38	0.09	0.50	0.00
STUDENT 15	0.50	0.00	0.00	0.16	0.00	1.00	0.00	0.25	0.27	0.75	0.00
STUDENT 16	0.50	0.10	0.00	0.66	0.18	1.00	0.00	0.50	0.09	0.58	0.00
STUDENT 19	0.13	0.70	0.00	0.25	0.36	1.00	0.00	0.25	0.09	1.00	0.00
STUDENT 12	0.75	0.00	0.00	0.33	0.81	0.80	0.00	0.38	0.63	0.83	0.16
STUDENT 18	0.13	0.00	0.00	0.16	0.27	0.00	0.00	0.38	0.09	0.41	0.16
STUDENT 23	0.50	0.20	0.00	0.33	0.09	0.80	0.08	0.13	0.00	0.83	0.16
STUDENT 24	0.13	0.60	0.00	0.16	0.18	0.60	0.00	0.38	0.00	0.83	0.16
STUDENT 6	0.00	0.40	0.00	0.00	0.00	1.00	0.00	0.25	0.09	0.33	0.17
STUDENT 9	0.13	0.50	0.00	0.58	0.00	1.00	0.00	0.50	0.00	0.17	0.17
STUDENT 25	0.63	0.00	0.00	0.16	0.36	1.00	0.00	0.38	0.27	0.66	0.33
STUDENT 26	0.63	0.00	0.10	0.33	0.36	0.40	0.00	0.50	0.00	0.66	0.33
STUDENT 2	0.25	0.20	0.50	0.50	0.45	1.00	0.00	0.38	0.09	0.75	0.34
STUDENT 7	0.25	0.50	0.30	0.33	0.64	1.00	0.00	0.25	0.00	0.17	0.34
STUDENT13	0.75	0.00	0.00	0.50	0.63	0.80	0.00	0.38	0.09	0.41	0.50
STUDENT 14	0.25	0.20	0.00	0.33	0.09	1.00	0.00	0.50	0.09	0.75	0.50
STUDENT 17	0.13	0.20	0.00	0.41	0.09	0.60	0.00	0.38	0.18	0.83	0.50
STUDENT 22	0.13	0.50	0.00	0.66	0.36	0.60	0.50	0.50	0.54	0.75	0.50
STUDENT 30	0.50	0.30	0.00	0.50	0.36	1.00	0.00	0.25	0.72	0.41	0.50
STUDENT 27	0.50	0.10	0.10	0.75	0.90	1.00	0.08	0.38	0.54	0.75	0.66
STUDENT 3	0.13	0.10	0.20	0.33	0.27	0.60	0.00	0.50	0.54	0.83	0.67
STUDENT 20	0.25	0.00	0.10	0.25	0.00	1.00	0.00	0.25	0.63	0.41	0.83
STUDENT 21	0.88	0.20	0.10	0.75	0.36	1.00	0.00	0.00	0.09	0.50	0.83
STUDENT 29	0.75	0.00	0.00	0.00	0.18	1.00	0.00	0.38	0.00	0.83	0.83
STUDENT 5	1.00	0.20	0.20	0.33	0.18	0.40	0.00	0.38	0.09	0.66	0.84
STUDENT 10	0.13	0.50	0.00	0.67	0.09	1.00	0.00	0.63	0.18	0.83	0.84
STUDENT 1	0.13	0.50	0.80	0.08	0.18	1.00	0.00	0.25	0.09	0.42	1.00
STUDENT 4	0.38	0.70	0.30	0.92	0.64	1.00	0.00	0.50	0.36	1.00	1.00
STUDENT 11	0.38	0.20	0.10	0.50	0.90	1.00	0.00	0.50	0.27	0.75	1.00
STUDENT 28	1.00	0.00	0.00	0.75	0.54	1.00	0.00	0.25	0.00	0.50	1.00

	/-m/	/ŋ/	/r/	/-t/ /-d/	/ʃ/	/tʃ/	/z/	/v/	/s~/	PAST	PLURAL
FAR [0-33]	0.35	0.28	0.02	0.26	0.23	0.80	0.01	0.36	0.14	0.63	
NEAR [67-100]	0.50	0.24	0.18	0.46	0.33	0.90	0.00	0.36	0.23	0.67	