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Un éventail de formations, une multitude d'horizons

Faculté de philosophie, arts et lettres

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Auteur : Rachel Lemaitre
Promoteur : Philippe Hiligsmann
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Written convention

In this study, the phonetic alphabet is be used to transcribe words as they are produced phonetically. Since Dutch and English have a different pronunciation of the phone /r/, the distinction is made in phonetic writing as well. In most cases, the English *r* is transcribed as [ɹ] as it is a postalveolar approximant and the most common pronunciation in Received Pronunciation and General American English. Meanwhile, the Dutch *r* is written as [r], as it is an alveolar trill and the most common pronunciation in Standard Belgian Dutch. However, if the test subjects pronounce the letter *r* in a different fashion, such as the voiced uvular trill [ʀ] or the voiced uvular fricative [ʁ], it has also been indicated. The specification for the /r/ remains particularly important as French, Dutch and English have the phone /r/ produced in very distinct manners. While this is true for the phone /r/, the method also applies to every other phoneme produced by the language learners in the context of this dissertation. Similarly, for the sake of clarity, the phone /ɛ/ is used for both Dutch and English open-mid, unrounded front vowel. Some conventions in the English language have discarded the use of /ɛ/ for /e/. However, the phone /e/ in both Dutch and French is a higher vowel: a close-mid, unrounded, front vowel, and has therefore a semantic contrast with /ɛ/. To this end, /ɛ/ is used in English words with a single short vowel as in *bed* /bɛd/ or in diphthongs as in *eight* /ɛɪt/ to keep the coherence of sound representation across languages. Mistakes in pronunciation are preceded by an asterisk (*), for the purpose of clarity.

Introduction and Generalities

1. Introduction

"So, French is difficult as well, but I think English is more difficult. And the reason I have this thought is that, my wife […] is French. We've been together [for] nine years. Her level of English is incredible, she speaks amazing English, but she still has problems pronouncing certain things, specifically, the letter *h*. In English, she takes the letter *h*, she adds it to words where there's no *h* required but then she takes it away when the *h* is required. So, words like *happiness* turn into *appiness*, which sounds like *a penis*, and things get very awkward very quickly between the both of us.

The hardest thing that I have with the *h*, though, is that I can never tell the difference […] whether she's *angry* or whether she's *hungry*, it sounds the same, which is like 'Paul, I am so *(h)angry* right now!'. So, I found a solution. What I do is: I make her dinner and I apologise at the same time. It's the only solution I found.

She came back from work the other day, she goes:

'Paul, I'm so *hungry* that I could eat something.' So I went straight to the kitchen, I started making dinner. And she goes:

'Nan, t'es con ou quoi? [Are you stupid or something?].'

'I'm sorry, you said you were *hungry* and you could *eat* something, so I don't understand'.

'Paul, I said I'm so *hungry* that I could *eat* something.'

'Yes I'm making you dinner!'

'No, I said I'm so *hungry* that I could *eat* someth-'

What she was trying to say, was that she was so *angry* that she could *hit* something. But she moved the *h* to the other word! 'I'm so *hangry* that I could *'it* something, you know?' – 'No I don't know, give me a break.'"

(Taylor, 2019)

This is an excerpt from Paul Taylor's one man show *#FRANGLAIS* available on YouTube, in which he jokes about the most important pronunciation problem that his wife faces when speaking English; namely that the letter *h* remains one of her weaker points over the year. It is widely known and frequently joked upon that native French speakers of English and Dutch tend to omit pronouncing the [h] in words where one should be pronounced; numerous humoristic sketches and videos painting caricatures of the French accent are proof of this.

Words such as *hesitant* /hɛzɪtənt/ in English or *hart* /hɑrt/ ("heart") in Dutch become *[ɛzɪtənt] and *[ɑrt].

However, what about French-speaking learners of English and Dutch adding an [h] to words where none is required? Why are English sentences such as *Are you in a hurry* or *How are you?* in English often produced as *"Hare you hin a urry?" and *"Ow hare you?" by French learners? Why are words in Dutch such as *aandacht* /a.ndɑxt/ ("attention, concentration") produced as *[ha.ndɑxt]? How come French native speakers seem to find it difficult to correctly produce this specific vowel in words and sentences?

To this end, the author of the present dissertation has written about her personal experience coming from the observation of the production of the phone /h/ among French-speaking learners of Dutch and English:

"My motivation to work on the subject of the pronunciation of the /h/ phone by French natives, who are also learners of English and/or Dutch stems mainly from personal curiosity. As a French native myself, I attended secondary school primarily in Flanders, where I learnt Dutch. As a consequence, I mastered the Dutch language, vocabulary and pronunciation like any other Flemish pupil, during the 13 years I had spent sitting on the benches in Flemish classrooms. My French-speaking family was quickly overtaken by the rate at which I was assimilating everything, and soon, helping with homework and other assignments proved difficult, except in two courses: French and English. To me, English was harder than Dutch, as I had yet to master English like I did Dutch, up until my fourth year of secondary. This is the reason why I chose English as a first language when changing school from Flanders to Wallonia. Soon, I came to realise that I had an advantage over my French-speaking peers, not only in terms of grammar knowledge and vocabulary, but also in terms of pronunciation. As a matter of fact, I started to notice a recurring phenomenon in my fellow classmates' pronunciation: the phone /h/ is a difficult sound to create, both in English and Dutch. Since I had never noticed that difficulty occur among my Dutch-speaking peers in English, I felt intrigued by it. What makes French natives have such a hard time with the /h/? The question of sound production was rapidly set aside: French natives can, in fact, pronounce this phone correctly. Rather, my question was articulated into two parts: Firstly, what misleads French speakers into wrongfully omitting an /h/ where one should be heard? The answer to this question was, in my opinion, to be found in the French phonology itself: the phone /h/ is a foreign one to French. However, this did not predict *where* French speakers would make the mistake in a word or sentence. Secondly,

and perhaps most importantly, what misleads them into pronouncing an [h] where one is not written? This part seemed to be the hardest mystery to solve for me.

When confronted to their pronunciation, none of my interlocutors could provide me with a clear-cut answer. My secondary years were over, and I noticed the phenomenon was also present among Spanish speakers, albeit to a lesser extent. As a matter of fact, it did not appear as 'rampant' as the /h/-problem is among French-speaking learners. At university, my fellow students in Germanic languages – Dutch and English – also seemed to make the same mistakes as my fellow pupils in secondary, as well as many other French natives I regularly heard speaking in English, whether on the radio, on TV or on the internet. The mystery of the /h/ was not about to be solved just yet. While taking a closer look into the possible causes during my Bachelor's years, I soon discovered that the literature is rather limited, and therefore, decided to keep the subject in sight until my Master's years, which brings me to this dissertation."

This dissertation is divided into several parts. Firstly, second language acquisition is explained and which place pronunciation holds within its scope. Then, several models on the acquisition of pronunciation are exposed alongside studies on the perception and production of second language pronunciation in general. Since studies on the phone /h/ are very limited in the literature, a couple of articles are used to discuss the phenomenon among French-speaking learners of Dutch. Unfortunately, to the author's best knowledge, no additional study investigating this phone among French-speaking learners of English, or of other origins, has been carried out. The problem is exposed via reports found online, from a descriptive point of view. The following point touches onto the teaching of pronunciation and in what ways it can be related to the phone /h/. Lastly, the dissertation makes case of the study surrounding the phone /h/ by recording pupils from a couple of school situated in the province Hainaut in Belgium: in each school, two classes are investigated, one per language. Each pupil reads off a sheet of paper with entries containing words and other small nominal and verbal constituents, as well as sentences. After reading the piece of paper aloud, and individually, they are asked the question whether they could identify the purpose of the study based on what they have been presented with. This serves as a test of awareness that is put in relation with the performance of the pupils on the production task. A perception task is also done in the classroom with everyone who has previously taken the production task. The results on the perception task are also linked with the results on the production task. The recordings are then analysed based on the production of the phone /h/ by the pupils, and linked back with the awareness test and the perception task. Results show that the *h*-retention and *h*-omission are nearly random

phenomena alongside *h*-insertion. Not only do the pupils unpredictably omit pronouncing the letter *h* in nearly half the cases in both languages, but instances of intrusive *h* are sometimes produced in places that could not be foreseen. While *h*-omission is speculated to have its roots in transfers from the French phonological system (the phone /h/ is not a part of French phonology), *h*-insertion is estimated to stem from either a form of hypercorrection (if an orthographic *h* is present in the entry) or from a motivation to make production in the target language easier, most notably as a buffer sound between clashing vowels. While those hypotheses are partly confirmed, it is also noted that the pupils have trouble simply producing vowels without aspiration. While the cause of this remains obscure, further research could shed light on the problem surrounding the phone /h/ among French-speaking learners of Dutch and English, and explore ways in which the pronunciation of that phone could be corrected, for instance through the teaching of word stress, sentence accent and intonation, as mentioned in the perspectives.

2. Second language acquisition

This dissertation discusses phonetics in second language acquisition, and more specifically errors made on pronunciation by second language learners. It concerns both sound perception and production of French native speakers of Dutch and English, around the phone /h/. In order to dive into the subject, one should understand what second language acquisition is and what it entails. While second language acquisition is a broad subject, the process itself of learning a second language differs from language to language and person to person. This dissertation focuses on learning both English and Dutch as second languages as produced by native speakers of French in Belgium.

2.1. Terminology

The term *second language* (also known as *L2*) refers to acquiring a language that is not a native language (also called a first language or *L1*). However, a distinction is being made between a second language and a foreign language, and it is defined by the context in which the target language is being learnt. As a matter of fact, the assumption is made that people learning a *second* language refers to the learners gaining a better understanding of a target language from the circumstances in which they find themselves; usually those include their daily life (Ellis,

2015). Ellis (2015) poses the example of people learning English while in the United Kingdom or in the United Stated of America. The difference with a *foreign* language is that the communicative situations do not arise in the learners' lives outside the learning environment, as Ellis states (Ellis, 2015). An example would be learning English outside countries such as the United Kingdom, the United States, Australia, New-Zealand, etc. In short, learning a language outside the country where it is spoken. As a consequence, Ellis writes that communication in the target language outside the learning environment remains fairly limited. Considering Dutch in Belgium as a foreign language or a second language remains therefore a delicate situation. While Dutch is part of the three official languages of Belgium and could therefore be considered a second language in Belgium, the language border sets a clear border between the two main regions dividing the country: French-speaking Wallonia and Dutch-speaking Flanders. As such, French-speaking pupils often do not experience Dutch outside the classroom, because Dutch is spoken in limited situations in Wallonia, excluding the municipalities with language facilities where both French and Dutch are spoken in a more balanced manner. Consequently, Dutch as well as English are considered foreign languages when studied by French-speaking pupils in the French-speaking part of Belgium. This take goes for both "normal" school as well as immersion schools. Immersion schools in Wallonia offer to their pupils the experience of being partly immersed in Dutch or English ('L'immersion Linguistique Dans Le Fondamental', n.d.). While pupils have several classes in the target language during school hours, the environment outside the institution is still mainly related to their language in school and in life, which is also the learners' first language, i.e. French.

However, while the distinction between second language and foreign language exists, Ellis states that it "cannot [be] take[n] for granted that the process of acquiring a second language is different in these different contexts" (Ellis, 2015, p. 18). Therefore, this dissertation addresses Dutch and English in the same manner; as second languages in the context of second language acquisition, also known as L2 acquisition.

2.2. Second language acquisition and age

The main difference between first language and second language acquisition resides in the fact that, unlike a first language that is gained very early in life and in a successful manner, a second language is learnt later in life, and often not mastered perfectly (Ellis, 2015).

As a matter of fact, age plays a part in language acquisition in that theories claim there is a "critical period", which is defined by Ellis as : "a period […] during which learners can acquire a second language easily and implicitly and achieve native-speaker competence, but after which L2 acquisition becomes more difficult and is rarely entirely successful" (Ellis, 2015, p. 37). On the matter, Ellis estimates that, while statements like these retain parts of truth, this is to be put into perspective: second language acquisition is a complex process that cannot be solely based on age, because other factors need to be considered, such as motivation, strategy and rate of acquisition. On the question whether age influences the ultimate achievement of second language acquisition, Ellis exposes arguments both supporting and refuting the critical period hypothesis, since there is no clear consensus on the matter. Ellis (2015) mentions Oyama (1976) and Singleton (1989) as researchers supporting the hypothesis, both coming to the conclusion that children seem to attain a higher degree of language proficiency in the target language than adults (Oyama, 1976; Singleton, 1989 as cited in Ellis, 2015). On the other hand, Birdsong (2006) concludes that older learners can attain a high, native-like proficiency in a second language as much as younger learner. Later research also refutes the hypothesis by expanding on the idea of multicompetence and the former two by ruling any "window of opportunity" out of second language acquisition (Granena & Long, 2012; Cook, 1991 as cited in Ellis, 2015). Rather, it is to be considered "continuous" in nature. This is also correlated by Snow and Hoefnagel-Höhle in their study (Snow & Hoefnagel-Höhle, 1978) wherein they found out that their test subjects aged 12 to 15 years old perform better than those aged between three and five. Their conclusion is that a critical period does not exist in second language acquisition (Snow & Hoefnagel-Höhle, 1978). The same can be stated about the following study investigating immigrant people's level of English (Hakuta, Bialystok, & Wiley, 2003) using answers of 2,3 million immigrants taken from the 1990 U.S. Census. The results show that there is no significant difference based on age. Rather, Hakuta et al. found that level of education and age of immigration has a greater impact on the proficiency of language. As such, people in the census rated themselves as more proficient in English the longer they had stayed in the United Stated up to that point. This is also correlated by Guion, Flege, Lieu and Yeni-Komshian (2000) in their study on Italian migrants' arrival in Canada; subjects that had arrived in Canada later in life showed a heavier accented pronunciation, as well as it being less accurate on specific phones of the target language – this is correlated in a linear fashion: the later the age of arrival, the heavier and less accurate the pronunciation in the second language (Guion, Flege, Liu, & Yeni-Komshian, 2000). Thus, rather than age playing a role in the proficiency of a second language, it is the amount of input (the more time spent in the United States, the more

proficient the migrants were) and the level of education that helps the learner in acquiring a second language.

Age, however, does have an influence on the rate of acquisition. As a matter of fact, understanding grammar and broadening one's lexicon occurs at a faster rate with older learners than younger learners, according to Ellis (2015). This is also correlated and reinforced by Dixon et al.'s findings that older learners also outperform younger learners on reading comprehension and accuracy, as well as listening comprehension (Dixon et al., 2012). On the other hand, pronunciation remains one of the stronger points in early second language acquisition, as research has shown that older learners usually do not perform as well in that domain as younger learners (Barrios, Jiang, & Idsardi, 2016; Dixon et al., 2012; Ellis, 2015; Flege, 1987, 1995). Later learners, as Dixon et al. put it, are less likely to attain native-like proficiency in pronunciation and in tasks requiring grammatical intuition, particularly so if they start past the age of twelve (Dixon et al., 2012). In this regard, the age of the learner does play a role in acquiring skills comparable to native speakers of the target language. However, Ellis (2015) makes case of the rate at which younger learners process linguistic data that is relatively comparable with that of older learners past a certain point in their learning process.

2.3. Second language acquisition and vocabulary

With regards to vocabulary depth and expansion, Ellis compiles various studies in stating that receptive knowledge precedes productive knowledge (Ellis, 2015). Relating this statement to phonology and phonetics, this begs the question as to what extent sound perception precedes correct sound production. As a matter of fact, the manner with which learners perceive sound has an impact of their production of sound. More specifically, this means that the perception of the phone /h/ might explain – in part – how the mispronunciation by French native speakers of Dutch and/or English comes about. As such, it is essential that learners make a connection between receptive knowledge and productive work. This is to say, while learners can store (new) information, it is also crucial that they make the connection between knowing and producing, if they wish to enhance their productive skills.

One must be aware that the expansion of vocabulary in the second language is not simply about adding words to an already existing list of words. Broadening one's vocabulary can take place incidentally, this is to say that the learner is not in looking actively into learning new vocabulary. When this is the case, inference is needed on the side of the learner to correctly

identify the meaning in the context of a sentence in written or spoken form. Yet, 95% of the words from the context must already be known in order to do so successfully, and non-verbal clues may help the learner understand better in oral situations (Ellis, 2015). Formulaic sequences are also of importance in one's lexicon. Ellis takes the example of sequencing the chunk "I don't know"; thanks to which the learner identifies the various components that constitute the formula. As a consequence, the learner gains the knowledge that "I don't" can be combined with other verbs. (Ellis, 2015, p. 99). As for the act of purposefully learning vocabulary, Schmitt in his article states that "intentional vocabulary learning—i.e. when the specific goal is to learn vocabulary, usually with an explicit focus—almost always leads to greater and faster gains, with a better chance of retention and of reaching productive levels of mastery" (Schmitt, 2008, p. 341). Learners who are taught vocabulary and explicitly encouraged to use it will produce the words actively in two thirds of the cases, compared to one twelfth of the cases if the instructions do not mention the use of certain words of vocabulary. Those lexical gains appear to have a long-term lasting effect on the learners who still use the words in over half the students. (Schmitt, 2008).

In second language acquisition, research has shown that encouragement from the parents to learn the target language, for instance by reading books or going to the library with the children helped build the learners' vocabulary later in their learning process, most notably in their speaking and reading skills (Gonzalez & Uhing, 2008; Hammer, Miccio, & Wagstaff, 2003; Reese et al., 2000; Roberts, 2008 as cited in Dixon et al., 2012). However, while reading material with comprehensible input does broaden one's vocabulary, Ellis mentions that there are limits to this method. As a matter of fact, this method is adequate for all learners. Ellis states : "Low-ability readers may learn very few words incidentally" (Ellis, 2015, p. 170). Therefore, lexical skills of such learners might benefit from other types of input, such as mingling with native speakers of the target language, for instance, though this method is beneficial to all learners in terms of vocabulary, as mentioned by Dixon and colleagues (Dixon et al., 2012).

Moreover, Dixon et al. mention that intensity in teaching a second language has no impact on the learner's lexical skills, among others. For instance, learners who were taught 400 hours over ten months did not do worse on evaluation compared to their peers who were taught in half as much time (Collins & White, 2011 as cited in Dixon et al., 2012).

In Belgium, a popular approach in teaching foreign languages is the Content and Language Integrated Learning (CLIL) approach. This is related to the section 2.2, in which the pupils are exposed to larger quantities of input, "since a language other than the students' mother tongue

is used as medium of instruction" (Dalton-Puffer, 2007, p. 1). In Belgium, schools that apply this approach for Dutch or English are called immersion schools. Consequently, CLIL pupils are partly or fully "immersed" in the target language, following courses in the target language that are not classic second language courses. Studies in Belgium have shown that pupils in immersion schools – in other words, pupils who are exposed to larger amounts of input compared to pupils in traditional schools – have a broader and more varied vocabulary, and make fewer errors on grammar and vocabulary (Bulon & Meunier, 2017; 'Magazine PROF n°43', 2019; 'Mythes et réalités de l'immersion linguistique dans les écoles de Wallonie', 2019). Immersion

As for the written skills, the vocabulary of immersed pupils is larger and more complex; this is observed through higher numbers of words per sentence and per text, an increased length of sentences and a greater diversity in the lexicon (Bulon, Hendrikx, Meunier, & Goethem, 2017). On the matter of the phraseological lexicon (phrasicon), observations vary considerably. On the one hand, researchers have noted that immersed pupils show a phrasicon that is larger, used more frequently and in a more varied manner than pupils in traditional schools (Bulon & Meunier, 2017; Hendrikx, Van Goethem, & Wulff, 2019; 'Magazine PROF n°43', 2019). On the other hand, researchers have observed that immersed pupils do not show a significant improvement compared to traditional pupils (Bulon & Meunier, 2020). The drawback to immersive programmes is that the immersed pupils experience a faster peak in their learning curve than traditional pupils. The former level off more quickly than the latter in terms of language acquisition ('Mythes et réalités de l'immersion linguistique dans les écoles de Wallonie', 2019).

2.4. Second language acquisition and pronunciation

As mentioned previously in section 2.2, it has been shown that early learners of a second language achieve better pronunciation than later learners. In fact, early learners can achieve even a native-like pronunciation than while this is rarely the case for those learning a second language later in life. This is particularly true for people who start learning a second language before the age of three, according to Ellis (Ellis, 2015). To those results are added other studies that show that, instead of the age of the subject being the defining factor in one's pronunciation, migrants' age of arrival in the country of the second language has the most impact on the accuracy in their pronunciation, even past the age of three (Guion et al., 2000). As a matter of

fact, Guion et al. do not refute the presence of absence of a critical period in second language learning. Rather, they explain that this linear tendency – i.e. the younger the age of arrival, the more L2 input and the more accurate the pronunciation – is tied to the speaker's establishment of their first language when learning the target language. As they put it, "the more established the L1 is at the time of L2 acquisition, the greater the influence it will have on the L2" (Guion et al., 2000, p. 207). This has a link with the settlement of the L1 phonetic categories working as a filter for the L2 categories as put forward by Flege (Flege, 1987). This is to say, speakers of an L1 will need to assimilate the L2 phonological system correctly in order to speak that language in a native-like fashion. As Guion et al. write it, an early age exposure – thus an early L2 acquisition – means that L2 learners do not rely as much on the phonological system of the L1 in order to learn about the L2 system. This makes for an assimilation of L2 sounds under a category that could be considered an "L2 category", and this from the start of the process, instead of linking them to the already known L1 sounds (Guion et al., 2000).

This builds on the principles emitted by Flege and Wode in their works on phonology, and more specifically, second language phonology (Flege, 1987; Wode, 1994). Wode makes a difference between categorical and continuous perception of sound. The former helps distinguish various phones from each other while the latter works as a monitoring device that helps shape perception of phones more accurately. As such, the learners discriminate phones with their categorical perception of sound and distinguish smaller details in terms of pronunciation of a particular phone thanks to continuous perception (Wode, 1994). Building on this, it seems younger learners are more likely to be attune to subtleties in L2 pronunciation than later learners, which could explain why younger learners usually outperform later learners in terms of pronunciation (Ellis, 2015; Flege, 1987). In other words, while the categorical mode allows for a broad discrimination of sounds, the continuous mode is based on a spectrum that helps refine perception gradually in terms of pitch, voicing, loudness and other aspects of sound production (Wode, 1994). As such, L2 speech grows to sound more accurate, and thus, more native-like.

On the matter of whether native-like pronunciation can be attained past a certain biological age, research has shown that such feat is possible, though it is very rare (Bongaerts, van Summeren, Planken, & Schils, 1997). As a matter of fact, Bongearts et al. carried out a study that analyses six sentences produced by eleven highly proficient Dutch speakers of English, who had started learning English in high school and continued in higher education where they were continuously exposed to large numbers of native input of British English. The results have

shown that highly proficient learners received very high ratings, on par with the native speakers' pronunciation. Therefore, Bongaerts et al. conclude that attaining native-like pronunciation is possible past a certain biological period. However, extensive training in intonation and pronunciation remains necessary in order to achieve such a accomplishment (Bongaerts et al., 1997). Therefore, arguments for a critical period are arguable to a certain extent, although nuance should be brought to this theory. As a matter of fact, it is not that native-like is impossible speech as an L2 learner past a certain period in life; rather it is more difficult to do so. This is brought by Dixon et al. who state that eventually, L2 learners of all ages are "more likely to reach native-like proficiency in oral fluency, vocabulary, and literacy tasks than on grammatical intuition tasks or pronunciation, especially if they start after age 12" (Dixon et al., 2012, p. 45). While these differences exist, they do not prevent academic achievements. As such, Dixon et al. mention that the saying "younger is better" (Dixon et al., 2012, p. 45) should not be regarded as important by L2 learners, since research has proven that even late learners with constant exposure and instruction can achieve proficiency on a native-like level. As a conclusion, Dixon et al. complement Bongaerts' results in that more hours of input are indeed necessary to reach the same goal as younger learners in terms of grammatical intuition and pronunciation.

2.5. Second language acquisition and first language: transfers

In L2 acquisition, L1 transfers into the L2 refer to the phenomenon of bringing elements from the first language into the target second language. It can occur in various aspects during the process of acquiring a new language, among others: vocabulary, intonation, pronunciation, grammar, semantics (Ellis, 2015, p. 131). Ellis writes that transfers in terms of pronunciation are the most salient aspect in second language acquisition, an example of this being French native speakers' French accent while speaking in English. Concerning pronunciation, those types of factors of L1-to-L2 transfers are related to linguistic aspects between both the first and the second language, where they account for the theory of linguistic difference. As Ellis suggests in his book *Understanding Second Language Acquisition* that "the influence of the L1 is strongest when the difference between the native and target language is greatest and weakest when the difference is least" (Ellis, 2015, p. 134). This influence of the first language on the second language might result in non-targetlike pronunciation on the learner's behalf, as "interference from the L1 [is] seen as the primary phonological cause of foreign accent" (Flege, 1995, p. 235). Ellis argues, however, that this might not apply to every learner. As a matter of

fact, results have shown that learners experience greater difficulty in mastering sounds from a language that is closer to their native tongue. As a consequence, Ellis poses that the target language that is phonologically removed from the native language might not be harder to acquire than a language that has a higher degree of correspondence to the native tongue (Ellis, 2015). This is discussed more in depth by Major and Kim, who according to Ellis, have put forward the theory according to which "new" sounds, although harder to master at first, are acquired at a faster rate than similar sounds (Major & Kim, 1996). Major and Kim analysed how "similarity" and "dissimilarity" were phonologically assimilated by language learners. Following the study, the results show that dissimilar sounds are more easily acquired than similar sounds. This is explained by the fact that smaller differences between sounds often go unnoticed and unlearnt, while bigger salient differences are more easily noticeable and acquired (Ellis, 2015). Where correspondence between the native language and the target language does play a positive role, however, is to be observed in the grammatical domain. Small linguistic difference results in a faster acquisition rate of the target language. Ellis mentions the Morphological Congruency Hypothesis, as put forward by Jjiang, Novokshanova, Masuda and Wang (2011), that theorises that learning is made easier when both the first and the second language make use of identical grammatical morphemes for identical functions. As a consequence, if a morpheme is absent from the native language, it slows down the learning process to acquire such morpheme in the second language (Ellis, 2015). One could argue that the tendency of French speakers to drop the plural *-s* in English can be tied back to the fact that the plural *-s* in French remains silent. As French natives do not pronounce the final plural *-s* in French, they would be more likely to transfer this over to English. Another example of native French grammar exerting an influence on a target language, in this case, Dutch, is the fact that French learners tend to not pronounce the ending schwa sound at the end of Dutch words ending in an orthographic *-e*, since French grammar does not contain a sound /ə/ for words ending on an *-e* (Hiligsmann, 1998). Thus, features from the native language can transfer over to the target language when the features in the target language meet the criteria of the native language, although this is not always the case (cfr.: section 3.2.1 which handles Fayt and Heeren's research on the omission of the phone /h/ in Dutch by native French-speaking learners that is not influenced by their native grammar surrounding the orthographic *h*). On the topic of language distance, Ellis comments that similarity can play out both at the learner's advantage as well as disadvantage. While the target language being linguistically close to the native language could mean that a learner acquires that target language at a faster rate, it could also render the learning process slower due to the learner's inability to distinguish which elements

pertain to either language (Ellis, 2015). In conclusion, while linguistic differences and language distance can be the cause of both positive and negative transfers from the first to the second language, grammatical differences have shown to cause negative transfers in L2 speech production.

Yet, what research usually overlooks, is how pronunciation is tied to orthography, while in fact pronunciation both in the first and second language is very much tied to written form, although it is more prominent in the second language than it is in the first. That orthography influences pronunciation is nothing new, however, such as is illustrated by Cling in his book *Problèmes de l'enseignement de la prononciation anglaise par le laboratoire de langues. Etude de linguistique appliquée à l'enseignement de l'anglais aux étudiants francophones* (1972). Cling states that language is perceived through a phonological and graphical filter. In other words, spoken language is interwoven with written language; pronunciation influences the spelling of words, while spelling influences the pronunciation of words (Cling, 1972). Cling provides the reader with the example of the name of *François Mitterand,* the pronunciation of which has raised controversy in the French language. While the right pronunciation is /miterɑ̃/, some speakers, on the grounds of respecting rules of the French language, pronounce it as *[mitrɑ̃]. Cling explains it as speakers applying what they know of the French language – i.e. words such as *casserole* /kasrɔl/ (“pan”) in which a orthographic *e* is silenced when surrounded on the left by a double consonant and on the right by another single consonant – to new unseen words (Cling, 1972, p. 70).

Contrasting this with second language acquisition, it is important to notice a crucial difference which lies in the fact that learners of a second language are exposed to written forms of words to a much higher frequency while acquiring their target language than their first language (Bassetti, 2008). As it is, children learning their native language will not be exposed to written language until after mastering efficient communication with speakers of that language. As Bassetti puts it, the input is mostly acoustic when acquiring the native language. This is not the case for L2 learners who are exposed to larger amounts of written, orthographic input, even from the very beginning of the process to acquiring a second language (Bassetti, 2008). As it is, Bassetti dives deeper into the transfer theory by adding that orthography in the second language is influenced by the presence of an already existing native orthography. This influence also impacts the L2 representation of phonology by learners of the target language, which in turn has a link with non-targetlike production of L2 phonemes, syllables, and words. Pronunciation errors that stem from orthographic input cannot be tied back to native speakers’

production of the target language, as those errors do not occur in native speakers' speech (Bassetti, 2008). This could help understand the French speakers' pronunciation errors that occur in L2 speech production. As a matter of fact, this theory could explain why French native speakers of English – who are not exposed to /h/ in French but are aware that /h/ is an important phoneme in English – produce an [h] in words like *heir* /ɛə(ɹ)/ and *honest* /ɒnɪst/, resulting in *[hɛə(ɹ)] and *[hɒnɪst], in which the orthographic *h* is silent, since those are exceptions in terms of the pronunciation of the /h/. As such, orthography might play a crucial role in those types of errors. However, this does not enlighten the matter of insertion, a phenomenon in which an [h] is added in words where sometimes no orthographic *h* is present, *enjoy it* /ɛndʒɔɪɪt/ might be produced as *[ɛndʒɔɪhɪt]. In Dutch, insertion could also happen in the middle of the word, the word *beëindigen* /bəɛindəɣə(n)/ ("to finish"), might be produced as *[bəhɛindəɣə(n)]. As such, this error that French learners of English or Dutch make can sometimes not be linked back to orthography, since no *h* is observed in the orthographic form. This phenomenon is informally named as the intrusive *h* in this dissertation.

State of the Art

3. Sound perception and production

3.1. Models

In terms of pronunciation, it has been shown that perception precedes production both in the first and the second language (Ellis, 2015). According to Escudero (2007), correct sound perception is crucial for the development and improvement of the control on sound production, and an incorrect perception of sound could explain the difficulty in sound production of later (adult) learners (Escudero, 2007). Correct sound production, for that matter, implies that the learner can also correctly discriminate sound.

To this end, various learning models have been designed to understand non-native speech production as well as non-native speech perception. Models like Wode's (1994), Flege's (1986, 1987) or Best's (1995) might help understand the relationship French native learners of Dutch and English hold with the phone /h/. These models are in some ways connected to each other and help gain insight on a learner's learning process regarding sound perception and production.

Following Flege's model, L2 sounds are contrasted with L1 sounds in various ways. Flege makes case of three categories to distinguish the relationship that the L2 phones have with the L1: "identical", "similar" and "new" sounds (Flege, 1987). On the matter of identical sounds, Flege does not so much as dwell on the topic. Flege writes "[s]ome L2 sounds appear to be identical to sounds found in L1. Instrumental analyses and close auditory scrutiny reveal no systematic difference between them" (Flege, 1986, p. 228). Therefore, this "identical" category does not pose any problem for learners of a target language, since the L2 sounds resemble the L1 sounds so much that there is no difference in perception and production. The learner's ability to discriminate or produce those L2 sounds is not hindered.

Sounds that do cause significant difficulty for the learner are "new" and "similar" sounds. On the subject of "similar" L2 sounds, it can be stated that, while they resemble the original L1 sounds relatively, there are acoustic differences to be noted (Flege, 1987). Coupled with the phonetic similarity between L1 and L2 phones, there is usually an additional difficulty of similarity in orthography if both language systems use a comparable writing system (Flege, 1987, 1995). This poses a problem to learners, because similar sounds might be wrongly associated to L1 sounds which do not hold the same characteristics. As a means of illustration, Flege mentions the difference in /t/ between French and English: the French /t/ is an alveolar short-lag stop, while the English /t/ is rather an alveolar long-lag stop. Since L1-L2 similar

sounds contain differences on a more subtle level, it can occur that those are not picked up by the learner and remain unaddressed in their pronunciation. Briefly put, it causes the learner to continue with non-targetlike production of L2 sounds.

Finally, "new" phones in the second language are not related to any phone in the first language. In this regard, new L2 sounds have no equivalent in the L1, they have no counterpart. As such, "new" sounds are not ones that can be found in the phonology of the L1. Flege illustrates this with the French /y/ that does not occur in English, since the phone /y/ has no English category (Flege, 1987). As a consequence, English learners of French ought to create a new category for /y/ in order to produce that French phone correctly. This is not to say that new sounds are acquired correctly from the start; as a matter of fact, associations between the new L2 phones and existing L1 phones can occur when learners seem unable to create a new category for the new sound. An example of this concerns English phones that do not occur in other languages; the English phones /θ/ and /ð/ do not exist in languages like French, Russian, Dutch or German. In her study, Lombardi claims that the new L2 English phone /θ/ is associated with other existing fricatives or stops that occur in various native languages: [s] in French and German, [t] in Russian and both [s] and [t] in Dutch depending on the position of the phone /θ/ (Lombardi, 2003). Examples of this /θ/-[s] association in French include Louis de Funès' lines using both English and French interchangeably in several of his movies – examples are taken from films Louis De Funès starred in, since his burlesque French accent in every foreign language makes for perfect examples: *everything* /ɛvriθɪŋ/ becomes **everysing* [ɛvrisɪŋ] in: "Just a little *engueulade* ('row') but *everysing* alright!" (Girault, 1965, 0:46:40). The word *bath* /bɑːθ/ changes into **bas* [baːs] in: "If I go to the Turkish *bas*" (Oury, 1966 0:26:29). Most noticeably, the voiced version of /θ/ – i.e., /ð/ – also has a voiced equivalent of [s] among French learners, which is [z]. Examples include: "Where are the /ðə/ toilets?" becoming "Where are *ze* [zə] toilettes?" (Zidi, 1976, 0:22:52) and "*Ze* [zə] Germans, les Allemands, ils vont vous attraper! […] Donc I risk on *ze* [zə] deux tableaux" ("The Germans, they will catch you […] So I am taking risks either way") (Oury, 1966, 0:26:38-0:26:49). Association of the phones /θ/ and /ð/ with other existing French fricatives is also showcased in other films that Louis De Funès starred in. Light-heartedly mocking the English /ð/, which is considered a difficult sound to make for French learners of English – the phone being absent from the native French phonology – De Funès teaches his colleagues so that they can produce /ð/ correctly: "Non, pas 'ze'! La langue entre les dents, 'th' ! Faites-moi un 'th', vous !" ("No, not 'ze', the tongue between your teeth, 'th'! You, make me a 'th'!") (Girault, 1965, 0:15:30-0:15:57) to

which his colleagues visibly struggle, try as they might. In Dutch, phones like /h/, /ɣ/, /x/ and its uvular allophone /χ/ do not exist in French and learners of Dutch seemingly have problems with the accurate pronunciation of it, although pronunciation of the phones /ɣ/, /x/ and its uvular allophone /χ/ appears to be less problematic for French learners of Dutch than the pronunciation of /h/. According to Fayt, this is because the phone /h/ cannot be associated with any existing consonant in French; the Dutch /ɣ/ with the French /g/ and the Dutch /x/ with the French /k/ (Fayt, 2016). This association is also reported by Hiligsmann and his colleagues (Hiligsmann, 1998; Hiligsmann, Degrave, Rasier, & Van Goethem, 2017; Hiligsmann & Rasier, 2012), the /ɣ/-[g] association to be discussed further in this dissertation in section 3.2.1.

Yet, among others, Flege claims that it is usually the case that a new L2 sound is discriminated correctly and eventually gains its own L2 category, which is not so much the case with similar sounds from the second language. Moreover, he states that "L2 sounds not found in the L1 inventory may be produced more accurately than are L2 sounds with a counterpart in the L1 inventory" (Flege, 1995, p. 264). For that matter, new L2 sounds are, with time, more easily acquired than L2 sounds similar to the L1 (Ellis, 2015; Flege, 1987, 1995; Major & Kim, 1996). Another example can be used with the English and Dutch /h/. As mentioned before, the phone /h/ has no equivalent in French. Consequently, French native speakers of Dutch and/or English need to understand that /h/ requires its own "new" category and cannot be associated to the silent or aspirated orthographic *h* in French. As it stands, French speakers are usually able to discriminate the sound correctly as well as produce it. However, this does not explain the nature of the mistakes on the phone /h/, particularly the intrusive *h.*

The second model pertains to Wode (1994). Wode's model on sound perception might help complement Flege's model in the sense that continuous perception may help learners correctly identify the differences between Flege's similar sounds. As a matter of fact, as was previously mentioned, Wode's model of sound perception includes two modes – a categorical and a continuous perception (Wode, 1994). On the one hand, categorical perception might work well with Flege's identical and new sounds, because those operate on larger differences between first and second language phones of the same nature. On the other hand, continuous perception occurs on a more subtle level which makes it possible for learners to identify smaller differences between phones. As such, Wode's continuous perception might help the learner with correctly producing L2 similar sounds after identifying them. As a means of illustration, French-speaking learners would discriminate a French L1 /y/ from an English L2 /u/ with their categorical perception, both phones sharing similarities but not enough that L2 learners of

English would not distinguish the English /u/ from the French /y/. Additionally, continuous perception would help identify the presence of aspiration – or lack thereof – between [k] and [kʰ], for instance in the word "coffee". While aspiration is absent from the word French *café* [kafe] and the Dutch word *koffie* [kɔfi], it is in fact present in the English word *coffee* [kʰɒfi], most notably in the British variant that is usually taught in secondary schools in Belgium. As a conclusion, based on those two models of sound perception and production, Wode's categorical perception would help French native speakers of Dutch and/or English discriminate /h/, and, for that matter, create Flege's "new" category in their second language phonological representation.

The third model, designed by Catherine Best, is called the Perceptual Assimilation Model (PAM), and is centred around perception of non-native speech by learners of a target language. This model is not based on phonological representations like Flege's is (Flege, 1995), rather Best bases herself off of non-native speech perception of actual sounds. Best makes cases of different ways with which second language learners assimilate speech in the target language, and in doing so, the learners inevitably associate the sounds from the target language with the closest or most similar sounds from their native language that they have already assimilated. She states:

> The fundamental premise of the perceptual assimilation model of cross-language speech perception is that non-native segments […] tend to be perceived according to their similarities to, and discrepancies from, the native segmental constellations that are in closest proximity to them in native phonological space (Best, 1995, p. 193).

As a consequence, a language speaker whose native tongue contains bilabial stops /p/ and /b/, alveolar stops /t/ and /d/ and velar stops /k/ and /g/ will most likely associate the dental stops /t̪/ and /d̪/ to their alveolar stops /t/ and /d/ because the dental stops are more similar to their native alveolar stops in terms of place of articulation – the mode being a plosive, a stop:

> For a native listener of a language that has no dental stop but does have bilabial, alveolar, and velar stops, the tongue tip constriction of the dental stop is straightforwardly closer in native phonological space to the alveolar place than to the others, because the articulation involved is the same and the place of constriction is more similar than those of bilabial or velar stops (Best, 1995, pp. 193–194)

Similarly, a learner can assimilate the L2 sound gestures to native sound gestures that are the most similar:

> If the listener's language has no ejective stops but does have voiceless aspirated and prevoiced stops, the glottal gestures and phasings of ejectives are more similar gesturally to the voiceless aspirates than to the prevoiced stops, given that both glottal closure and glottal widening prevent voicing and that the glottal gestures of both are phased so as to reach their peaks at the release of the oral closures with which they are linked.

Coming back to the association of phones /θ/-[t] and /θ/-[s] that is previously given as example for Flege's model, it can also be explained through Best's PAM model: for French, German Dutch natives – depending on the position of the phone / θ/ in a word – it seems the manner of articulation remains what is important about the new phone /θ/, therefore, the manner remains (fricative), while the place switches from interdental to alveolar, places which are very similar in gesture. While Russian and Dutch natives – depending on the position of / θ/ in the word – associate this the interdental fricative /θ/ with an alveolar plosive [t], probably because the [t] sounds most similar.

In the PAM model, learners are expected to draw similarities between their target language and their native language. However, comparing languages in terms of phone production is not always possible. Therefore, not only are learners expected to catch on the similarities between both languages, they are also expected to detect discrepancies between them (Best, 1995). Best mentions that very discrepant cases cannot be associated to any native-like category, and as such, only be recognised as pertaining to L2 speech in general whilst not being entirely assimilated by the learners. In extreme discrepant cases, she mentions, an L2 sound might not even be recognised as a part of speech, instead being perceiving as something non speech-like (Best, 1995). In the case of the phone /h/, it could be assimilated to a "non-assimilable sound" according to Fayt (Fayt, 2016, p. 5). However, this applies to contrasts between two non-native sounds, and not to a sole phone (see Best, 1995, p. 195 for contrasts between non-native sounds). Instead, another category of Best's model is suggested, one that would fit the phone /h/; Best describes the category that Fayt actually refers to as a "nonspeech sound", as it is "not assimilated to speech" (Best, 1995, p. 195). As a matter of fact, since the phone /h/ does not pertain to the French phonological system, nor does it fall in between categories within its phonology – laryngeal consonants being notably absent from the French language – French-speaking learners of Dutch and English might therefore not view the /h/ as phone assimilable their L2 speech production.

3.2. Studies on second language sound perception and production

Studies on sound perception and sound production in second language learning have been carried out in order to understand the learner's phonemic representation of the target language. Research on how learners map the L2 phonological system have shown that making comparisons between both L1 and L2 phonological or phonetical phonemes might confuse

learners more than help them (Bohn, 2017). As a matter of fact, Bohn writes that there are several reasons why comparing written transcriptions of phonemes may lead to learner confusion, one of which being that the symbol used for transcriptions may differ, using the (mis)match of [e] and [ɛ]:

> Phonetically (and phonologically) identical sounds may be transcribed with different symbols for historical reasons, such as the vowel in *bet*, which is phonetically [ɛ] in the standards accents of both American and Southern British English, but is incorrectly transcribed as [e] in traditional descriptions of Southern British English (Schmitt 2007). Depending on whether one chooses [ɛ] or [e] as the English vowel to be mapped onto a Spanish vowel space (which has only [e], not [ɛ]), the result would either be a perfect match or a mismatch. (Bohn, 2017, p. 4)

Moreover, one could also argue that written forms of phonemes may also vary between languages. For instance, the phone /r/ in French, Dutch and English is pronounced differently depending on the language. For instance, the "French *r*" is pronounced usually as a uvular fricative [ʁ], while the "Dutch *r*" consists in an alveolar trill [r] in Standard Belgian Dutch and the "English *r*" is rather a postalveolar approximant [ɹ]. While the first two are often phonologically transcribed as they are phonetically produced, the same cannot be stated about the third. As a matter of fact, the *r* in English is often transcribed with the symbol of the alveolar trill, despite it usually being a postalveolar approximant in General American or Received Pronunciation (Wells, 1982a, 1982b). Hence, it could create confusion among native speakers of languages using the alveolar trill to phonetically or phonologically transcribe an orthographic *r* – such as Dutch, Spanish, or Italian – who might interpret that a trill is needed when pronouncing the phone /r/ in English. Though a trill can occur with the orthographic *r* in English, it is usually found in dialects; Scottish, New-Zealand, South-African, Irish English (Wells, 1982a, 1982b). This overlap in phonological (and sometimes orthographic) representation of phonemes that are acoustically different is correlated by Flege's work on the various types of L2 categories; namely that "similar" sounds, while phonetically different, can also have identical orthographic and phonological representations; in this case, the phone /r/ – with its various phonetic realisations – falls under that category.

On the subject of L2 perception, Bohn also writes that the learners experience what has been described as the phenomenon of "the 'phonological sieve' (Trubetzkoy 1939), the 'lens of native phonetics' (Bohn et al. 2011), or simply as the 'native language filter' (Ryan 1983)" (Bohn, 2017, p. 3). The theory behind this filter, sieve, lens, or grid (Flege, 1995) is that learners, while using their native language, develop a sharp sense of discrimination between L1 phonemes, tones, intonations etc. However, it might occur that this filter is not suitable when acquiring a second language. Consequently, learners might not be able to make a

distinction between L2 phonemes, tones, intonations, etc. where a distinction should be made. As stated by Escudero (2007) and Ellis (2015), since sound perception in the second language is often acquired before sound production (Ellis, 2015; Escudero, 2007), the phonological filter hinders correct perception, and as a consequence, it also hampers correct sound production among learners.

Literature has supported this theory of the phonological filter, which may clarify the reason why late learners of a target language do not produce certain L2 specific phones for they fail to perceive those L2 sounds accurately (Flege, 1995). Flege names the phonological grid forming an obstacle to accurate L2 sound perception in various of his papers, and elaborates through an example of Portuguese learners of French experiencing difficulty in discriminating the French /y/ from /u/ or /i/. As a matter of fact, Flege states that Portuguese learners of French tend to mistake the phone /y/ for /i/ (Flege, 1995). Darcy et al. also mention them having trouble in the discrimination of the French phone /y/ from /u/ (Darcy et al., 2012) . However, Flege, in another of his papers, in collaboration with Hillenbrand, researched the perception and production of American learners of French concerning the French /u/ and /y/ (Flege & Hillenbrand, 1984). The results have shown that learners discriminate and produce the French phone L2 /y/ more easily, because, as the authors claim it, it is phonologically easier to distinguish and produce since it shares fewer categorical similarities than the French L2 /u/ does with the English L1 /u/. In other words, the French L2 /u/, which is perceived as an "equivalent" sound to the English L1 /u/ is estimated to be more difficult to discriminate and harder to produce than the French L2 /y/, which is not perceived as "equivalent" (Flege & Hillenbrand, 1984). Additionally, the French L2 /y/, while remaining difficult to distinguish from the English L1 /u/ for English speaking learners of French, seems less problematic in its discrimination than the French L2 /u/, because, as stated previously, it shares fewer similarities with the English L1 /u/. In the same fashion, American learners of French were asked to produce the French phone /t/, which has a shorter voice-onset-time (VOT) than their native /t/. As stated in section 3.1, Flege and Hillenbrand write that American learners merge their perception of English /t/ (with long-lag VOT values) and French /t/ (with short-lag VOT values). As a result of not distinguishing the subtleties differentiating /t/ in both languages, American learners of French continue to equate the English /t/ to a French /t/, and therefore, produce the L2 French /t/ with a relatively long VOT, which is a characteristic belonging to the English /t/ (Flege & Hillenbrand, 1984).

Studies about the pronunciation errors by Spanish-speaking learners of Dutch have been conducted by Pepi Burgos and colleagues. However, while the study does not exclude any particular type of mispronunciation, it is focused on the vowel mispronunciation more so than consonant mispronunciation (Burgos, Cucchiarini, van Hout, & Strik, 2013, 2014). As a matter of fact, on the subject of consonants, Burgos et al. state that: "the acquisition of consonants is relatively effortless, independently of vowel pronunciation, which lags behind having its own pattern of acquisition" (Burgos et al., 2014, p. 135). Yet, consonants that do pose a certain problem in the pronunciation of Spanish-speaking learners of Dutch, is the substitution of the /v/ for a /b/, Burgos et al. clarifying that this confusion stems from the fact that Spanish phonology does not contain the phone /v/, the orthographic letter *v* and *b* being homophonous (Burgos et al., 2014, pp. 39–40). On the phone /h/ in Dutch, Burgos and colleagues write that the letter *h* is often overlooked or overcompensated for by the Spanish-speaking test subjects. This results in the phone /h/ either being omitted, or produced as a /x/, (Burgos et al., 2014), which is another phone pertaining to the Dutch phonological system, used for other meaningful discrimination of sound (Hiligsmann, 1998; Hiligsmann & Rasier, 2012). What Burgos and her colleagues' studies also reveal is that Spanish-speaking learners of Dutch seem to experience difficulty in producing a clear-cut distinction between the phones /ɑ/ and /a/ as well as /o/ and /ɔ/, more specifically, the Spanish test subject kept producing the former as the latter, thus erasing the phonemic importance of both vowels in Dutch (Burgos et al., 2013, 2014).

In another study, Spanish learners of English, while exceeding expectations of researchers (although not performing as well as native speakers), experience difficulty in distinguishing the contrasts between L2 /i/ and /ɪ/ as well as L2 /ɑ/ and /æ/ (Barrios et al., 2016). Barrios et al., however, nuance their results by adding that this would not mean that Spanish speakers systematically fail to discriminate both pairs of English phones. As mentioned before, learners performed better than expected on their discrimination tasks, and could in fact distinguish both pairs of phonemes correctly (Barrios et al., 2016). This is partly explained in a study on the discrimination of the phone /h/ among French-speaking learners of Dutch, a study carried out by Fayt and Heeren; learners appear to better discriminate phones when they are given in minimal pairs, the semantic value of the minimal of the phonemes that are being studied is heightened (Fayt, 2016; Fayt & Heeren, 2018). Additionally, while the discrimination of /i/–/ɪ/ remains a difficulty for Spanish learners of English, those who could accurately discriminate /i/ – /ɪ/ (Burgos et al., 2013, 2014) in English have shown to produce a low /e/ "in the vowel space" in order to "accommodate the /ɪ/" (Eckman, 2011, p. 279). By discriminating the phones

/i/ and /ɪ/ accurately, the test subjects in Barrios et al.'s study have disproven Brown's feature-based theory. This theory claims that if learners lack a feature to perceive or create contrast in the second language because it is absent from their first language, then perception and production of that L2 feature will not occur, and no contrast will be perceived nor produced. However, features in the L1 can still be used to perceive and make a contrast, which is called "redeployment" (Barrios et al., 2016). Discussing the results, Barrios et al. mention that Brown's theory may have been disproven because of two reasons; on the one hand, there was no redeployment in the discrimination of /ɑ/ and /æ/, the Spanish language containing features that could enable such a distinction. In short, on the one hand Barrios et al. claim that the Spanish speakers of English may have acquired target-like phonological representation of /ɑ/ and /æ/, using a [± back] feature and /i/ and /ɪ/, using a [± tense] feature (Barrios et al., 2016). On the other hand, they claim that Spanish speakers of English may have used the feature of length to perceive and create contrast in their second language; a feature that is absent from the target language's native speakers to make and create a distinction between the mentioned pairs of phonemes (Barrios et al., 2016). As such, "learners may represent the contrast between /i/–/ɪ/ as one of length in which English [i] is represented as bimoraic and English [ɪ] as monomoraic" (Barrios et al., 2016, p. 388). The same can be stated about [ɑ] and [æ], Barrios et al. mentions, since English requires bimoracity as a minimum word requirement, illustrating this with the words *spa* and *bra* that are pronounced as /spɑ/ and /brɑ/ and not as *[spæ] and *[bræ]. Hence, the phone /ɑ/ can be considered bimoraic and /æ/ as monomoraic. The conclusion that Barrios et al. come to is that learners of a second language may use features different from features that native speakers of that target language use so as to accurately make contrasts and discriminate phonemes, should a particular feature in that second language be absent from the learners' own native tongue (Barrios et al., 2016). This can be correlated with the production of the phone /h/ with French-speaking learners of Dutch and English. Since the French language does not have the feature [± glottal] for meaningful contrast – the phone /h/ or other laryngeal and glottal consonants being notably absent from the French phonology – French learners of Dutch and English should not be able to produce this phoneme, according to Brown (but not to Flege, or Wode, among others). The fact that French speakers are, in fact, able to produce the phone /h/ (Fayt & Heeren, 2018; Hiligsmann, 1998; Hiligsmann & Rasier, 2012) disproves Brown's hypothesis on features, concerning this particular phone. To the best of the author's knowledge, no article similar to Barrios et al.'s has been released surrounding the phone /h/, in which learners of English or Dutch as second languages make use of non-

native features (in Barrios et al.'s article, time) to perceive and create contrast in the target language while lacking the native language.

3.2.1. The problem with the pronunciation of the phone /h/ among French-speaking learners of Dutch

In a 1998 paper, Hiligsmann makes a statement: French learners of Dutch experience difficulty in pronouncing the foreign phone /ɣ/, and tend to replace this with another phone that is present in their first language, namely the phone [g] (Hiligsmann, 1998). As a consequence, Hiligsmann writes, French learners tend to substitute a widely used phone /ɣ/ in Dutch, by another that also exists within the Dutch language, albeit used with a much lesser frequency, most notably in loanwords and other foreign words in Dutch, and is therefore a different phone relevant for meaning differentiation in Dutch (Hiligsmann, 1998, p. 174). Hiligsmann and Rasier speculate that the confusion may come from the spelling of the phone /ɣ/, which is written as the letter *g* (Hiligsmann & Rasier, 2012), which provides another example of how spelling may confuse second language learners (Bassetti, 2008). Another confusion with the phone /ɣ/ is that French learners of Dutch also happen to replace it with a [h] (Hiligsmann & Rasier, 2012), although, that is partly due to the fact that learners may be exposed to some Dutch dialects in Belgium, in which the phone /h/ is omitted from speech or, in the case of the West-Flemish dialect, it is replaced by [ɣ] (De Wulf, 2003). Hiligsmann and Rasier illustrate this with the sentence *ik ga naar Gent* ("I go to Ghent") being pronounced as [ɪkha.naːrhɛnt] instead of /ɪkxa.naːrɣɛnt/ (Hiligsmann & Rasier, 2012, p. 81). Nonetheless, Hiligsmann and Rasier write those problems with the production of the phone /ɣ/ are less prominent, and /ɣ/ is usually acquired more easily and at a faster rate than the phone /h/. Still, the phone /h/, while constituting a new L2 sound for French-speaking learners, appears significantly more difficult for French speakers to master, Fayt theorising that it having no clear counterpart in French makes for a difficult phone to produce accurately (Fayt, 2016) while other problematic phonemes like /ɣ/, /x/ and its uvular allophone /χ/, may be associated to the phonemes /g/ and /k/, which are part of the French phonological system (Fayt, 2016). This goes against Flege's theories according to which new sounds are more easily acquired than similar sounds.

On the omission of the phone /h/ in Dutch, this phenomenon is not solely restricted to West-Flanders, as both the whole of Flanders and the Netherlands are characterised by various degrees of *h-behoud* ("h-retention") (De Wulf, 2003). The degree to which the phone /h/ is

retained can be broadly categorised into two trends: on the one hand, the Southern part of the Dutch-speaking community shows an increasing tendency to delete the phone /h/ from speech production. On the other hand, the Northern part – i.e., the Netherlands – increasingly manifests its phone /h/, as regions where it is deleted from speech are shrinking (De Wulf, 2003). Charles Fayt makes a conclusion that, while Belgian French speakers of Belgium account for a significant number of learners of Dutch as a second language, the reason they have trouble pronouncing the phone /h/ accurately might stem from the input they receive as fellow Belgian citizens. This is in line with the previous commentary on the replacement of the phone /ɣ/ by [h]; the pronunciation of French-speaking Belgian learners of Dutch might be influenced by the way with which Flemish natives speak – i.e. in a dialect that often does not make case of the phone /h/ (Fayt, 2016). This is correlated by Lively, Logan and Pisoni who conclude that perception and realisation by second language learners is influenced by the variation in realisation of native speech: learners who are exposed to large groups of native speakers, and, consequently, to a high variability in the realisation of phones will have more ease in perceiving and producing such phones than learners who are exposed to a limited number of native speakers (Lively, Logan, & Pisoni, 1993).

On the matter of *h*-omission still, Fayt and Heeren (2018) report French speakers producing more instances of the phone /h/ in the contexts of the phenomena of *élision* and *liaison* (Fayt & Heeren, 2018). Their paper presents the research whether Dutch words eligible for either *liaison* or *élision* would influence the production of the phone /h/ among French-speaking learners of Dutch in a secondary school setting. To this end, two factors are analysed during their study. The first factor consists in a transfer phenomenon that could occur from the first language (in this case, French) to the second language (Dutch) through the French language rules of *élision* and *liaison*. The expectations of Fayt and Heeren concerning the production of the /h/ were that the native French grammar would influence the test subjects' pronunciation of the /h/ in Dutch in a negative way; French learners would produce fewer [h] than in contexts where *élision* and *liaison* are possible than in contexts where it is not possible (Fayt & Heeren, 2018). Surrounding the phone /h/ and the letter *h*, one must be aware that, while the orthographic *h* exists in French, it is silent in French phonology; this is not the case in Dutch, where the letter *h* is in fact pronounced almost every single time (Hiligsmann et al., 2017; Hiligsmann & Rasier, 2012). On the subject matter of French grammar, the researchers briefly explain in which French contexts *élision* and *liaison* occur and in what way this type of context in Dutch could have an impact on the production of the phone /h/. On the one hand, the process

of *liaison* occurs when consonants in the previous syllable's coda are pronounced instead of an empty onset in the following word. Fayt and Heeren provide the following example: *petit à petit* /pti-a-pti/ is pronounced as [pti-ta-pti] ("step by step") (Fayt & Heeren, 2018, p. 92). They add that *liaison* with the letter *h* occurs with the *h-muet*, and provide another example: *un homme* is pronounced as [œ̃-nɔm] ("a man"). On the other hand, *élision* is characterised by a schwa deletion when the nucleus in the previous syllable equals an /ə/. In short, *petite amie* is produced as [pti-ta-miː] ("girlfriend"), the /ə/ in /pətit/ being deleted (Fayt & Heeren, 2018, p. 92). *Élision* with the *h* occurs with the *h-aspiré*, also called *h-germanique* in French. In the case of an *h-muet*, speakers apply *élision* similarly as in the following example: *des héros* is pronounced as [dɛ-eʁɔ] and not as *[dɛ-zeʁɔ] ("heroes") (Fayt & Heeren, 2018, p. 92). As a consequence, one could question that the presence of *h-muet* and *h-aspiré* in French could mislead French-speaking learners of Dutch (and English) into mispronouncing the phone /h/; that the silent letter *h* could confuse leaners into mispronouncing the /h/ in Dutch (and English).

Contrary to Fayt and Heeren's expectations, the results from the reading exercise show that the test subjects produced statistically more [h] in contexts where *élision* and *liaison* are possible; slightly fewer [h] are produced in contexts where *élision* and *liaison* cannot be applied, although the difference is only of approximately 2%. The explanation that the test subjects respected word boundaries remain unsatisfactory according to the authors, as few words in the reading exercise were linked to one another (Fayt & Heeren, 2018, p. 100). Observations of the test subject's performances revealed, however, that a recurring use of compensation strategies in the production of the [h] in contexts where *élision/liaison* are possible; Fayt and Heeren hypothesising that the subjects probably knew *something* had to happen around the orthographic *h.* As a consequence, the /h/ was sometimes replaced by a [ɣ] in words as *hoort* /hoːrt/ ("(s)he hears"), thus resulting in a word with much more stress than its surroundings. Another compensation strategy used by test subjects consisted in changing the nature of the vowel; *hoort* /hoːrt/ as *[øʁt].

The second factor in the study relates to the semantic importance of the production of the /h/, particularly in minimal pairs. The study predicts that the position of the /h/ might play an impact on perception, and thus on the production of the /h/ by the test subjects (Fayt and Heeren 92). The results show that the test subjects tended to produce more [h] in minimal pairs than in the reading text related to the transfer phenomena of *élision/liaison* – Fayt and Heeren speculate that the semantic impact is greater with minimal pairs – even more so when the word containing an *h* is placed in second position than in first. The results also show that the subjects tended to

use the same overcompensations that are mentioned previously, along with a third one in which they elongate the vowel of word containing the *h* compared to the *h*-free word (Fayt & Heeren, 2018). Overall, test subjects who score higher on the reading task monitoring transfers also scored well on the minimal pairs task. Fayt and Heeren conclude that those test subjects are more likely to produce [h] where it is required, and not overcompensate.

An important point to notice is that Fayt and Heeren mention that the research did not include the analysis of mistakenly produced [h]. This research does, however, strive to take into account that French-speaking learners of Dutch and English have a hard time producing the phone /h/ authentically. Since Fayt and Heeren's results show that – much against their expectations – more instances of [h] are produced in contexts where *élision* and *liaison* are possible, the research in this dissertation focuses on other questions that have not been explored yet. Firstly, are words starting with a vowel in which the letter *h* initiates the second syllable more likely to contain an intrusive *h*, as put forward by Hiligsmann and Rasier (Hiligsmann & Rasier, 2012)? As a matter of fact, cases of intrusive *h* are reported by Hiligsmann and Rasier in their book: a word starting with a vowel, the second syllable starting with an orthographic *h* will likely trigger intrusive *h* before the vowel. In other words, French-speaking learners of Dutch might start a word with an [h] followed by a vowel in lieu of a vowel on its own that is followed by a syllable starting with an *h* – instead of *aanhalen* /a.nha.lə(n)/ ("to mention") and *inhouden* /ɪnhɔudə(n)/ ("to contain"), they would produce respectively *[ha.nha.lə(n)] and *[hɪnhɔudə(n)] (Hiligsmann & Rasier, 2012, p. 63) in Dutch. Secondly, do French learners of Dutch (and English) produce an intrusive *h* when coming across two or more clashing vowels?

3.2.2. The problem with the pronunciation of the phone /h/ among French-speaking learners of English

Surprisingly, there is little literature about the phone /h/ in English as a second or foreign language. Unlike the Dutch literature which showcases research into the /h/ (Fayt, 2016; Fayt & Heeren, 2018; Hiligsmann, 1998; Hiligsmann et al., 2017; Hiligsmann & Rasier, 2012), only very few researchers have delved deeper into the subject of the pronunciation of the phone /h/ in English. Some, like Haycraft, recognise the problem surrounding the /h/, and provide remedy to the mispronunciation around it (Haycraft, 1971). She mentions the mistake with the example *"Hare you hin a urry?", in which she observes the phone /h/ either being omitted or inserted. The cause of this mistake in pronunciation, according to her, is a "letter-sound confusion" and

is typically to be associated with natives of Latin languages, more specifically, native French speakers. Haycraft, in her book, mentions as "quick teaching point": "Say 'h' emphatically, using your abdominal muscles. Also, correct stress and link words together" (Haycraft, 1971, p. 98). That Haycraft mentions stress and intonation play a role in this is supported by Fayt and Heeren's results on the overcompensation of the phone /h/ among French-speaking learners of Dutch putting emphasis on the word containing an orthographic *h*. This is not to say that the problem surrounding the phone /h/ is not being reported elsewhere in the English-speaking community – because it is, albeit scarcely – but it seems that research surrounding the /h/ has not developed (yet?) into the subject matter that it is now in the field of Dutch as a second language. This is perhaps the most unexpected conclusion that has been drawn while writing the dissertation. Since the literature is scarce concerning the pronunciation of the phone /h/ by French-speaking learners of English, this section is mostly about reporting problematic phones – including the phone /h/, among others – that native speakers of Romance languages encounter while acquiring the English language. Reports include sources taken from non-academic databases and websites, reviewing some of the most important Romance languages.

Firstly, this blog written by a TEFL/TESOL graduate, reports problems in the pronunciation of Italian learners of English while teaching in high school:

> The /h/ sound. They should say it in words like hate, have, and home; However, as in the Italian language, the /h/ is silent, they just omit it, instead of pronouncing it. At the same time, to compensate for it, they add a /h/ where it is not considered – between two vowels, for example, like in the word away or before a vowel at the beginning of a word, like apple (Pachina, 2019).

In the same blog is mentioned a similar problem with French learners of English: "In general, I noticed that the most challenging difficulties for French speakers were the /h/, which was completely ignored when they found a word starting with /h/" (Pachina, 2019). Another TEFL/TESOL blogs mentions the difficulty that Italian learners face with the /h/, namely that they "tend to overpronounce" said phone (Bogart, 2007). From the excerpt from Pachina, it can be argued that this *h*-omission can be correlated with language transfer from Italian to English; the fact that Italian speakers of English omit pronouncing the voiceless laryngeal fricative can indeed be linked back to orthography, the letter *h* being substantially rarer in Italian spelling, as the language has gradually evolved from Latin: "The letter has also been discarded in most words that contained it in Latin, such as *onore* 'honour', Latin HONOR" (Krämer, 2009, p. 9). Nonetheless, when the letter *h* is present in Italian words, it is silent either way: "The letter h occurs in some forms but never has a phonetic value" (Krämer, 2009, p. 8).

Secondly, the problem has also been reported among Spanish learners of English, under the phenomenon that Spanish-speaking natives learning English tend to omit the pronouncing the letter *h* (Moore & Marzano, 1979), since the orthographic *h* is holds no phonemic value (Colina & Martínez-Gil, 2020). Loanwords from English into Spanish that have as initial an *h-* are usually pronounced as a /x/: *high school*, written as *jaiscul* in Spanish in pronounced /xaiskul/ and *hookey*, written as *juqui* is pronounced /xuki/ (Smead, 1998). However, some other website, though less academic in style, reports a confusion among Spanish natives with the letter *j* in English*: "*Pronouncing a 'j' as an 'h'. For examples, a student might pronounce the name 'Jerry' as 'Herry'" (McGloin, n.d.). Interesting about the phonee /h/ in Spanish is that, according to Uribe-Enciso et al., Venezuelan native speakers of English tend to show difficulty with the phone /s/ and /z/ by replacing those with the phone /h/ (Uribe Enciso, Fuentes Hernandez, Vargas Pita, & Rey Pabón, 2019). As a consequence, Uribe et al. write that words like *second* and *same* are not respectively pronounced as /sɛɪm/ and /sɛkənd/ but rather as *[hɛɪm] and *[hɛkənd] (Uribe Enciso et al., 2019, p. 228).

Thirdly, among Portuguese learners of English, the error of *h*-omission is also being reported (Turpin, 2018), for the letter *h* on its own in European Portuguese and Brazilian Portuguese is silent. In the South-American variant, a handful non-academic websites report that Brazilian Portuguese learners of English tend to confuse both letters *h* and *r* (Chad, 2012; Lanteigne, 2006), since the letter *r* has a pronunciation that varies between [h], [χ] and [x] in the various Brazilian Portuguese dialects (Mateus, Pardal, & Andrade, 2000). As a consequence, Brazilian Portuguese learners of English tend to confuse both letters *h* and *r* in English, and sometimes overcompensate for the letter *h* as mentioned in "Common, Persistent Errors in English by Brazilian Portuguese Speakers" (Lanteigne, 2006).

Lastly, to the author's knowledge, no problem has been reported surrounding the phone /h/ among Romanian learners of English. This is most probably due to the Romanian phonological system. As a matter of fact, Romanian contains the laryngeal fricative /h/ in its phonology (Chițoran, 2002). The Romanian language also includes words starting with the letter *h*, which is clearly pronounced, unlike in French, Spanish, Italian, European Portuguese and Brazilian Portuguese. As an example, the words *hain* ("mean") and haină ("coat") taken from Chițoran's book *The phonology of Romanian: a constraint-based approach*, showcase that the letter *h* is pronounced (Chițoran, 2002). Further in her book, Chițoran reports a "morphological palatalization of labials, /h/ and other sonorants", though she continues: "All of these consonants acquire a secondary articulation from palatalization, but the primary features

[related to the place of articulation of the consonants] are not further affected" (Chițoran, 2002, p. 189). Whether palatalisation could affect how Romanian learners of English pronounce the phone /h/ has not yet been researched, to the author of this dissertation's best knowledge at the time of writing.

All in all, to the author's best knowledge, the recurring problem with the phone /h/ among French-speaking learners of English has not been as extensively studied as it has been among French-speaking learners of Dutch. Yet, the studies that have been carried out with (Belgian) French-speaking learners of Dutch do not take the intrusive *h* into account, although reports of the intrusive *h* exist. Additionally, there has not been extensive research on the pronunciation of the /h/ or other laryngeal or glottal consonants among speakers of romance languages who learn English, or, within the frame of this dissertation, Dutch. Nonetheless, this subject could be considered for further research, in a comparative study on the pronunciation of native speakers of romance languages learning English or Dutch and having trouble with the pronunciation of the phone /h/.

4. Teaching pronunciation

4.1. Approaches

In the research, pronunciation in second language acquisition has long been cast aside for two other domains that have been more extensively studied: grammar and vocabulary (Celce-Murcia, Brinton, & Goodwin, 1996). As a consequence, research on pronunciation is recent in research history. Several models to teach pronunciation have emerged over the years, and approaches were developed. The two main approaches to teach pronunciation are the intuitive-imitative approach and the analytic-linguistic approach, according to Celce-Murcia and colleagues (1996). The first relies entirely on the learners' abilities; the ability to listen and the ability to reproduce sounds and phones. This would occur without the help of explicit instruction or knowledge. Celce-Murcia et al. also add that, for this approach to be effective, it requires good input to introduce to learners. Naturalistic methods fall into that type of approach. As a matter of fact, naturalistic methods consist in learners listening to input from the target language for a period of time before speaking. Celce-Murcia et al. summarise those methods as allowing learners of a second language "to internalize the target sound system". As such,

according to naturalistic methods, the pronunciation of learners should be "quite good", even if learners are not provided with explicit instruction (Celce-Murcia et al., 1996, p. 3).

The second main approach – the analytic-linguistic approach – was developed later in time. This approach consists in providing explicit information such as "a phonetic alphabet, articulatory descriptions, charts of the vocal apparatus, contrastive information, and other aids to supplement listening, imitation, and production. It explicitly informs the leamer of and focuses attention on the sounds and rhythms of the target language" (Celce-Murcia et al., 1996, p. 2). While it may seem that the analytic-linguistic method could serve as a replacement for the intuitive-imitative approach, the former was in fact designed to be complementary to the latter (Celce-Murcia et al., 1996). Nowadays, both approaches are used when teaching pronunciation as they complement one another in the field of foreign language teaching.

Other methods and approaches include the present-day Communicative Approach (Celce-Murcia et al., 1996). This approach is primarily concerned with language as a tool of communication. Thus, teaching a second language, and more specifically teaching its pronunciation, is done while bearing in mind the communicative purposes. In schools, the incentive for pupils to learn a target language is often found in educational trips to the place where said language is spoken. Consequently, pupils might find a renewed motivation to speak with the native speakers of the target language they are in the works of acquiring. For French-speaking learners of Dutch and/or English in Walloon schools, the target places often include the Netherlands, Belgium itself, namely Flanders, or the United Kingdom, England in particular. Celce-Murcia et al. mention that this communicative approach is driven by the fact that learners, in order to orally communicate with native speakers of their target language, need to attain a certain threshold level in terms of pronunciation. As a result, the "urgency" is for teachers to make their students attain that point in their learning process. As Celce-Murcia et al. state: "if [learners] fall below this threshold level, they will have oral communication problems no matter how excellent and extensive their control of English grammar and vocabulary might be" (Celce-Murcia et al., 1996, p. 7). The goal, therefore, is not for learners to acquire a native-like pronunciation, but rather, to master a target language past that threshold so that their oral communication does not suffer from a possible lack in pronunciation skills. The goal therefore is intelligible communication made possible through what Celce-Murcia et al. label "intelligible pronunciation" (Celce-Murcia et al., 1996, p. 8). This is also stated by Witt (2012) who concludes that in recent years, a consensus has been reached that consists in that language teaching should be done with the goal of being intelligible rather than achieving

native-like speech production. Moreover, expecting L2 learners to achieve native-like speech is often considered unrealistic or inappropriate, particularly so for later L2 learners, adults or teenagers alike (Dixon et al., 2012; Ellis, 2015; Wagner & Toth, 2017). The Communicative Approach is also cited by Elliott in his paper wherein he states that language use nowadays prevails over language knowledge, and where language skills constructed around a model of communication (Elliott, 1997). Therefore, the focus of pronunciation should lie in developing and improving learners' communicative skills, with an intelligible sound production (Witt, 2012). To this end, CLIL programmes in Belgium and elsewhere appear to be the "ultimate dream of Communicative Language teaching", since "the curricula of the […] content subjects (e.g. geography, history, business studies etc.) constitute a reservoir of concepts, topics and meanings which can become the object of 'real communication' where natural use of the target language is possible" (Dalton-Puffer, 2007, p. 3). Thus, the CLIL programmes ensure an authentic form of communication, consequently morphing the classrooms into "'streets' […], when there are no 'streets' around the school in which the language could be picked up" (Dalton-Puffer, 2007, p. 2).

When applying the aforementioned approaches to the phone /h/, there are several points to discuss. Learning about the phone /h/ through the intuitive-imitative approach would most probably not help learners much in the production of this phone. As a matter of fact, French speakers are physically able to produce the sound /h/, and even mistakenly insert it where it should not be produced (Fayt & Heeren, 2018; Haycraft, 1971; Hiligsmann, 1998; Hiligsmann & Rasier, 2012) this phenomenon being the main joke in Taylor's one-man show when he addresses his wife's problems with the pronunciation of this laryngeal consonant (Taylor, 2019). What Taylor's example might highlight in this case, however, is the lack of help from teacher to learner. This is to say, if learners are left to solely process and imitate any given input in an intuitive-imitative approach, their errors in pronunciation might not be addressed explicitly, and therefore corrected. The example of the phone /h/ is striking among French-speaking learners of Dutch and English, since pronunciation, and particularly the phone /h/ is not explicitly addressed in the programmes of language teaching put forward by the Fédération Wallonie-Bruxelles (*Socles de Compétences : Langues Modernes*, 2016). This is not to say that learners would not get rectification from a teacher in terms of their own L2 pronunciation. However, learners not being provided with meta-linguistic tools might not help in understanding where their mistakes occur in their own perception and production of speech in the second language. To this end, the analytic-linguistic approach may provide useful tools for

learners to understand where things go wrong with the phone /h/, and what they could do in order to correct such an error. Useful and authentic input – and imitation of such input – combined with linguistic knowledge and meta-linguistic tools could maximise the understanding of the phone /h/ and when it should or should not be pronounced by the learners. However, according to the communicative approach, maximisation of knowledge would only truly happen while communicating with native speakers (Celce-Murcia et al., 1996) – in this case, of Dutch and English ; and avoiding pronunciation mistakes that could confuse the native speaker should be addressed and worked upon. This is particularly the case of phones that are significant in terms of meaning, such as the phone /h/. Moreover, learners being unable to distinguish phones from one another in the native speech of the target language causes a communication problem. As a matter of fact, communication is "hampered" when leaners fail to discriminate phones, or allophones, correctly (Elliott, 1997). This is also true on the side of native speakers; namely that native speakers sometimes have difficulty communicating with learners if the pronunciation of learners is lacking (Celce-Murcia et al., 1996), and even when pronunciation is not the main problem in L2 speech whilst communicating with natives (Johnson, 2012).

4.2. Errors, misunderstandings

As the goal of language learning is to gain, develop and improve learners' communication skills with native speakers, instead of attaining native-like pronunciation, L2 learners often speak with a foreign accent. As Selinker and Gass (2008) write that the native language of an L2 learner is often noticeable and retraceable to a particular accent. They continue, "in fact, nonnative speaker pronunciation is often the source of humor, as in the case of comedians mimicking particular accent types, or in cartoon characters adopting nonnative accents" (Gass & Selinker, 2008, p. 178). As a means of illustration, *#FRANGLAIS*, Paul Taylor's one-man show is based on how languages – in particular French and English – and the foreign accents associated with them are perceived by natives and learners alike (Taylor, 2020). To this end, he uses his own experience as a Brit living in France and his French native wife's experience living in Great Britain. Another video shows a job interview happening between two hiring managers and a French-speaking job applicant. Before the interviewee enters the room, the camera pans over the two employers with a bingo game in their hands. "If he drops an 'S', I get a point. If he drops an 'H', you get a point", one interviewer tells the other (Bagadiya, 2020). The video goes on with the interview containing common misunderstandings stemming

from the French-speaking candidate's mispronunciation of certain words, phrases and sentences. The video ends by the employer checking the last instance of *h*-omission to complete his bingo sheet and exclaiming: "Bingo!". About the *h*-omission still, a good example can be heard throughout Louis De Funès' films, most notably when he speaks English with a heavy French accent for comedic purposes: "You 'ave to come tout de suite!" ("You have to come right now!") (Oury, 1962, 2:04:21) or "'e speaks very well") (Girault, 1965, 0:29:43).

Studies on the acquisition of L2 pronunciation have emerged and proposed various theories how to teach pronunciation to learners. Some models consist in a system to help learners improve their L2 pronunciation in a way that is independent from their native language, while other models instead rely on the native language itself, creating a language-specific approach to a given target language. While systems that are L1-independent help learners with their pronunciation regardless of what their mother tongue is, research has shown that systems integrating the first language yields overall better results. In other words, learners perform better when introduced to a model that takes into account their already existing knowledge – this is to say, their native language – in order to tackle the second language (Witt, 2012). Witt adds that targeting a particular section where learners seem to encounter difficulty producing the correct L2 pronunciation also helps improving accuracy in the detection of pronunciation errors (Witt, 2012).

About mistakes in the second language, Lewis Johnson (2012) writes, "various kinds of errors can impede understanding and lead to misinterpretation, including problems with grammatical structures and vocabulary, unusual phrasing, or failure to conform to the pragmatic norms of discourse in the language" (Johnson, 2012, p. 37). Yet, while a lack of pronunciation is not listed as one of the determining factors that affect native speakers' comprehension of L2 speech the most, native speakers often misjudge their confusion and attribute poor understanding with poor pronunciation on the L2 speaker, even though pronunciation is not at the basis of the misunderstanding itself (Johnson, 2012). What Lewis Johnson also mentions is that, as a consequence of that type of misjudgement, pronunciation may gain more importance than it actually has in L2 speech. In fact, pronunciation is often used by native speakers of a language to differentiate who they would consider "good speakers" from "bad speakers" of their language (Elliott, 1997). Moreover, it has been found that an L1 listener has a better grasp on an L2 speaker's oral production if the former is familiar with the latter's foreign accent. In other words, intelligibility increases the more familiar a listener is with a given foreign accent (Browne & Fulcher, 2017). This puts pronunciation in a particularly important position, as L2

learners need to pay close attention to their pronunciation if they want to communicate efficiently with native speakers of their target language.

In this frame of work, errors in L2 speech, particularly errors in pronunciation, should be detected and corrected for the learners to improve on their skills. As stated before, since language is considered a tool to communicate with native speakers of a given target language, error detection and correction should also be done in order to develop and improve learners' communicative skills (Johnson, 2012). As such, error detection and correction should happen within the scope of promoting communication. However, pronunciation is not explicitly addressed in the programmes that have been published by the Fédération Wallonie-Bruxelles (*Socles de Compétences : Langues Modernes*, 2016), and therefore, (mis)pronunciation rarely has the opportunity to be addressed. One could argue that, because the current language teaching approaches prioritises intelligibility and communication with natives, pronunciation may have been placed second in the language teaching programmes in the French-speaking part of Belgium.

4.3. Explicitness

Explicit knowledge and explicit learning refer to a type of acquiring and mobilising one's knowledge with conscious purpose, making hypotheses, analyses, in order to understand and apply language structures (Gass & Selinker, 2008). As such, when learning a second language, it is often that explicit knowledge is gained, developed, and applied during an explicit learning process, with explicit instruction, rather than implicit knowledge is. Implicit knowledge, for that matter, is usually more tied to first language acquisition, since there is no intentional input processing when addressing implicit knowledge, or implicit learning.

As Ellis (2015) states, it seems to be the case that explicit knowledge in tasks that require learners to draw on their L2 knowledge can help reduce or even "inhibit" instances where transfers from the first to the second language might occur (Ellis, 2015, p. 142). However, this explicit knowledge might not help learners in tasks where they are required to be more spontaneous. As a matter of fact, learners, while performing spontaneous tasks, tend to draw on the knowledge they master – i.e. the knowledge they acquired very early on in their target language, or else, the knowledge they have of their native tongue. Therefore, transfers occur more often, even if the learners have acquired some explicit knowledge about the target language (Elliott, 1997; Ellis, 2015). As such, explicit knowledge can be overwritten during

spontaneous, oral tasks. As a matter of fact, Elliott mentions in his study that errors stemming from L1-to-L2 transfers are more frequent in running speech than in isolated words, and they are more frequent in casual speech than in formal speech (Major, 1987, as cited in Elliott, 1997). On the subject of the nature of knowledge, it is to be considered a continuum, in the sense that explicit knowledge can become implicit via explicit instruction given by the teacher (language practice, drills, repetitions, corrective feedback, metalinguistic explanations, etc.) and explicit learning initiated by the students. Likewise, explicit instruction can render implicit knowledge explicit, so as to make students focus on particularities of the target language (Gass & Selinker, 2008). Explicit instruction within the scope of the communicative approach has shown to yield improvement in pronunciation among English-speaking learners of Spanish (Elliott, 1997).

On the matter of corrective feedback, which is a form of explicit instruction, it can be stated that it has a positive effect on the acquisition of a second language. It helps the learners in better acquiring a target language. As a matter of fact, Ellis mentions that a group of learners receiving corrective feedback showed improvement over learners who didn't receive corrective feedback (Saito & Lyster, 2012 as cited in Ellis, 2015), showcasing the effectiveness of explicit instruction in language teaching and learning. Learners who received corrective feedback showed a broader range in vocabulary, a higher accuracy in pronunciation as well as improved grammatical skills and a better understanding of pragmatics (Ellis, 2015; Gass & Selinker, 2008). Surrounding the phone /h/, while this is not the subject of the present dissertation, further research could shed light on how effective explicit instruction – corrective feedback among others – could be for French-speaking learners of Dutch and English in their acquisition of this phone. As a matter of fact, research on this subject could put into perspective in what ways the phone /h/ is most easily acquired by French learners of Dutch and English. Combined with a study that stretches over a period of time – it could be as long as a classic secondary school programme, i.e. six full academic years, or a couple of years for closer monitoring – this could help develop better strategies for the teaching and learning of the phone /h/ by French-speaking secondary school pupils who are learning Dutch and English as first or second foreign languages.

However, while explicit instruction can help in acquiring a second language at a faster rate and with a higher accuracy, Ellis mentions that the learners' aptitudes remain a crucial element during the learning process, and it is uncertain whether instruction can help bridge the gap of discrepancies between learners' aptitudes. As a matter of fact, according to Ellis, "some

abilities (for example, phonological ability and memory) are important in both implicit and explicit learning" (Ellis, 2015, p. 56). Hence, while learning pronunciation explicitly could help learners in their abilities to produce sound accurately – particularly in their pronunciation of the phone /h/ – it is to be noted that sound production skills remain very variable and unpredictable, varying from learner to learner, which Fayt and his colleague Heeren pointed out in their research (Fayt, 2016; Fayt & Heeren, 2018).

For that matter, stances on explicit instruction and the results it yields are divided. One example of this is Kissling being critical about explicit instruction in her paper. She researched whether learners' pronunciation could be improved through explicit instruction, writing that the expectations were positive, based on the literature (Kissling, 2013, p. 734). The results of her study do not corroborate that. In fact, the only factor that influences the improvement in pronunciation was time; Kissling concluding that the test subjects showed an improvement in their pronunciation only during a short timespan after following instructions, whether explicit or not. She writes:

> [T]he data did not suggest that the phonetics instructions provided any advantage in the production test […]. The only effect that reached significance for almost all phones and for the aggregate test was the main effect of time, which indicated that learners in both instructional conditions improved their pronunciation of most phones immediately following instruction (Kissling, 2013, p. 734).

In this line of work, Kissling mentions Elliott (1997) in the results of her study, clarifying why the pronunciation of some phones among her test subjects did not improve. As a matter of fact, she states that some phones remain resistant to instruction based on the Markedness Differential Hypothesis (Eckman 1977). This is correlated by Elliott in his study, he writes:

> The lack of improvement of these features might be explained by Eckman's Markedness Differential Hypothesis (1977). Assimilatory processes are marked and occur more frequently in Spanish than in English in syllable and word-final position. […] [T]hat would make these Spanish sounds harder to master for English speakers (Elliott, 1997, p. 102).

Furthermore, both Elliott and Kissling make remarks on the spelling impeding learners from correctly producing phones (cfr. Barrios et al., 2016), most notably, the acquisition of the letter *v* that is pronounced similarly as the letter *b* in Spanish. Learners whose native language use the phone /v/ to discriminate meaning (among others, French, English and Dutch), seem to experience trouble equating the letter *v* to a [b] (Elliott, 1997; Kissling, 2013)

As a conclusion, while explicit instruction may help learners with their pronunciation in the target language, one should be aware that explicit instruction might in fact not help with the pronunciation of some phones or phenomena (like assimilation) (Elliott, 1997; Kissling, 2013), since those are resistant to explicit instruction due to markedness constraints. Further research

should be done on the production of the phone /h/ in English and Dutch. While the phone /h/ is not the most reoccurring consonant in the Dutch language (Luyckx, Kloots, Coussé, & Gillis, 2007), markedness constraints might still apply and make the acquisition of this phone harder for French-speaking learners.

4.4. Word stress, sentence accent and linking sounds

"So, words like *happiness* turn into *appiness*, which sounds like *a penis*, and things get very awkward very quickly between the both of us" (Taylor, 2019). The main reason why this sort of confusion can happen in the first place, is not only due to the *h*-omission, but also to the L1-to-L2 transfers; in this case, the native French word stress and sentence accent is being transferred into English. Hence, this puts the teaching of word stress and sentence accent in a peculiar position.

In her book *The Teaching of Pronunciation: A Classroom Guide*, Haycraft suggests practicing word stress and linking words together as a remedy for the *h*-omission and the *h*-insertion (Haycraft, 1971). This overcompensation is also addressed by Fayt and Heeren in their research paper (Fayt & Heeren, 2018).

To this end, French-speaking learners of Dutch and English should understand in what ways English and Dutch speech differ from French speech. On the subject of linking words together, the author of the present dissertation would also present linking sounds between clashing vowels in Dutch and English, theorising that teaching linking sounds to French natives learning Dutch and English could be beneficial, particularly with the *h*-insertion.

On the matter of word stress, several fundamental differences between the three languages are briefly explained in the educational book *Uitspraakleer Nederlands voor Franstaligen* by Rasier and Hiligsmann. As a matter of fact, they clarify the differences between the Dutch (and English) system and the French one in terms of prosody, pedagogically laying out the general ground work for learners of Dutch to understand the structure of the prosody (Hiligsmann & Rasier, 2012) and explaining differences between syllable-timed rhythm and stress-timed rhythm in languages. With the syllable-timed rhythm, Abercrombie lays out that the rhythm between syllables remain equal; as such, the syllables are isochronous (Abercrombie, 1992, p. 97). Hiligsmann and Rasier write about *lettergreepisochronie* ("syllable-isochrony") (Hiligsmann & Rasier, 2012, p. 92). They cite several languages, French, among others. Meanwhile, languages that are characterised by stress-timing showcase an equal interval of

time, not between syllables, but rather between stressed syllables. As such, it is the stressed syllables that are isochronous. Examples of this type of rhythm include Dutch, English and Russian, which are also cited in Hiligsmann and Rasier's book (Abercrombie, 1992, p. 97; Hiligsmann & Rasier, 2012, p. 91). Hiligsmann and Rasier add to this that with stress-timing, the number of unstressed syllables between two stressed ones should not be regarded as an influencing factor in the length of the interval separating two stressed syllables, as there is, what they label as *klemtoonisochronie* ("stress-isochrony"), and unstressed syllable are in fact often reduced or merged to respect the stress-timing (Hiligsmann & Rasier, 2012, p. 91).

On the matter of word stress as such, Hiligsmann and Rasier illustrate that French on the one side, and Dutch and English on the other, remain different in their handling word stress. In French, word stress is invariable, namely that it always falls onto the last syllable that does not contain a schwa, while word stress in both Dutch and English is variable (Hiligsmann & Rasier, 2012) – compare the following pair of words in English: *photograph*, *photographer*. In the former, the word stress falls on the first syllable, while in the latter, the stress falls on the second. Differences in meaning can also arise from word stress in English. Compare the following homographs that are spelt *present* and *suspect* ('Present', 2021; 'Suspect', 2021). In the case of those words being the nouns *present* /ˈpɹɛz(ə)nt/ and *suspect* /ˈsʌspɛkt/ the accent falls on the first syllable, in which case they respectively refer to a gifted object and a person. In the case of those words being the verbs *present* /pɹɪˈzɛnt/ and *suspect* /səsˈpɛkt/, then the accent falls on the second syllable, in both cases describing actions. In Dutch, such distinction with word stress, although not quite a frequent as in English is also present in language: the word *voorkomen* has two different meaning based on the word stress falling on the first or the second syllable ('Voorkomen', 2021). On the one hand, if the stress falls on the first syllable, *vóórkomen* as a noun means "the appearance of something or someone". The verb *voorkomen* /vo:rko.mə(n)/ also showcases a word stress on the first syllable and has among other meanings: "to happen, to exist, to appear (in court)". In this case, the verb is also *scheidbaar* ("splitable"), which means that the particle *voor* can be separated from the root verb *komen* in the following sentences: *De zaak komt voor op 2 mei* ("The affair is to appear in court on May 2nd.") and *Wolven komen ook voor in Nederland* ("Wolves also exist in the Netherlands"). On the other hand, if the word stress falls onto the second syllable, *voorkomen* /vo:rˈko.me(n)/ only occurs as a verb and carries an entirely different meaning, "to prevent, to make sure something does not happen". In this case, the verb is not *scheidbaar* and only occurs in full form, as illustrated in the following sentence: *Ze probeerde het ongeluk te voorkomen* ("She tried to prevent the

accident"). As such, word stress in Dutch does not only have semantical impact like it does in English, but it also has morphological and syntactic impact, since it can change both word and sentence structure.

Since Haycraft states that linking words together is important in order to avoid producing an intrusive *h*, one should be aware of how sentence structure is organised in French compared to English and Dutch. With that, Hiligsmann treats briefly on the subject of accent in a sentence. A phenomenon that pertains to the Dutch and English language is the possibility of a speaker to make more prominent one or several parts of a sentence in case the speaker desires to emphasise (Hiligsmann & Rasier, 2012). An example given by Hiligsmann and Rasier: *Je zou alles op school moeten leren* ("You should learn everything at school") compared to *Je zou alles op school moeten leren* ("You should learn everything at school"). In the first sentence, the interlocutor puts emphasis on the place that is best suited to learn things, whilst in the second, the interlocutor puts emphasis on the content to be learnt (Hiligsmann & Rasier, 2012, p. 164). The same is done in English with the Emphatic Accent (Culicover & Rochemont, 1983; Saito, 1984): *I've left the yellow hat in the room*, contrasted with *I've left the yellow hat in the room*. In the first sentence, the interlocutor puts emphasis on the object which has been forgotten in the room, while the in the second, it is more about the particularity of that object being forgotten; As Saito puts it, a possible follow-up could be: *not the purple one* (Saito, 1984, p. 36). In contrast with this, the French language does not make use of accent in a sentence to bring emphasis to one of several parts in a sentence; instead, syntactic structures are put in place for emphasis. The following example can be used a means of illustration: the unstressed structure *Je l'ai fait* ("I did it.") cannot emphasise the subject as **Je l'ai fait*, instead the sentence is rearranged as *C'est moi qui l'ai fait* (litt. translation: "It is I who did it"). Compare this to the Dutch and English translations: *Ik heb het gedaan* and *I did it* can both place the emphasis on the subject without modifying the sentence structure: *Ik heb het gedaan* and *I did it*.

Yet, while the understanding of word stress and sentence accent is of crucial importance to learners of Dutch and English in order to link words together, it can be argued that it is essential that learners also learn to link sounds on a more basic level, in order to not produce the intrusive *h*, Fayt and Heeren reporting that [h] has been inserted in both the minimal pairs task and the reading task (Fayt & Heeren, 2018). On the matter of gliding sounds in English, those occur "when two vowels locally adjacent but heterosyllabified within words or across word boundaries" (Lee, 2018, p. 89). With the word *heterosyllabified*, Lee refers to vowels that are

in direct vicinity of each other while belonging to a different syllable. This is not the case of diphthongs, in which vowels also follow one another within the same syllable structure. Compare *point* /pɔɪnt/, in which the orthographic *o* and *i* belong to the same vowel, with *hiatus* /haɪɛɪtəs/, in which the orthographic *i* and *a* are not in the same syllable. In order to make speech easier, strategies are developed and used by English speakers, learners and natives alike. In English, these two strategies include glide insertions with the [j], [w] and [r], sometimes called the intrusive *r*, or a glottal stop (Lee, 2018). Examples of glide insertions include *triumph* [tɹaɪʲʌmf], *fluid* [fluːʷɪd] and *law and order* [lɔːˈəndɔːdə]. For the last example, glottal stops are also a possible insertion in order to deal with adjacent, heterosyllabified vowels, as in *triumphant* [tɹaɪʔʌmfənt], and *aorta* [ɛɪʔɔː(ɹ)tə], for example (Lee, 2018, p. 96).

Compared to the two strategies used in English to make pronunciation smoother and faster, Dutch uses gliding sounds within words and glottal stops when two Dutch vowels clash but are part of different constituents (Hiligsmann & Rasier, 2012, p. 62). Unfortunately, gliding sounds in Dutch are not discussed extensively by Hiligsmann and Rasier (2012), who mention in their book *Uitspraakleer Nederlands voor Franstaligen* that the most reoccurring *overgangsklanken* (i.e. "transitional sounds", sounds that help with the pronunciation of the clashing vowel sounds) are the [j]-sound and the [w]-sound, in words like *accentueren* [ɑksɛntyʷe.rən] ("to stress, to emphasise") and *biograaf* [biʲoɣra.f] ("biographer") (Hiligsmann & Rasier, 2012, p. 62). They state that a [j] linking sound is to be inserted after [i] and [e] sounds that are followed by any vowel within a word. As for the [w] linking sound, they write that it occurs in words before any vowel preceded by [u] and [y]. As for glottal stops, the authors write that those are used between clashing vowels pertaining to different constituents (compounds or derivation). However, the examples they give do not use the same clashing vowels and it is therefore difficult to compare both categories. This assertation is challenged in the experimental part (cfr. sections 5-9) in an attempt to facilitate pronunciation among learners of Dutch by applying the English model to it. As a conclusion, gliding sounds and glottal stops used to facilitate transitions from one sound to another might be helpful for learners when confronted with clashing vowels. They could, for instance, reduce the tendency to of French learners to use the intrusive *h*. However, to the author's best knowledge, extensive research is yet to be carried out on that subject. Further research could, in fact, confirm whether glide insertions are useful to learners, regardless of their first language.

Experimental Section

5. Research question and objectives

Both English and Dutch are taught as foreign languages in secondary schools – and sometimes in primary schools – in Belgium. Once the pupils have completed their education up to the last year of secondary school, it is expected that they be able to understand their target foreign language(s), as well as speak and write in one or both languages. The fluency and language skills that are required to be reached at the end of each year depend on criteria that are established in the official programmes provided by the Fédération Wallonie-Bruxelles for education and in language courses provided by the teachers themselves.

A recurring problem seems to occur when French-speaking learners of Dutch and English orally produce words or sentences in one or both target language(s). As a matter of fact, some learners tend to either add a phone [h] where it is not required, or they tend to not produce it at all where it is in fact required. As stated before, an example in English combining both phenomena could go as follows, according to Haycraft: "Are you in a hurry" becomes *"[h]are you [h]in a urry" (Haycraft, 1971, p. 98). It is important to analyse both contexts in which those phenomena happen in order to propose ways to correct this pronunciation problem. The research questions to answer in this dissertation are:

1. Is the phonemic context around the [h] impactful on the pronunciation of learners?
2. Is transfer from the mother tongue a cause of a *h*-omission? Do learners not pronounce the orthographic *h* because it is not pronounced in their mother tongue, i.e.: French?

After reviewing the various aspects of second language acquisition, questions tied to L2 pronunciation remain unanswered. The literature, while enlightening on diverse subjects that are related to sound perception and production, only provides insight and clues to concrete answers up to a limited extent. Why French speakers tend to remove the phone /h/ can be explained through various theories that are accounted for in the state of the art. However, errors like the intrusive *h* have yet to be researched, according to the author's knowledge at the time of writing the dissertation.

Several hypotheses are researched in this dissertation. Firstly, the *h*-omission might – partly or fully – stem from a transfer from the first to the second language of learners, since the *h*, while being orthographically present in the French language, is phonetically absent from it. This is not the case in Dutch and English, where the *h* is generally pronounced whenever it occurs orthographically, though exceptions exist where the *h* is silent (cfr.: the English words *honest*

and *heir* and the Dutch words *hors d'oeuvres* and *honneurs*, all of which are of French origin). As a consequence, the phone /h/ may not be produced by French-speaking learners in the target language. Since, according to Fayt and Heeren, contexts of *élision* and *liaison* do not impact the omission of the /h/ (Fayt & Heeren, 2018), this dissertation solely focuses on the orthographic *h* as such, written into various contexts. It is expected that the test subjects omit pronouncing the orthographic *h* more frequently in the second part than in the first part of the production task, and [h]-production in the second column of the first part of the production task (i.e., minimal pairs) is expected to be the highest.

Since the /h/ is a significant phoneme in minimal pairs, in both English (*high/eye*) and Dutch (*hoor/oor*), learners should be made aware that omitting an [h] – or adding one – might contribute to confusion when orally communicating in the target language. By testing the pronunciation of the phone /h/ in minimal pairs, it is expected to elicit more production of the phone *h* than in contexts where there are no minimal pairs. The hypothesis behind this follows what Fayt and Heeren have obtained as results in their paper concerning the production of the phone /h/ among French-speaking learners of Dutch: minimal pairs encourage test subjects to produce a higher number of [h] since it carries an increased semantic value (Fayt & Heeren, 2018). For this reason, expectations for the minimal pairs task are that the test subjects obtain a higher score by more accurately producing [h].

On the addition of [h], it is hypothesised that it might stem from a sort of hypercorrection among the learners, according to Hiligsmann and Rasier (Hiligsmann & Rasier, 2012). One interpretation of this is that, while the learners are aware that the phone /h/ does not exist in French, they might try to compensate by unnecessarily adding an [h], sometimes even resulting in a change in meaning (Fayt & Heeren, 2018). This observation is made by Hiligsmann and Rasier in their book *Uitspraakleer Nederlands voor Franstaligen*; namely that learners also insert an [h] in words whose first syllable starts with a vowel and is followed by an orthographic *h* (Hiligsmann & Rasier, 2012) – this is being tested in the present dissertation. The third column of the first part of the production task is expected to yield intrusive *h* through hypercorrection, thus testing Hiligsmann and Rasier's hypothesis. On top of that, *h*-omission is also expected to occur in that column, mostly due to the L1-to-L2 transfer phenomenon.

A second hypothesis that this dissertation introduces concerning the intrusive *h*, is namely that there may be a pronunciation difficulty for French-speaking learners of English and Dutch in certain cases. For example, adding an [h] between two clashing vowels in "Do you *[h]eat" might be learners' way to deal with certain cases of difficult pronunciation of vowels.

Expectations for the first column are that intrusive *h* is inserted between clashing vowels as a means of facilitating pronunciation, as a buffer. It is not expected that the test subjects produce glottal stops, since they most probably are not aware of this possibility to transition from vowel to vowel. In English, *r*-insertion is not expected either when encountering words or phrases in which a schwa [ə] or an [ɔ] is directly followed by another other vowel (Lee, 2018), because it is assumed that the test subjects are not aware of the *r*-insertion phenomenon.

As suggested by Haycraft (1972) in her book, actively teaching linking sounds, word stress and speech pattern might help correct such errors in pronunciation (Haycraft, 1971). As a matter of fact, helping pupils become aware of both phenomena surrounding the letter *h* might help them with perception early enough for them to correct any occurring errors in their pronunciation, particularly if this is paired with explicit instruction (Meritan & Mroz, 2019). For this reason, raising the learners' awareness around the phone /h/ might be a possible way for them to correct this slip in pronunciation. However, this point is not studied in this dissertation and remains to shed light on with further research.

Concerning the second part of the production task, the expectations are that *h*-insertion is more prevalent than in the first part, due to connected speech posing pronunciation problem for French-speaking learners in terms of fluency and intonation, as observed by Haycraft and Fayt and Heeren (Fayt & Heeren, 2018; Haycraft, 1971). It is also expected that more instances of *h*-omission are observed. For the perception task, it is expected that pupils scoring badly on the production task might also have difficulty in perceiving the phone /h/ accurately. Overall, following Fayt's observations, it is expected that pupils perceive this phone better in the first word of a minimal pair contrasting a phone /h/ with an empty onset (Fayt, 2016).

6. Methodology

In order to carry out an analysis concerning the errors on pronunciation concerning the phone /h/, perception and production of test subjects are to be analysed. For the translations of the instructions given on paper to the test subjects, refer to appendices 10 and 11.

The experiment consists in two main parts: a production task and a perception task. The former task is carried out before the latter so that the pupils who are interrogated do not to realise in any straightforward way that the test has been constructed based on the phone /h/. This production task is recorded so that each of the test subject's pronunciation of the phone /h/ can

be analysed. In order to confirm if there is any existing bias in the first part of the experiment, a question is asked to the test subjects at the end of the production task to check if they are aware of what aspect of pronunciation the test is being studied. There are no expectations concerning the answers to this question; answers are expected to vary on an individual basis, the test subjects exhibiting various degrees of awareness around the pronunciation of their first foreign language. However, asking this question towards the end of the first part of the experiment could confirm an already existing bias for the second part of the experiment, which is a perception task in the form of a listening exercise. After the pupils have filled in the table when they hear or do not hear an /h/, the same question is asked to the test subjects if they could guess what aspect of pronunciation is being studied. Since the instructions are clearly stated that the test subjects should pay attention to any /h/, it is highly expected that the subjects give an answer related to the phone /h/ in an overwhelming majority the cases.

As for the more detailed structure of the experiment (see sections 6.1 and 6.2), the production task consists in two parts; the first part checks the pronunciation of the test subjects on a smaller scale. It includes standalone words, minimal pairs, nominal and verbal groups (see sections 6.1.1 and 6.2.1). The test subjects are told that they are recorded for research purposes and are given a couple of minutes to prepare themselves for the reading exercise. At any point during this exercise can the test subjects ask for the meaning of the words that they are asked to read. However, no indication should be given concerning the pronunciation of the entries, since this could create a bias in the results. The first column contains words with clashing vowel sounds. This is meant to monitor whether the test subjects insert an intrusive *h* between clashing vowels. In the English version, the first column made of words and nominal phrases as well as verbal phrases that contain clashing vowels were specifically chosen to understand whether the test subjects insert an [h] where gliding sounds [j], [w] and [r] should be used instead. In the English version, all examples were taken from the article “English Vowel Hiatus and Consonant Epenthesis” by Minkyung Lee (Lee, 2018). There are a total of 13 examples of vowel-clashing and glide-insertion in the first column; the gliding *j*-insertion goes from *hiatus* [haɪʲɛɪtəs] until *I enjoy it* [aɪʲɛndʒɔɪʲɪt], counting five examples, the *w*-insertion from *doing* [duːʷɪŋ] to *new image* [njuːʷɪmɪdʒ], counting four examples and the glottal stops from *idea of* [aɪdɪəʔɒf] to *awe-inspiring* [ɔːʔɪnspaɪɪŋ]. In the Dutch part of the production task, examples of words that could use [w] as a linking sound range from *continueren* [kɔntinyʷe.rən] (“to keep on doing something”) to *autoalarm* [ɔutoʷɑlɑrm] (“car alarm”). Words candidates for a *j*-insertion range from *reünie* [re.ʲyni] (“meeting”) to *zij-ingang* [zɛi.ʲɪŋɣɑŋ] (“side entrance”),

counting four examples. While the insertion of glides between two constituents is not a phenomenon that is being done in Dutch, the clashing pairs of vowels that could admit such linking sounds are investigated whether they are problematic transitions for the test subjects. The linking sounds [j] and [w] are nonetheless proposed as mere strategies for learners to not insert [h], in case they produce one. This first column also contains possibilities to apply possible linking sounds in between those vowels that do not cannot admit either one of the glides as proposed by Hiligsmann and Rasier (2012), since not all the words that have been chosen for the Dutch part of the survey exactly fit with the criteria for the insertion of the phones [j] and [w] as established by the authors of *Uitspraakleer Nederlands voor Franstaligen*. Words that could possibly admit a glottal stop range from *ongeacht* [ɔnɣəʔɑxt] ("regardless") to *beïnvloeden* [bəʔɪnvludə(n)] ("to influence"). Considering that no category has been officially set for a glide between the phone /o/ and other vowels, the English model is being applied, therefore classifying it under the [w]. While intrusive *h* production is expected in the first column, it also highly depends on how the test subjects deal with clashing vowels; whether they produce linking sounds, glottal stops or intrusive *h.*

As for the second column, it contains a total of 13 minimal pairs, 5 entries contrasting the presence of the letter *h* with its absence such as *aan-haan* and *air-hair*, 3 entries contrasting another consonant with the *h*, such as *heel-veel* and *feat-heat*, and 2 entries contrasting the lack of an onset – in this case, the word starts with a vowel – with another consonant than the *h*, such as *boog-oog* and *odd-cod*. The remaining 3 entries are used merely as "distractors", so that the students are not solely focused on the phone /h/. These distractors are not taken into account in the results of the production task, since they do not start with either an orthographic *h*, or a vowel. Examples of these pairs are: *rash-bash* in English and *daar-naar* in Dutch. The expectations for this column are that omission and insertion occur less frequently compared to the third column.

Finally, the third column is testing Hiligsmann and Rasier's hypothesis on the intrusive *h*: a word starting with a vowel, the next syllable starting with an orthographic *h* likely triggers intrusive *h* before the vowel. In other words, the test subjects might start the word or phrase with an [h] followed by a vowel instead of a vowel on its own – *aanhalen* /a.nha.lə(n)/ ("to mention") and *inhouden* /ɪnhɔudə(n)/ ("to contain") would respectively be produced as *[ha.nha.lə(n)] and *[hɪnhɔudə(n)] (Hiligsmann & Rasier, 2012, p. 63) in Dutch. Other expected results are: *[ha.na.lə(n)] and *[hɪnɔudə(n)], in which the [h] is misplaced. It is also considered that this type of context might create another scenario: the test subjects might omit

the phone /h/ altogether. This would mean that the production of the word *aanhalen* and *inhouden* could result in *[a.na.lə(n)] and *[ɪnɔudə(n)]. For the English part, the same phenomenon of either *h*-omission and *h*-insertion are highly expected. Words like *inherit* /ɪnhɛɹɪt/ and *exhale* /ɛkshɛɪl/ are expected to be produced as *[ɛksɛɪl] and *[ɪnɛrɪt] with *h*-omission, as *[hɛkshɛɪl] and *[hɪnhɛrɪt] with *h*-insertion (Hiligsmann and Rasier) or as *[hɛksɛɪl] and *[hɪnɛrɪt] both omission and insertion. Following Hiligsmann and Rasier's theories, the expectations for this column are that it yields the highest number of insertion in the first part of the production task.

The second part of the production task consists in reading 16 sentences aloud. These sentences contain part of the entries from the table the test subjects have to read from beforehand so that the test subjects are more accustomed to the exercise – as well as other case studies that meet the criteria for the hypotheses concerning the phone /h/. This second part of the pronunciation test mirrors the first part with the smaller entries in the sense that the test subjects are given a couple of minutes to skim through the sentences, in order to be prepared for the reading. They may also ask for the meaning of one or more sentences, should they require additional information. However, as mentioned before, no information concerning the pronunciation should be given so as to not create a bias in the results. At the end of this second part of the first task, the test subjects are asked to answer the question whether they could figure out which aspect of pronunciation the study focuses on. The sentences in the second part of the production task are expected to yield higher numbers of both omission and insertion than the words and small constituents in the first part.

The second part of the study focuses on the listening exercise. To this end, native speakers of Dutch and English have been recorded to read the minimal pairs in a different order than they appear in the second column of the first part of the production task, which the test subjects have taken beforehand. In order not to lead the pupils into filling in the perception task with a bias, the order of the minimal pairs has been altered, both on the pair order level, as well as on the word order in a minimal pair. Moreover, the perception task does not contain the written minimal pairs, but it is indicated through letters from A to M; the pairs are indicated by the numbers 1 and 2. Since instructions are explicit ("Can you hear an *h*? Indicate which number you hear an *h*, or scrap the number in which you do not hear an *h*."), it is expected that the test subjects pay close attention to the phone /h/ during the exercise and consequently produce high scores. A similar question on awareness had been designed for the pupils to answer at the end of the perception task. However, this question was later not asked to be answered, since the

explicitness of the task being was considered too straightforward (cfr. section 8). The perception task is linked back with the production task through the number that the test subjects have been assigned to at the beginning of the experiment. As a consequence, should a test subject perform poorly on the production task, the results on the perception task might help understand whether or not perception is at play, since perception precedes production (Ellis, 2015), and accurate perception is required for the correct production of sounds (Escudero, 2007). For the perception task, it is expected that pupils scoring badly on the production task might also have difficulty in perceiving the phone /h/ accurately.

In order to have an accurate report of statistics, rates of *h*-omission, *h*-retention and *h*-insertion are counted by the author of the present thesis. The total number of production of the phone /h/ is calculated according to English and Dutch grammar surrounding *h*, with the help of various online dictionaries (*The Macmillan* for English, the *Van Dale* for Dutch). The cases of *h*-omission are therefore calculated from that total number of /h/ that should be produced if no errors are committed. The number of *h*-retention, for that matter, is the number of /h/ that should be produced without mistakes, minus the number of [h] that is omitted by the test subjects. In other words, it is the effective production of this phone by the test subjects.

On a specific case of *h*-omission in Dutch, it is to be mentioned that Hiligsmann and Rasier argue that the unstressed defined determiner *het* /hət/ (“the”) is pronounced as [ət] (Hiligsmann & Rasier, 2012). It is most probable that the test subjects in the secondary school environment have not learnt about this particular reduction. Additionally, since the test subjects variably pronounce *het* in their sentences, the production of the [h] in this word is taken into account. Consequently, if the test subjects omit pronouncing the phone /h/, it is counted as an occurrence of *h*-omission in the word *het.*

As for the total count of *h*-insertion, it is executed using the hypotheses of the clashing vowels, the minimal pairs and the theory of Hiligsmann and Rasier regarding the intrusive *h* (Hiligsmann & Rasier, 2012). Other types of insertion are counted, even if they do not occur in the predicted locations. For this matter, insertion occurring in places that are unaccounted for, make the rate of insertion rise significantly. While cases of insertion are visible in the first part of the production task, it is much more apparent in the second part in which the test subjects read sentences. For this reason, the second part of the production task in each language showcases a much higher rate of insertion, since the test subject produce [h] in locations unaccounted for (cfr.: sections 7.1.1 and 7.2.1).

6.1. Test subject handout: Dutch

6.1.1. First part of the production task: Words

Langue : Néerlandais **Élève n°**

Lis les mots ci-dessous.

Continueren	Daar - haar	Iets afhakken
Zoiets	Uur - duur	Iets omhoog houden
Domino-effect	Eerlijk - heerlijk	Een eenheid
Autoalarm	Heel - veel	Iemand ophalen
Ongeacht	Daar - naar	Iets aanhebben
Na-apen	Hoor - oor	Een eihoofd
Gala-avond	Bad - kat	Iets afhalen
Beëindigen	Waar - maar	Uitheemse bloemen
Beïnvloeden	Oog - hoog	De engheid van iets
Reünie	Hand - tand	Iets uithalen
Café-eigenaar	Eet - heet	Ophouden met iets
Mini-emmer	Boog - oog	Een eekhoorn
Zij-ingang	Haan - aan	Iets aanhalen

6.1.2. Second part of the production task: Sentences

Langue : Néerlandais **Élève n°**

Lis les phrases ci-dessous.

1. Ik heb het meerdere keren aangehaald: je hond zal je houding na-apen, je moet daarmee opletten.
2. Helaas zingt de zangeres niet in harmonie met het koor.
3. Ik voel dat we bij elkaar horen, ongeacht de uitkomst.
4. Ik heb haar moeten tegenhouden.
5. Eerlijk gezegd vind ik haar helemaal niet aardig.
6. Hoe oud ben je? Ik ben achttien jaar oud.
7. Wij hebben een mooi huis met acht slaapkamers.
8. Je zou aandacht moeten hechten aan je uitspraak.
9. De zijtakken afhakken houdt de bomen gezond.
10. De leraar zal de les grammatica beëindigen en continueren met een les Nederlandse woordenschat.
11. De haan kraait elke dag rond vier uur ’s morgens.
12. Oog om oog, tand om tand.
13. Het vlindereffect is een soort domino-effect, het kan heel veel gebeurtenissen beïnvloeden.
14. We komen aan rond acht uur ’s avonds. Kom je ons ophalen?
15. Zoiets was mij nooit overkomen.
16. Uitheemse bloemen zou je moeten uithalen omdat die het lokale ecosysteem kunnen vernietigen.

Dans cette première partie du test, sur quel aspect de la prononciation penses-tu avoir été interrogé.e? _____

6.1.3. Perception task

Langue : Néerlandais **Élève n°**

Est-ce que tu entends un ‘h’ ? Le chiffre 1 correspond au premier mot qui est prononcé, le chiffre 2 correspond au deuxième mot qui est prononcé. Biffe le chiffre si tu n’entends pas de ‘h’, ou encercle-le si tu en entends un.

Mots	**Est-ce que j’entends un ‘h’ ?**
A.	1 ---- 2
B.	1 ---- 2
C.	1 ---- 2
D.	1 ---- 2
E.	1 ---- 2
F.	1 ---- 2
G.	1 ---- 2
H.	1 ---- 2
I.	1 ---- 2
J.	1 ---- 2
K.	1 ---- 2
L.	1 ---- 2
M.	1 ---- 2

Dans ce test d’audition, quel est l’aspect de la langue qui a été étudié, selon toi ?

_____

6.2. Test subject handout: English

6.2.1. First part of the production task: Words

Langue : Anglais **Élève n° :**

Lis les mots ci-dessous.

Hiatus	Odd - cod	Enhance something
Triumph	Here - ear	Unhip trends
Hierarchy	Rank - hank	An eyehole
See Ed	Row - bow	An unholy relic
I enjoy it	Mouse - house	Exhaust fumes
Doing	Told - old	An inhaler
Fluid	Feet - heat	Inhale - Exhale
You eat	Rash - bash	Inherit something
New image	Itch - hitch	An unhappy man
Idea of	Eight - hate	An airhole
Visa office	Bold - mold	Uphold a tradition
Law and order	Hall - all	An inhuman character
Awe-inspiring	Air - hair	A few miles ahead

6.2.2. Second part of the production task: Sentences

Langue : Anglais **Élève n° :**

Lis les phrases ci-dessous.

1. He is blowing air through the airhole.
2. Space X has enhanced its rockets; but it still needs to work on how to reduce the exhaust fumes.
3. I hate the idea of hierarchy and law and order.
4. Have you heard about Harry? – Who do you mean? Harry Potter?
5. How old are you? I am eighteen years old.
6. Do you eat healthy food?
7. Last year, I inherited grandma's fortune when she passed away, and this makes grandpa unhappy, because he wanted to have it all.
8. I accidently overheard his conversation with her.
9. He has a habit of biting his nails.
10. I had a happy childhood.
11. What are you doing here? Are you in a hurry?
12. When you feel anxious, inhale deeply and slowly exhale – use an inhaler if you need to.
13. I see Ed has damaged his hair because of the heat.
14. Elisa told me that the criminal was apprehended in his own house.
15. Bungee jumping? I enjoy it very much.
16. Thomas has a skin rash, it is itchy.

Dans cette première partie du test, sur quel aspect de la prononciation penses-tu avoir été interrogé.e? _____

6.2.3. Perception task

Langue : Anglais **Élève n° :**

Est-ce que tu entends un *h* ? Le chiffre 1 correspond au premier mot qui est prononcé, le chiffre 2 correspond au deuxième mot qui est prononcé. Biffe le chiffre si tu n'entends pas de *h*, ou encercle-le si tu en entends un.

Mots	**Est-ce que j'entends un *h* ?**
A.	1 ---- 2
B.	1 ---- 2
C.	1 ---- 2
D.	1 ---- 2
E.	1 ---- 2
F.	1 ---- 2
G.	1 ---- 2
H.	1 ---- 2
I.	1 ---- 2
J.	1 ---- 2
K.	1 ---- 2
L.	1 ---- 2
M.	1 ---- 2

Dans ce test d'audition, quel est l'aspect de la langue qui a été étudié, selon toi ?

_____

6.3. Participants

The target demographic group for analysis consists in secondary school pupils who are learning Dutch and English as foreign languages at school. All pupils are in their last year of secondary school. Since the study focuses on the last year of secondary education, no mean age was taken into account when collecting the recordings. Instead, the focus lies in that the pupils are in their last year of secondary education. For the dissertation, pupils from two schools were interrogated, both of which are situated in the province Hainaut, and more specifically in the city of Tournai. These are the Collège Notre-Dame and the Athénée Royal Jules Bara. In each school, two classes were interrogated, one with pupils who had chosen English as a first foreign language and one with pupils who had chosen Dutch as a first foreign language. The distribution of pupils in both schools is the following: 23 pupils for Dutch and 21 pupils for English in the Collège Notre-Dame de Tournai as well as 12 pupils for Dutch and 23 pupils for English in the Athénée Royal Jules Bara. This makes a total of 35 pupils that were interrogated for the Dutch part of the experiment and 43 that were interrogated for the English part. The grand total of interrogated pupils thus amounts to 78. However, due to unforeseen circumstances in the English part of the experiment, one recording could not be used, as it was not complete. Additionally, seven pupils that had been interrogated for the production task did not partake in the perception task, hence, their production task could not be linked back to the perception task. Lastly, one pupil was from foreign origin, and, while she performed well on both tests – as a matter of fact, she did not make any mistakes on the phone /h/ both in the production and the perception task – it was decided that the data would not be used, as the present dissertation merely examines the pronunciation of French native speakers who are learning English and Dutch. As a result, the English part of the test yielded 35 usable samples. This is equivalent to the Dutch part of the experiment, which also yielded 35 usable samples for analysis.

The pupils that are being interrogated for one of the target languages follow courses for that language, as a “first foreign language”. Since secondary school pupils can choose to have one, two or sometimes three languages, it is important to point out that each task is carried out for the first foreign language of each pupil. This is to say, pupils who have both Dutch as a “first foreign language” and English as a “second foreign language” will only be tested on the task for perception and production of the /h/ in Dutch. The reverse case scenario is also expected; a pupil who has had English as a first foreign language and Dutch as a second, will only be tested

for the English part of the experience. It may also happen that the pupils only have one foreign language, in that case, they are tested in that language.

7. Results and discussion

7.1. Dutch

7.1.1. Production task

The results of the first part of the experiment on pronunciation – containing words with clashing vowels, minimal pairs as well as nominal and verbal constituents – are represented in Figure 1. Extended results are represented in appendix 12.1. It is to be noted that the opportunities that are given for omission and insertion are not equal. Respectively, 22 opportunities for omission and 33 opportunities for insertion are given per test subject in this first part of the production task. Despite creating more opportunities for *h*-insertion, *h*-omission remains more prevalent. While *h*-omission is 165.2% more prevalent than insertion in an absolute manner, the former is actually more than twice as prevalent as the latter when normalised in terms of their respective opportunities (247.9%).

In total, 184 occurrences of *h*-insertion are counted, compared to 304 occurrences of *h*-omission in the first part of the Dutch production task. The number of /h/ that are produced is 466, out of a total of 770. It is to be noted that 770 is the number of /h/ that should be produced if every pupil produced their part without any omission. Therefore, the score of the test pupils in terms of *h*-retention is of 60.5% – i.e.: 39.5% of *h*-omission. The overall rate of *h*-insertion is of 15.9%, since 184 cases are counted out of a total of 1155 possible loci of insertion that have been estimated and predicted (cfr.: section 6). In other words, 39.5% and 15.9% are also the normalised averages of omission and insertion produced by the test subjects in the first part of the production task.

Out of the 7 test subjects that do not produce any intrusive *h* during the first part of the experiment, 4 exhibit a tendency to produce high numbers of *h*-omission (between 17 and 21 occurrences of *h*-omission), the remaining test subjects showcase a poor rate of *h*-omission. This is also visible in the second part of the production task, containing full sentences of varying lengths. On average, test subjects produce more *h*-omission than they do *h*-insertion. However, 9 test subjects do not follow this trend. The number of average occurrences, respectively 8.7 occurrences of *h*-omission and 5.3 occurrences of *h*-insertion per test subject

in the first part, coupled with their standard deviation of 6 and 5.5 show that the data is spread out very heterogeneously over the sample, i.e. the respective average numbers of occurrences are heavily influenced by the values situated at the extremes.

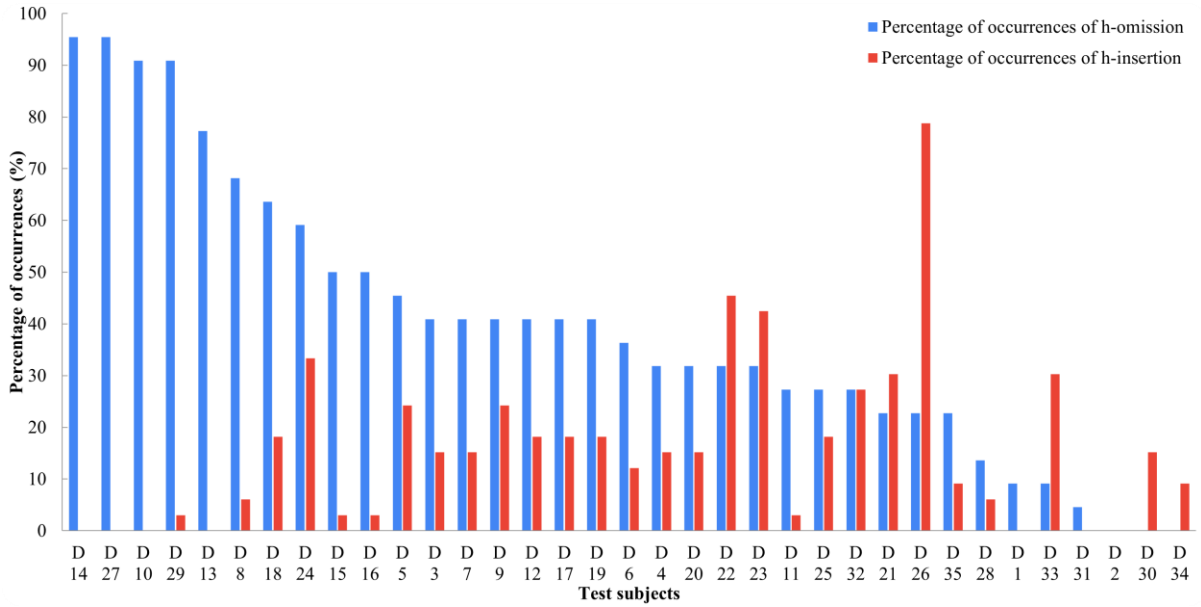

Figure 1: Percentage of *h*-omission (blue) and *h*-insertion (red) produced by the test subjects in the first part of the Dutch production task, organised in a decreasing order based on the rate of omission. With D = Dutch test subjects.

As expected, the first column as seen in section 6.1.1 yields intrusive *h* in the context of clashing vowels, thus ruling out that intrusive *h* production is linked with hypercorrection. As a matter of fact, the test subjects still produce intrusive *h* in words where there is no orthographic *h* present, the only exception being *ongeacht* in the orthographic cluster *-ch-*, pronounced as a voiceless velar fricative [x]. The number of clashing vowel locations in which *h*-insertion is possible, is estimated to be a total of 455, which is to say, a maximum of 13 locations produced by all 35 test subjects. For all the test subjects, the first column yields between 1 and 17 occurrences of *h*-insertion per location, amounting to a total of 68. That is a rate of *h*-insertion of 14.9%. In other words, nearly 15% of the possible locations are actually used with the [h] as a buffer sound. The results per word are given in Figure 2.

Out of the 68 occurrences of *h*-insertion, 47 are found between clashing vowels of [a]-[a] for *na-apen* and *gala-avond* (27 occurrences), [ə]-[a] for *ongeacht* (10 occurrences) and [i]-[ɛ] for *mini-emmer* (10 occurrences). In 24 of 35 cases, the test subjects produce at least 1 occurrence of intrusive *h* in this first column, resulting in 11 test subjects who did not produce any *h*-insertion between clashing vowels. In total, over half the test subject produce an intrusive *h* on the Dutch word *gala-avond* /ɣa.laa.vɔnd/ or /ɣa.laa.vənd/ (“gala evening”). As it is, these 17

test subjects produce the word as a variation of either *[ɣa.laha.vɔnd] or *[ga.laha.vɔnd], the orthographic *g* leading them to produce a voiced velar stop [g] instead of a voiced velar fricative [ɣ], as has been discussed previously in this thesis in section 3.2.1. The other word containing an [a]-[a] vowel clash is the word *na-apen* /na.a.pən/ ("to imitate"), in which 10 occurrences of intrusive *h* are found among the test subjects, as in *[na.ha.pən]. Other important occurrences of intrusive *h* include: *ongeacht* /ɔnɣəɑxt/ ("regardless") produced 10 times as either *[ɔnɣəhɑxt] or *[ɔnɣəhɑkt]. It is produced once as *[o.jəhɑxt]) – the substitution of the phone /x/ for a /k/ being prevalent among French learners of Dutch (Hiligsmann, 1998; Hiligsmann & Rasier, 2012). The entry *mini-emmer* /mi.niɛmər/ ("small bucket") is produced 10 times as a variation around the base *[mi.nihɛmər]. It is to be noted that there is a tendency of test subjects to lengthen and/or raise the short phone /ɛ/ to an [e] or [e.]. Most likely, this stems from a will of the test subjects to (wrongly) emphasise the double orthographic *m.* As for *beëindigen* /bəɛindəɣə(n)/ ("to finish"), this word showcases 11 occurrences of intrusive *h*, and results to be most difficult for the test subjects to produce in the first part of the experiment, measurable in terms of moments of hesitation, stutter, restart and mispronunciation. The most common pronunciation errors include *[bəhɛindrɣən], or *[bəhɛindɪgən], the penultimate schwa (/ə/) sound being accentuated by the test subjects as a manner of hypercorrection. This could be explained by a lack of word stress knowledge among the test subjects, as they have the tendency to accentuate the orthographic *i* instead of reducing it to an unaccentuated schwa. Other forms of *beëindigen* include more convoluted mispronunciations, such as: *[bəɣhɛindɪŋgən], *[bəhɛhindɪgən], *[bəhɛindɪŋghən] and *[məɣhɛindɪŋgən] alongside pauses, restarts or hesitation on the test subjects' part. *Beïnvloeden* /bəɪnvludə(n)/ ("to influence"), *autoalarm* /autoɑlɑrm/ ("car alarm") and *zij-ingang* /zɛiɪŋɣɑŋ/ ("side entrance") respectively have 3, 3 and 2 occurrences of *h*-insertion, namely *[otohɑlɑrm], *[bəhɪnvludən] and *[zɛihɪŋɣɑŋ] or *[zɛhiɪŋgɑŋg]. One test subject produces *beïnvloeden* as *[bəɪnvluɣdən], the same one that mispronounces *ongeacht* as *[o.jəhɑxt]. The words with the fewest occurrences of *h*-insertion are respectively *café-eigenaar* /kɑfeɛiɣənaːr/ ("bar owner") and *domino-effect* /do.minoefɛkt/ ("domino effect") with a sole occurrence: *[kɑfehɛiɣənaːr] and *[do.minohefɛkt]. As for the words that are executed without any addition of intrusive *h*, those are *continueren* /kɔntinye.rən/ ("to keep on doing"), *zoiets* /zo.its/ ("something like this") and *reünie* /re.yni/ ("meeting"). However, while they do not pose the French-speaking test subjects any problem in terms of *h*-insertion, this does not exclude any other difficulty in the pronunciation of those words, *zoiets* garners various vowel distortions, with sometimes an insertion of a [w]-sound, and *reunie* as [røni], as the vowel cluster *-eu-* in Dutch is frequently

associated with the phone /ø/ (Hiligsmann & Rasier, 2012). As a conclusion, it can be stated that the vowel transitions [ə]-[a], [a]-[a], [i]-[ɛ] and [ə]-[ɛi] are the most problematic among the vowel clashes, while the vowel clashes [e]-[y], [o]-[i] and [y]-[e] remain the least problematic among the test subjects. To be reminded that *reünie* and *continueren* might be unproblematic in part due to the French origins of these words, *réunion* and *continuer*, which carry similar meanings.

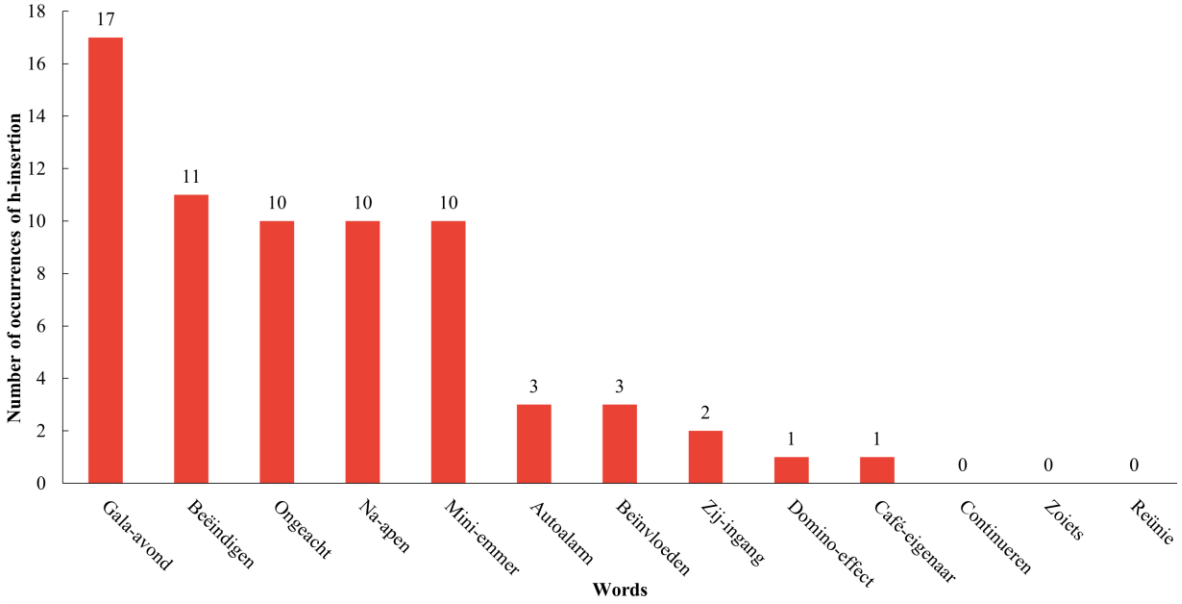

Figure 2: Number of occurrences of *h*-insertion in clashing vowels in the first part of the Dutch production task, organised in a decreasing order.

The second column from section 6.1.1 analyses the production of minimal pairs. Respectively, 8 opportunities for omission and 7 opportunities for insertion are given per test subject in this second column. In terms of prevalence, *h*-omission is 720% more frequent than insertion in an absolute manner, and this number is reduced to 630% when the scores are normalised in terms of their respective opportunities. This is in line with the expectations as omission was predicted to occur with less frequency than insertion in this column. Overall, the score for *h*-retention is similar to the overall score, namely 61.4%, and the rate of *h*-insertion is lower (6.1%; 15 occurrences of *h*-insertion are produced over a total of 245 possible locations spread among the test subjects). The results are in line with the expectations, since the rate of retention in the second column is higher than in the third column. The results are shown in Figure 3.

All seven pairs that are prone to be produced with an intrusive *h* yield between 1 and 3 occurrences of *h*-insertion overall, amounting to a grand total of 15. Additionally, the 8 pairs in which an orthographic *h* could be made silent all showcase between 3 and 22 occurrences of *h*-omission, the highest being *hoor-oor* (20.4% of all cases of *h*-omission in the second

column). In both cases of omission and insertion, the semantic contrast between both words is lost, as they consequently sound identical. In the case of the pair – *eerlijk* /eːrlək/ ("honest") and *heerlijk* /heːrlək/ ("delicious") – that yields 1 occurrence of *h*-insertion on the word starting with a vowel – the test subject overcompensates for the *h*-production on *eerlijk* by pronouncing the orthographic *h* in *heerlijk* as a [ɣ]. However, that pair does yield high numbers of *h*-omission – in fact, it does so in more than half the total number of test subjects: 17 test subjects on a total of 35 omit pronouncing the *h* in the word *heerlijk*. The same pattern – i.e. approximately a 10 to 1 ratio on *h*-omission compared to *h*-insertion – occurs in two other pairs. The first one is *hoor* /hoːr/ ("hear") and *oor* /oːr/ ("ear"), the second one is *oog* /o.x/ ("eye") and *hoog* /ho.x/ ("high"). A total of 22 occurrences of *h*-omission are observed on *hoor* and 2 occurrences of *h*-insertion on *oor*, while *oog* and *hoog* respectively showcase 20 cases of *h*-omission for *hoog* and 2 cases of *h*-insertion for *oog*. In total, 15 test subjects produce omission on both pairs, while 1 test subject produce insertion on both pairs (and is simultaneously part of the omission on *hoor-oor* only). The two remaining pairs in which both *h*-omission and *h*-insertion can take place do not show this ratio: the pair *eet* /e.t/ ("[I] eat") and *heet* /he.t/ ("[I] am, [I] have the name of") has a 2:1 ratio of *h*-omission compared to *h*-insertion, while *haan* /ha.n/ ("cock") is produced three times as much without the phone *h* than *aan* /a.n/ ("on") is with the addition of an [h]. In the case of *hoor-oor, eet-heet* and *haan-aan*, two occurrences of both *h*-insertion and *h*-omission are observed in each pair, resulting thus, in a production of *[oːʁ], *[e.t] and *[a.n] on *hoor, heet* and *haan* and *[hoːʁ], *[he.t] and *[ha.n] on *oor, eet* and *aan.* While semantic contrast is kept, the words are not produced correctly. In this case, hypercorrection might be playing a role, as all 6 pupils probably realise that something has to be done about the orthographic *h*, yet cannot determine on which word to produce the phone *h.* In order for contrast to be kept between minimal pairs, the test subjects resort to modifying phones: the pair *eerlijk-heerlijk* becomes *[eːʁlək]-*[ɛʁlək] under the influence of the *h*-omission on *heerlijk* while the pair *eet-heet* is produced as *[he.t]-[hət] under the influence of the *h*-insertion on *eet.*

On words starting with an orthographic *h* contrasted in a minimal pair that does not start with an empty onset, *h*-omission is a reoccurring phenomenon: 42.9% in the pair *daar-haar* /daːr/-/haːr/ ("there-her"), 22.9% in the pair *heel-veel* /he.l/-/ve.l/ ("extremely-a lot") and 37.1% in the pair *hand-tand* /hɑnt/-/tɑnt/ ("hand-tooth"), or respectively, 15, 8 and 13 cases out of a total of 35 test subjects. While *h*-insertion is fairly limited in minimal pairs contrasting words starting with [empty onsert]-[consonant that is not *h*], respectively 2 cases of *uur-duur* /uːr/-

/duːr/ (“hour-expensive”) produced as *[huːʁ]-[duːʁ] and 3 cases of *boog-oog* /o.x/-/bo.x/ (“bow-eye”) produced as [bo.x]-*[ho.x] are counted. All in all, it appears [e] and [o] – *hoor*, *heerlijk*, yet *heet* and *heel* to a lesser extent – attract a lot of *h*-omission. Nonetheless, more *h*-production can be seen in pairs in which words with empty onsets are contrasted with words that start with an *h*.

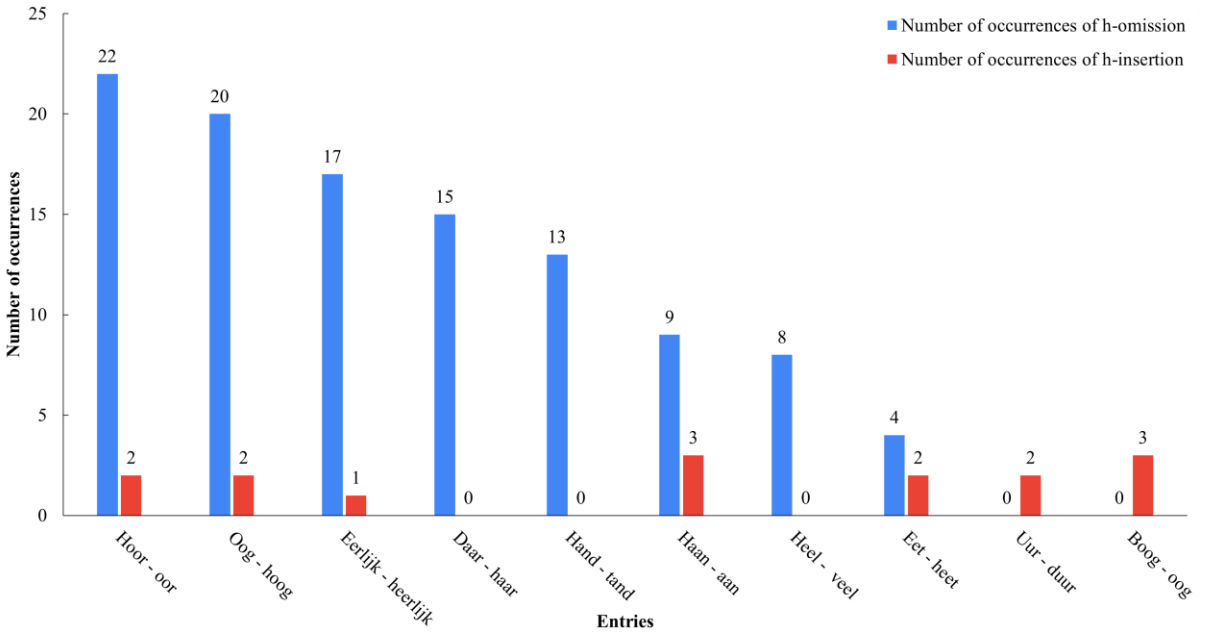

Figure 3: Number of occurrences of *h*-omission (blue) and *h*-insertion (red) in the minimal pairs in the first part of the Dutch production task, organised in a decreasing order according to *h*-omission.

The results of the third column (cfr.: section 6.1.1) are seen in Figure 4. In this column, 101 occurrences of intrusive *h* are found, spread across the 455 total loci of possible insertion, while 304 occurrences of *h*-omission are counted out of a total of 490 /h/ that should be produced. In total, 14 opportunities for omission and 13 opportunities for insertion are given per test subject in this third column. In an absolute manner, *h*-omission is 165.2% more prevalent than insertion; that number is brought to 153.4% when normalised in terms of their respective opportunities.

While the *h*-retention rate remains similar to the second column (60%), it is lower nonetheless, which confirm the expectations towards this column. Still in line with the author’s expectations, the production of intrusive *h* in this column is the highest: 22.2% of *h*-insertion (compared to the 14.9% in between clashing vowels). This confirms Hiligsmann and Rasier’s hypothesis that words starting with a vowel and containing an orthographic *h* as the onset of the next syllable showcase increased numbers of *h*-insertion. All entries are produced with an *h*-omission, ranging from 3 to 46 occurrences per entry. On the matter of insertion, the number of

occurrences that are observed falls within the scope of the expectations. Yet, the entry *uitheemse bloemen* /œythe.msəblumən/ (“exotic flowers”) does not showcase any insertion, which is not in line with the expectations. Surprisingly, it seems that French-speaking learners of Dutch do not exhibit any difficulty with the intrusive *h* if the first word starts with the phone /œy/. A phenomenon that jumps out from the analysis of the third column is that the highest numbers of *h*-omission coincide with the smaller quantities of *h*-insertion in each entry. For instance, the entry *iets omhoog houden* /i.tsɔmho.xhɔudə(n)/ (“to hold something up”) counts 46 instances of *h*-omission (38 of which are found in a “double omission” produced by 19 test subjects on both *omhoog* and *houden*) compared to 3 instances of *h*-insertion, 2 of which coexist with *h*-omission: *[i.tshɔmo.xɔudən] and *[i.tshɔmho.kɔudən]. The second highest number of *h*-omission is found in the entry *een eekhoorn* /əne.khoːrn/ (“a squirrel”) and equals 25, compared to 2 instances of *h*-insertion, one of which coexist with the *h*-omission: *[ənhe.xoːrn].

The remaining entries, both in omission and insertion, do not have such stark differences in terms of ratio. In fact, most entries vary in prevalence between 237.5% and 133.3% of insertion compared to omission or vice versa. For instance, *h*-insertion in the entries *iemand ophalen* /i.mɑndɔpha.lə(n)/ (“to pick someone up”), *de engheid van iets* /dəɛŋhɛidvɑni.ts/ (“the creepiness of something”), *een eenheid* /əne.nhɛid/ (“a unit”), and *iets afhalen* /i.tsɑfha.lə(n)/ (“take something”) respectively has a prevalence of 237.5%, 200%, 162.5% and 155.6% prevalence over *h*-omission. In all but the second aforementioned entry, test subjects produce an intrusive *h* twice in the same entry; in the previously mentioned order: 3 double insertions for *iemand ophalen* produced as *[hi.mɑndhɔpha.lən], 2 for *een eenheid* produced as *[hənhe.nhɛid] and 1 occurrence of a double *h*-insertion for *iets afhalen* produced as *[hi.tshɑfha.lən]. Furthermore, *een eenheid* and *iemand ophalen* also occur with both insertion and omission, thus resulting in *[hi.mɑndɔpa.lən] and *[ənhe.nɛid]. In turn, *h*-omission is between 133% to 283% more prevalent than *h*-insertion in the following entries: *iets aanhebben* /i.tsa.nhɛbə(n)/ (“to wear something”), *ophouden met iets* /ɔphɔudə(n)mɛti.ts/ (“to stop doing something”), *iets uithalen* /i.tsœytha.lə(n)/ (“to take something out”), *iets afhakken* /i.tsɑfhɑkə(n)/ (“to cut something off”) and *een eihoofd* /ənɛiho.ft/ (“intelligent person, or bald person”), both the first and third case are also produced with an intrusive *h* before the word *iets*, thus producing two occurrences of intrusive *h* in those entries. Additionally, out of those 5 aforementioned entries, 3 showcase simultaneous *h*-omission and *h*-insertion; *[i.tsha.ne.bən], the short open-mid /ɛ/ being lengthened and raised to a longer close-mid /e/,

*[ənhɛio.ft] and *[hɔpɔudənmɛti.ts]. In terms of heavier mispronunciations, there is 1 occurrence of a test subject changing *iets uithalen* to **iets uitlaten* [i.tsœytla.tən] ("to let something loose") and *de engheid van iets* to *de eigenheid van iets* [dəɛiɣənɛidvɑni.ts] ("the uniqueness of something"), while performing an *h*-omission. Both entries are a part of the *h*-omission category because the test subject, by changing the given entry to another result, does not pronounce an [h] where one should need to be produced. The same reasoning holds for changing the orthographic *ph* in *ophalen* to an [f]. This change in phones is most probably due to an L1-to-L2 transfer, the orthographic *ph* in French being pronounced as an /f/. This change in phones does not affect the word *ophouden*, probably because the test subjects know of the word *houden* ("to hold").

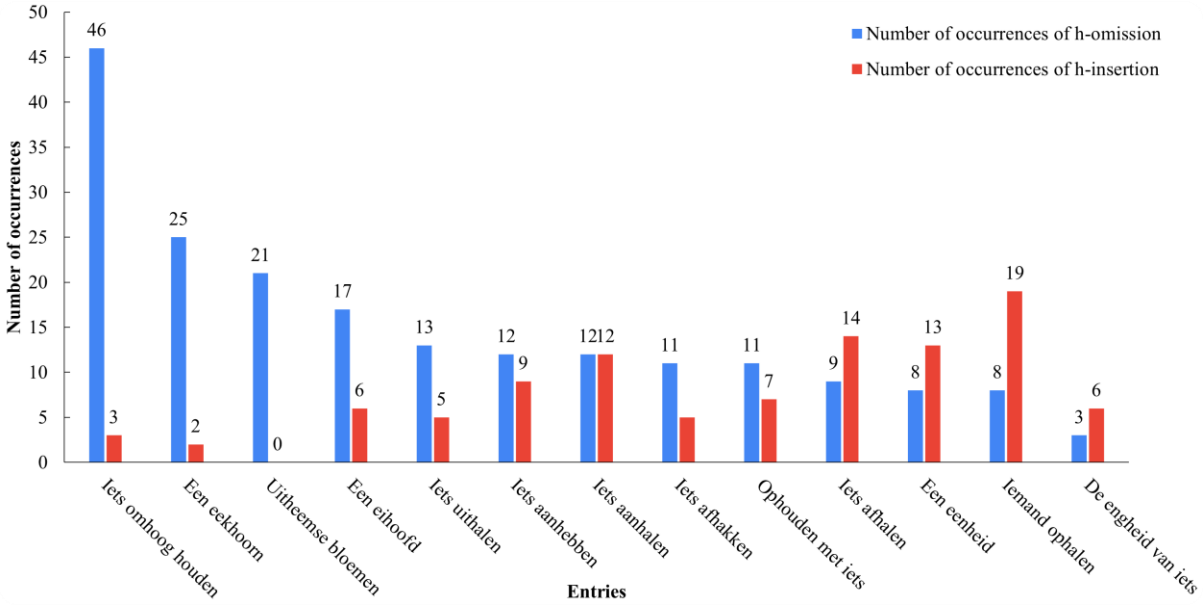

Figure 4: Number of occurrences of *h*-omission (blue) and *h*-insertion (red) in vowel-initial words containing an orthographic *h* in the next syllable in the first part of the Dutch production task, organised in a decreasing order according to *h*-omission.

In the second part of the production task as seen in section 6.1.2, the results show that *h*-omission is 432.3% more prevalent than *h*-insertion in an absolute manner, which is significantly higher than in the first part of the production task. Yet, it is to be noted that the opportunities for omission and insertion in this part respectively among to 28 and 18. Consequently, omission is slightly over half as prevalent than insertion when the results are normalised in terms of their respective opportunities (277.9%). Extended results are represented in appendix 12.2.

The score for *h*-retention is lower than in the parts of the words, namely 42.7% (418 occurrences of /h/ retained over a total of 980), as opposed to the *h*-retention in the words and

small verbal and nominal constituents of 60.5%. This is in line with the expectations concerning omissions for this part, as the first part was predicted to yield a higher rate of *h*-production due to the heightened semantic value of the phone /h/. Consequently, the rate of *h*-omission is of 57.3%, which is higher than in the previous part (39.5%); in the same fashion, it is speculated that the absence of direct semantic impact of the phone *h* might contribute to this higher score. As for *h*-insertion, 130 instances of intrusive *h* are produced out of a total of 630 possible loci of insertion. This puts the rate of occurrences of the intrusive *h* at 20.6%, which is lower than in the previous part (15.9%). This is also in line with the expectations concerning insertions. In other words, 57.3% and 20.6% are the normalised averages of omission and insertion produced by the test subjects in the second part of the production task. The normalised results are seen in Figure 5. This score supports Haycraft's theory that linking words together might indeed correct the error made on the intrusive *h* (Haycraft, 1971), since it appears that the test subjects have a harder time producing the phone /h/ correctly in continuous speech than in shorter entries as seen in the first part of the production task. The higher rate of insertion stems from the fact that the test subjects produce cases of intrusive *h* in other contexts than in clashing vowels, minimal pairs and in cases where *h* is the onset of the second syllable of a word starting with a vowel, as mentioned in section 6.

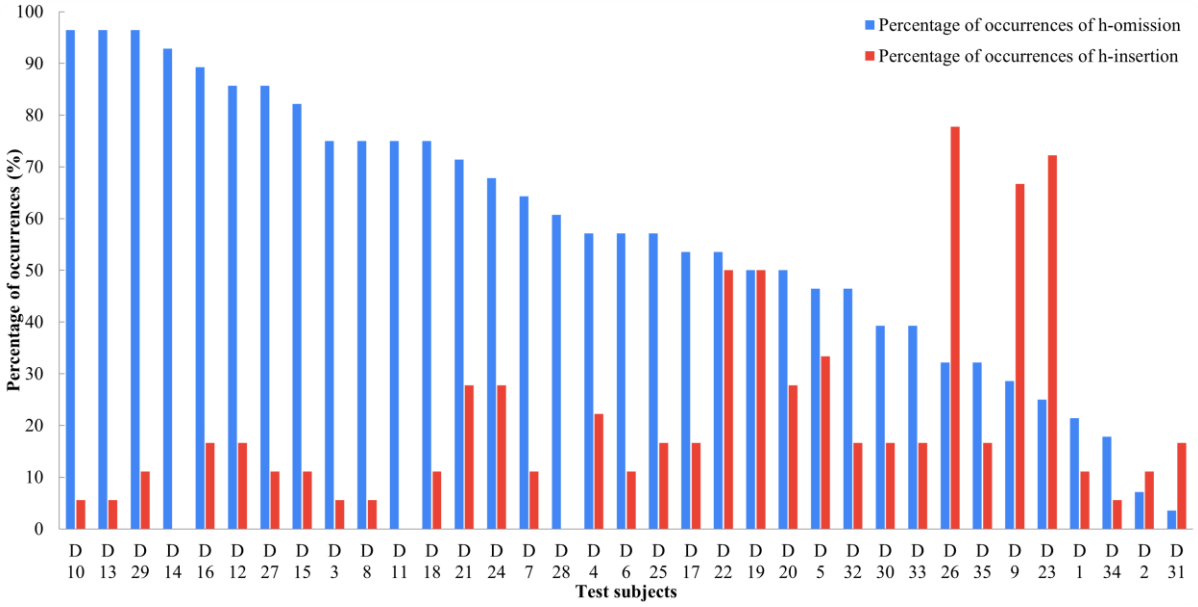

Figure 5: Percentage of *h*-omission (blue) and *h*-insertion (red) produced by the test subjects in the second part of the Dutch production task, organised in a decreasing order according to the rate of *h*-omission. With D = Dutch test subjects.

On average, the test subjects omit pronouncing an [h] in 16.1 cases in the second part of the production task, while inserting 3.7 [h]. However, those averages vary considerably from test

subject to test subject, the respective standard deviations of 7.3 for omissions and 3.6 for insertions showcase that the results are highly spread out over the sample; yet again, the average numbers of occurrences are heavily influenced by the values situated at the extremes, as visible in Figure 5.

In total, 6 test subjects deviate from the general trend of producing more *h*-omission than *h*-insertion in the second part of the production task – i.e.: they have an equal or a higher *h*-insertion rate. In other words, they exhibit equal or less *h*-omission than *h*-insertion in terms of opportunities. Figure 5 also illustrates that *h*-omission and *h*-insertion in the second part of the production task are not linked to each other: the test subjects who produce high numbers of *h*-omission do not necessarily produce more instances of *h*-insertion, and vice versa.

Of all the sentences of *h*-omission, the cases in the first sentence alone amount to 16% (90 occurrences) of the total 562. However, this is solely due to the fact that this sentence contains a higher number of orthographic *h* present in the sentence, i.e.: 5. Besides this first sentence, the number of orthographic *h* varies from 0 to 3. Sentences which contain 3 orthographic *h* that are not situated in clusters (such as *ongeacht*) show occurrences of *h*-omission between 10.7% to 13.7%. Sentences containing 2 orthographic *h* hover between 6% and 6.8% of *h*-omission, while the remaining sentences with 1 occurrence result in 2.3% to 5.2% occurrences of *h*-omission.

The word showing the most occurrences of *h*-omission in the second part of the production task is *het*, with a total of 127 omissions out of a total of 562, which constitute 22.6% of all cases. Of all the words containing an orthographic *h* that is not part of a cluster, the least amount of occurrences of *h*-omission is 11 – *afhakken* /ɑfhɑkə(n)/ (“to cut off”) and *aangehaald* /a.nɣəha.lt/ (“mentioned”) – and 10 – *uithalen* /œytha.lə(n)/ (“to take out”). The highest number of *h*-omissions, excluding *het*, are *heb* /hɛp/ (“[I] have”) with 42 omissions and *haar* /haːr/ (“her”) with 38 omissions. Other modifications on these words are observed as well: the test subjects produce *afhakken* as variations of *[ɑfɑkən]; some fronting on the [ɑ] is observed, morphing it into an [a], as well as the [k] being replaced by a [x]. On *afhakken*, it should be noted that, when test subjects do produce the /h/, they tend to overaccentuate it by morphing it into a [ɣ]. Others pronounce *aangehaald* with the /ɣ/ replaced by a [g] and the [a] occasionally produced at the back of the mouth, thus resulting in an [ɑ]. The morphing of [a] into [ɑ] is also observed in *uithalen.* On the higher end of the spectrum, modification on the words – besides *h*-omission – include *[ɛb] for test pupils do not perform *auslautverhärtung* (Hiligsmann, 1998). Concretely, when reading the letters *b* and *d* at the end of words, the test subjects tend

to also produce [b] and [d], while they should actually produce their voiceless counterparts /p/ and /t/. The phone /r/ is more often than not produced in the uvular region rather than in the alveolar region, resulting, for instance, in *[a:ʁ] for *haar*.

Lastly, the prevalence in the entirety of the production test in Dutch is that *h*-omission is nearly thrice as frequent as *h*-insertion (281.3%). Consequently, the test subjects are more likely to omit pronouncing an [h] than producing an intrusive *h*. Yet, exceptions to this trend subsist, as 6 test subjects produce more insertion than they do omission for the opportunities that are given. This can be seen in Figure 6. This figure also illustrates that *h*-omission and *h*-insertion in the production task are not correlated: test subjects who produce high numbers of *h*-omission do not necessarily produce more instances of *h*-insertion, and vice versa.

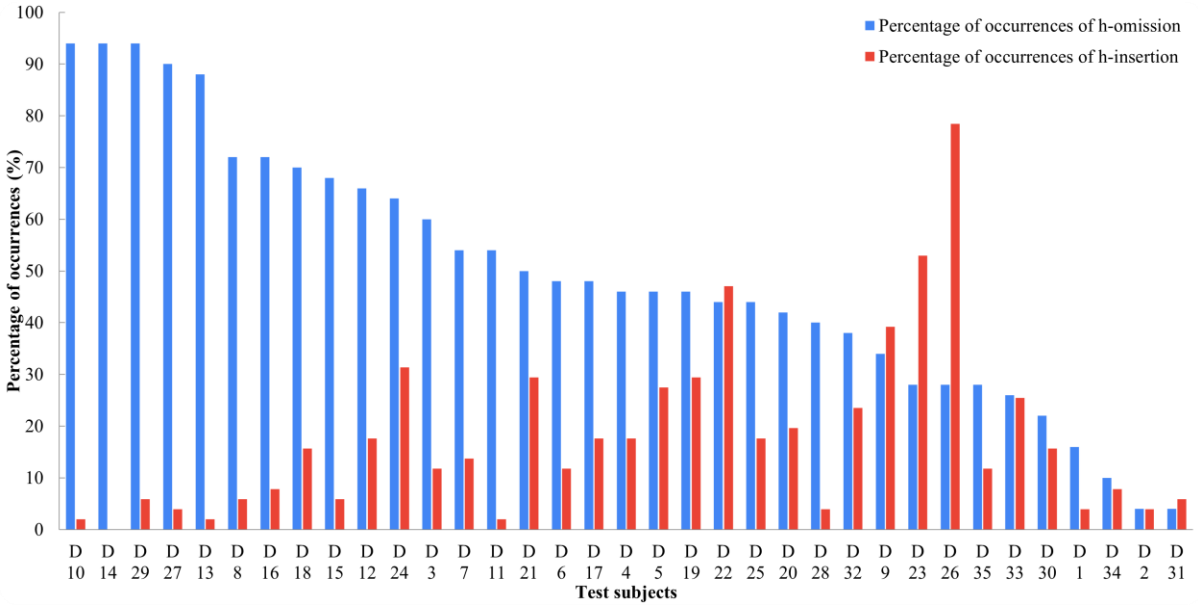

Figure 6: Percentage of occurrences of *h*-omission (blue) and *h*-insertion (red) per test subject in the Dutch production task, organised in a decreasing order according to the number of *h*-omission. With D = Dutch test subjects.

Over the course of the production task, 866 [h] are omitted on a total of 1750, which amounts to approximately half of the total production being omitted (and consequently, retained): the retention rate is of 50.5% while the rate of omission is of 49.5%. The total of 314 instances intrusive *h* being produced out of a total of 1750 possible loci results in a rate of *h*-insertion of 17.9%. In other words, 49.5% and 17.9% are respectively the normalised averages of omission and insertion produced by the test subjects over the course of the whole production task. In absolute values, omission is 275.8% more prevalent than insertion, yet this number is increased to 281.3% when normalised in terms of their respective opportunities; 50 opportunities for omission and 51 for insertion over the course of the whole production task. All in all, the

average count of errors made on the phone /h/ by the test subjects in the production task is of 33.7, but the standard deviation of 12.8 makes for a very heterogeneous sample and illustrates that the average is not very representative of the actual production of the test subjects.

As it is, the limitation of this study lies in the reduced number of test subjects; a larger sample of test subjects should be taken in order to establish more reliable averages and possibly shed light on some patterns in *h*-omission and *h*-insertion that might not be visible on a sample of 35 people. While *h*-omission is more prevalent among the test subjects, it is difficult to state that an average can be applied homogeneously over 35 test subjects. As a matter of fact, the test subjects omit pronouncing 24.7 /h/ during the entire production task. However, this number varies considerably per test subject, as the standard deviation of" 12.6 is high compared to the average. As for the average insertion of [h], the standard deviation is also very high (the value is 8.9); so high, in fact, that the average of 9 inserted [h] per test subject in the production task appears as extremely high for some test subjects while at the same time being extremely low for others. In normalised numbers, the averages of a 39.5% rate of omission in the first part and a 57.3% rate in the second part are shown to not be representative of the sample. The same can be stated about insertion: a 15.9% rate of insertion in the first part and a 20.6% rate in the second part show great variability from test subject to test subject. Figure 7 and Figure 8 illustrate *h*-omission and *h*-insertion per test subject, normalised in terms of their opportunities in each part of the production task. The normalised average per phenomenon is also added on each figure for visual help. The data also shows that the test subjects who produce high numbers of either insertion or omission in the first part of the production task also tend to reproduce such number in the second part, although exceptions exist.

All in all, it does not appear that the test subjects have trouble pronouncing the phone /h/, they are physically capable of producing the voiceless laryngeal fricative. As stated previously in this study, the test subject can recognise the orthographic *h* and act on it. It is speculated that the test subjects might have difficulty pronouncing clashing vowels without aspiration. This is made clear in the first column of the experiment that studies how the test subjects behave around clashing sounds. The occurrence of the intrusive *h* in similar contexts in the second part of the experiment helps build on that theory. As it is, it appears that the test subjects use the sound [h] as a buffer sound between vowels, particularly between the same clashing vowels (such as in *na-apen* and *gala-avond*). This also occurs over word boundaries as in *je ons* /jəɔns/. This buffer theory is supported by the fact that only a small number of test subjects produce an intrusive *h* at the beginning of either constituents or sentences. For instance, the entry *uitheemse*

bloemen does not attract intrusive *h*, while *ophalen* does, as it is located after *iemand* in the first part of the production task and inserted after *ons* in the fourteenth sentence in the second part.

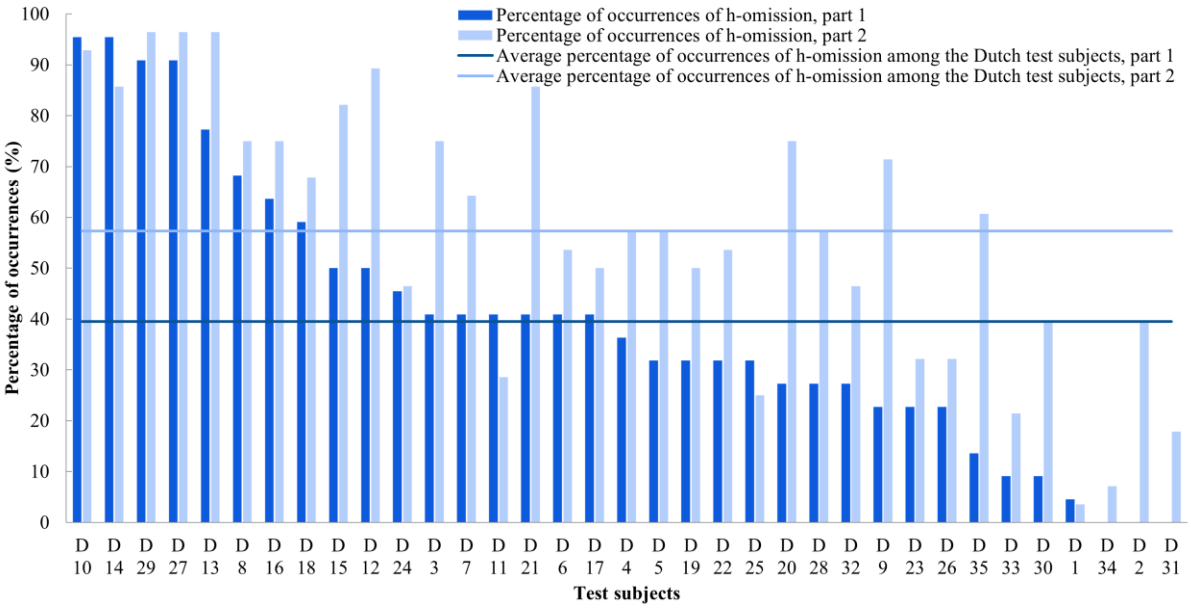

Figure 7: Percentage of occurrences of *h*-omission in first part (deep blue) and second part (light blue) the Dutch production task per test subject, ordered in a decreasing order according to *h*-omission in the first part. The averages for the first part (deep blue) and the second part (light blue) are also given. With D = Dutch test subjects.

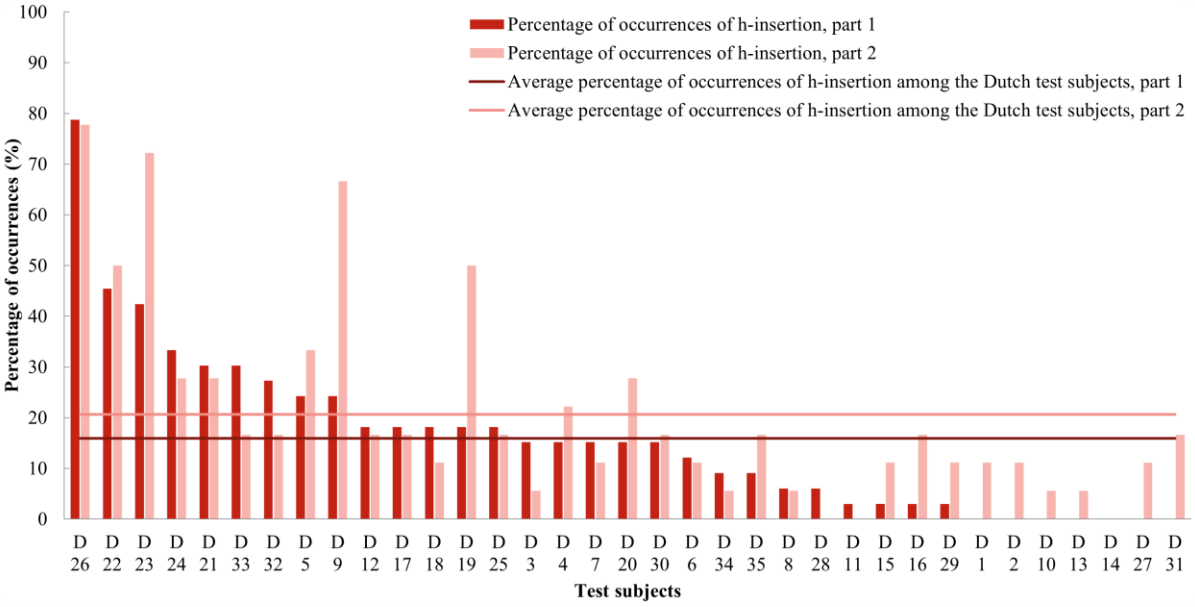

Figure 8: Percentage of occurrences of *h*-insertion in first part (deep red) and second part (light red) the Dutch production task per test subject, ordered in a decreasing order according to *h*-insertion in the first part. The averages for the first part (deep red) and the second part (light red) are also given. With D = Dutch test subjects.

What has been written about the phone /h/ so far is that learners hypercorrect their pronunciation into inserting an intrusive *h* in an attempt to produce an [h] in a word containing

an orthographic *h* in its second syllable; this explains how *een eenheid* becomes *[ənhe.nhɛid]. The fact that the learners know an [h] is coming might prompt them into hastily producing an [h], as has been reported by Fayt (Fayt, 2016; Fayt & Heeren, 2018). About *h*-omission, Fayt and Heeren have not found that contexts of *liaison* and *élision* have an impact on the production of the /h/ (Fayt & Heeren, 2018). As a matter of fact, more instances of [h] are produced in those contexts, thus disproving that such contexts exert more influence than the simple fact that the French language does not have the phone /h/ in its phonological inventory. Yet, the reoccurring coexistence of *h*-omission and *h*-insertion in the same entry is proof that learners facing contexts with an orthographic *h*, are not only subject to hypercorrection but also to their L1's linguistic aspects; in this case, the letter *h* being silent in French. Moreover, the fact that the test subjects produce a unique intrusive *h* on words like *iets* and *iemand* before the main word (*afhalen, uithalen, ophouden*), proves that a deviance exist on the theory of Hiligsmann and Rasier. While the learners are prematurely prompted into pronouncing an [h] when they see one, they omit to produce one where needed.

Additionally, the results in the second part of the production task shed light onto another form of *h*-insertion, which does not fit into the categories that are proposed (clashing vowels, minimal pairs, *h* as the onset of the second syllable of a word starting with a vowel). As a matter of fact, the test subjects insert an [h] in front of vowels that are not situated in the aforementioned contexts. The fact that the test subjects regularly produce an [h] in front of vowels that are either the initial of a constituent or a sentence, or preceded by a consonant, shows that the test subjects tend to aspirate vowels in Dutch as an L2 in contexts that are not accounted for in the hypotheses. The presence of an orthographic *h* in the vicinity appears to play a role, albeit to a small extent, since pupils produce an intrusive *h* even in the absence of an orthographic *h*. Those types of insertion that were not accounted for in the methodology constitute 10.9% of the number of *h*-insertion in the first part – i.e., 20 occurrences out of 184. The second part shows an increased number; 41 occurrences out of 130, thus accounting for 31.5% of the production. Overall, those occurrences account for 19.4% of the entire production. In conclusion, it appears that insertion is negatively impacted by the production of connected speech. While that was within the expectations, further research would be needed so that new hypotheses could cover the actual production of insertion by French-speaking learners of Dutch.

All in all, this is related to Haycraft's theory on linking words together in order to correct this error in pronunciation through connected speech, i.e., sentences (Haycraft, 1971), as the higher

rate of *h*-insertion proves that the test subjects have difficulty producing unaspirated vowels in all contexts. Since *h*-insertion is more prevalent in the production of sentences, it appears crucial that the test subjects learn to recognise their overproduction of the [h]. Along with *h*-insertion, the rate of occurrence of *h*-omission is also higher compared to the first part, however, those results are in line with the expectations concerning this part, due to the reduced semantic impact of the /h/. Overall, sentences – or connected speech – affects the correct production of the [h] in a negative manner in Dutch.

7.1.2. Awareness test

Concerning the question towards the end of the production task, 15 test subjects reply with a correct answer for the question whether they could guess on which aspect of pronunciation they were being tested upon. The 20 remaining test subjects provide an incorrect answer to the question. The absence of a definite answers, such as "I don't know", is counted as an incorrect answer. In order to evaluate whether the awareness could potentially influence the result of the production task, a chi-square test of independence is conducted (cfr.: appendices 12.4). Since $p = 0.5$, the null hypothesis according to which the results of the production task and the results of the answers are independent, cannot be rejected. To be noted that the *p* value would have to be < 0.05 for this to be the case. As a consequence, it can be stated that the test subjects that answer correctly to the question do not perform better than the test subjects that answer incorrectly or in an uncertain manner. The data is organised by clusters around the number of errors committed by the test subjects and by groups of the same number of test subjects. This allows the arrangement of the data to result in groups that are as homogeneous as possible, while still respecting the boundaries of clusters of the results in the production task.

However, seeing that the value of *p* is relatively small, it can be argued that both aspects might, in fact, not be independent. Since the scope of this study is relatively small (35 test subjects per language), further study on a larger scale might help shed light on a possible correlation.

7.1.3. Perception task

The average score on the perception task is of 16.4, the highest score attainable by test subjects is 20, the standard deviation of 2.4 for this part shows that the average remains representative of the results obtained by the test subjects. Extended results are represented in appendix 12.3.

As it is, the test subjects score rather well on perception; overall, 26 test subjects obtain a score higher than 15, one of whom performs the perception task flawlessly. The remaining 9 test subjects score between 11 and 15 on the test. The expectations concerning the perception task were that the test subjects who perform badly in the production task might obtain a lower score for the perception task. The results of the perception task are not in line with these expectations, considering the fact that the test subjects who score badly on the production task also have high results in perception compared to the test subjects who score well in production.

Going into more detail, the perception task sheds light on the fact that *boog-oog* is the most problematic pair for the test subject to evaluate whether an [h] is to be heard. As a matter of fact, 2 out of 35 test subjects evaluate that *boog-oog* does not contain any *h*, and out of the 33 test subjects that report hearing one, 24 of them report hearing it on *oog*, which is 72.7% of the test subjects that report hearing an [h]. The second most problematic pair is *uur-duur*, which has a correct evaluation rate of 34.3%. Out of the 23 test subjects that report hearing an [h], 19 report hearing it on *uur*. The absence of any [h] in a word that is paired with another word that starts in a distinctive manner (in these cases, [b] and [d]), may lead the test subjects to mistakenly expect an [h] where there is none to be heard. This is made clear with the fact that other pairs such as *daar-haar, heel-veel* and *hand-tand* – in which a word starting with an [h] is paired with a word that starts with another consonant – have high perception results: respectively 100%, 97.1% and 94.3%. The other pair that is evaluated flawlessly is *haan-aan* in which all test subjects correctly identify the [h]. Yet, the other pairs with the contrast [empty onset]-[h] exhibit a tendency of test subjects to not only miss the [h] on the word that has it, but also misidentify it on the word that does not contain it. For instance, 5 test subjects identify the pair *eerlijk-heerlijk* (85.7% correctly evaluated) as **heerlijk-eerlijk*, while 13 perceive *oog-hoog* (62.9% correctly evaluated) as **hoog-oog*; these two pairs do not have any other mistake regarding their perception. As for *eet-heet* (82.9% correctly evaluated) and *oor-hoor* (71.4% correctly evaluated), this tendency to switch up the words is also present (respectively, 5 test subjects perceive **heet-eet* and 8 report hearing **hoor-oor*), but one test subject for each pair fails to identify the [h], while another reports hearing [h] in both words in the pair *oor-hoor*. It appears that test subjects perform better in identifying the [h] in pairs in which the word starting with the [h] comes first. This is in line with the results that Fayt has written in his 2015 Bachelor's thesis as well as his 2018 article with Heeren (Fayt, 2016; Fayt & Heeren, 2018).

7.2. English

7.2.1. Production task

Overall, the first English part of the production task contains 373 occurrences of *h*-omission and 191 occurrences of *h*-insertion, spread out over the production of 35 test subjects, as visible in Figure 9. Extended results are represented in appendix 13.1. It is to be noted that the opportunities that are given for omission and insertion are not equal. Respectively, 23 opportunities for omission and 35 opportunities for insertion are given per test subject in this first part of the production task. Despite creating more opportunities for *h*-insertion, *h*-omission remains more prevalent. While *h*-omission is nearly twice as prevalent as *h*-insertion (195.3%) in an absolute manner, the former is thrice as prevalent as the latter when normalised in terms of their respective opportunities.

In total, the rate of *h*-retention is of 53.7%, which means that nearly half of the occurrences orthographic *h* is not produced, as *h*-omission amounts to 46.3% of 805 occurrences that should be produced. Overall, the rate of *h*-insertion is of 15.6% for this first part of the production task. In other words, 191 intrusive *h* are produced over a total of 1225 possible places of insertion spread over the 35 test subjects. In other words, 46.3% and 15.6% are respectively the normalised averages of omission and insertion produced by the test subjects in the first part production of the English task.

Out of the 7 test subjects that do not produce any intrusive *h* during the first part of the production task, 3 exhibit a tendency to produce moderate to high numbers of *h*-omission (between 12, and 21-23 occurrences of *h*-omission), the other 3 test subjects showcase little production of *h*-omission. This is also visible in the second part of the production task, as discussed later in this section. On average, the test subjects produce more *h*-omission (on average, 10.7 occurrences of *h*-omission per test subject in the first part) than they do *h*-insertion (on average, 5.5 occurrences of *h*-insertion per test subject in the first part). Yet, the standard deviations of 6.1 for omissions and 5.7 for insertions show that the averages are not representative of the whole sample, since the variation is very high, particularly with insertion. This is visible in the 9 test subjects that do not follow this trend of fewer occurrences of insertion compared to omission.

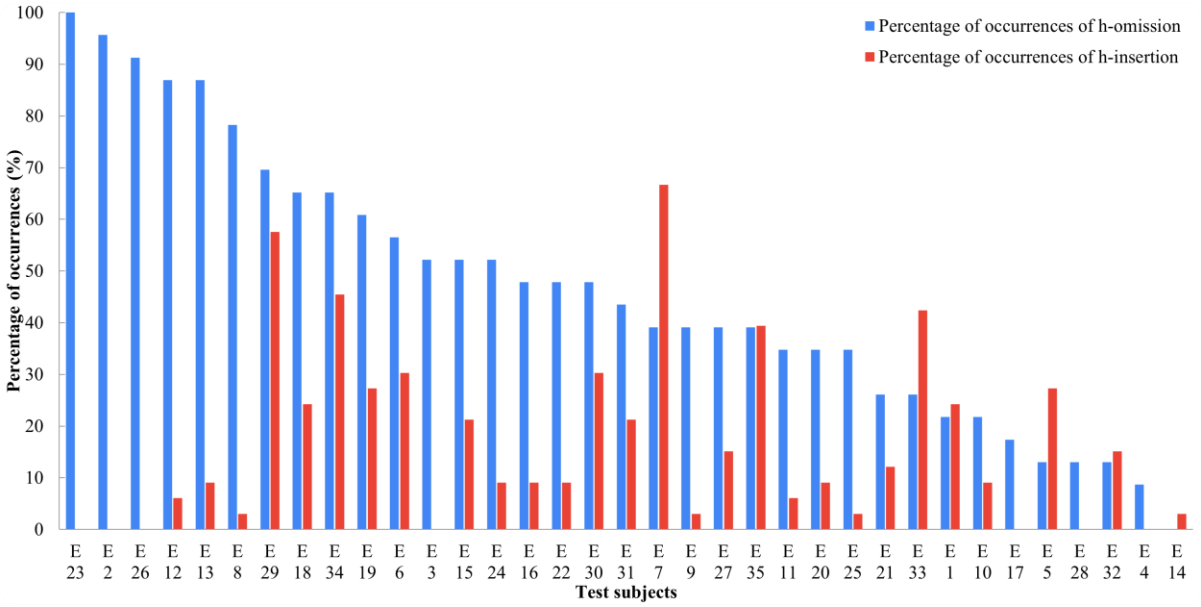

Figure 9: Percentage of *h*-omission (blue) and *h*-insertion (red) produced by the test subjects in the first part of the English production task, organised in a decreasing order according to the rate of *h*-omission. With E = English test subjects.

As expected, the first column as seen in section 6.2.1 yields intrusive *h* between clashing vowels, although not every pair of clashing vowels provokes *h*-insertion among the test subjects, as is seen in Figure 10. The total count of *h*-insertion in the first column amount to 53, which is a rate of insertion 10.8%, on the 490 total loci of possible insertion produced by 35 test subjects; this is an equivalent of 14 possible occurrences of insertion per test subject in the first column.

Clashing sounds starting with /aɪ/ (/aɪɛɪ/, /aɪʌ/ and /aɪə/ do not attract any intrusive *h*, and neither does /uːɪ/ in the words *fluid* /fluːɪd/ and *doing* /duːɪŋ/. The speculation is made that there is no occurrence of intrusive *h* in the context of this clashing pair due to the fact that it is encased within the boundaries of the words. This is confirmed by the fact that *new image* /njuːɪmɪdʒ/ shows 1 occurrence of *h*-insertion, the [h] being inserted between the two words. Higher numbers of *h*-insertion are observed in the entries *visa office* /vɪsəɒfɪs/, *law and order* /lɔːəndɔːdə/ and *awe-inspiring* /ɔːɪnspaɪɪŋ/, respectively showing 4, 4 and 5 occurrences of *h*-insertion out of the total 53. However, for the case of *law and order*, the intrusive *h* is not produced in between the clashing vowels /ɔːə/ as had been expected. Rather than producing the expected *[lɔːhəndɔːdə], the test subject produce *[lɔːəndhɔːdə], placing the [h] in front of *order* instead of the expected *and*. Therefore, the intrusive *h* is not inserted in between clashing vowels, but rather at the beginning of a word starting with a vowel. Even higher numbers of *h*-insertion are observable on the entries: *idea of* /aɪdɪəɒf/, *I enjoy it* /aɪɛndʒɔɪɪt/ and *you eat* /juːiːt/,

respectively at 7, 7, and 8 occurrences of intrusive *h*. Consequently, *you eat* is produced 8 times as *[juːhiːt], *I enjoy it* 3 times as *[aɪɛndʒɔɪhɪt] and *idea of* 3 times as both *[haɪdɪəɒf] and *[aɪdɪəhɒf]. To be noted that for both *I enjoy it* and *idea of*, there are instances of double *h*-insertion; 2 occurrences of *[aɪhɛndʒɔɪhɪt] are observed, compared to 1 instance of *[haɪdɪəhɒf]. The entry that registrates the most *h*-insertion is *see Ed* /siːɛd/, with 16 occurrences of *[siːhɛd], which constitutes 29.1% of the total 53 occurrences of *h*-insertion in the first column. The first column also yields *h*-omission due to its two words starting with an orthographic *h*: *hiatus* /haɪeɪtəs/ and *hierarchy*. Both these words showcase *h*-omission to various extent: 40% of the test subjects produce *h*-omission (14 occurrences) on *hiatus* while 85.7% do on *hierarchy* (30 occurrences). In other words, 37.1% of the test subjects produce an /h/ in these entries in the first column of the production task.

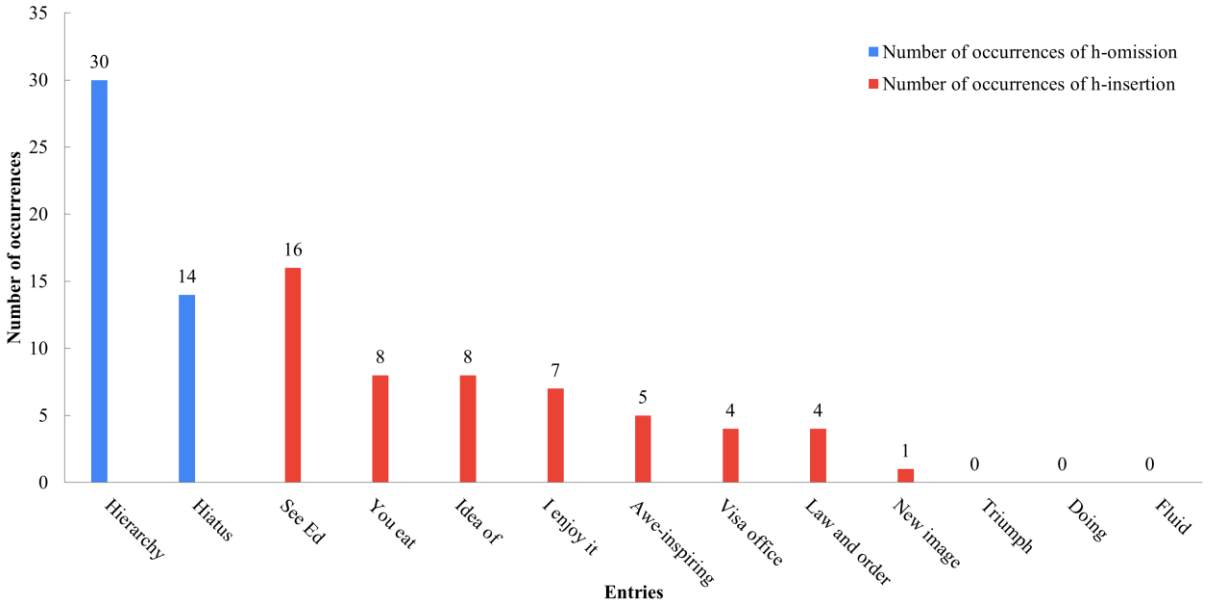

Figure 10: Number of occurrences of *h*-insertion (red) in clashing vowels in the first part of the English production task, organised in a decreasing order according to the number of occurrences of *h*-omission (blue).

Contrary to expectations concerning insertion in the second column from section 6.2.1, it is the most prevalent of the first part of the production task (15.5%). Each test subject is given respectively 8 and 7 occurrences for omission and insertion in this column, and the production of the whole sample includes 99 occurrences of omission and 38 of insertion. Overall, this column shows a prevalence of *h*-omission over *h*-insertion of 260.5% in an absolute manner, and 228% when normalised to their respective number of opportunities. Unlike insertion, the results in this second column concerning omission are in line with the expectations, since the rate of retention is of 64.6%, which is the highest in the production task.

In this column, both *h*-insertion and *h*-omission show relatively high numbers in pairs where only one or the other can be performed. This is the case for *odd-cod* /ɒd/-/kɒd/, produced 7 times as a variation of *[hɒd]-[kɒd], the vowel sometimes being lengthened to an [ɔː] or diphthongised to [oʊ]. The same can be stated about the pair *told-old* /əʊld/-/təʊld/, which showcases 9 occurrences of *h*-insertion in a variation of *[həʊld]-[təʊld], the orthographic *o* not being produced as a diphthong and instead as [ɔ] or [o]. Yet, while both these two pairs appear difficult for the test pupils to produce without adding [h], neither has the highest number of *h*-insertion in the column. As for the entries in which only *h*-omission is possible, these showcase relatively high numbers of *h*-omission, yet not the highest. *Mouse-house* /maʊs/-/haʊs/, *rank-hank* /ɹæŋk/-/hæŋk/ and *feet-heat* /fiːt/-/hiːt/ respectively show 15, 12 and 10 occurrences of *h*-omission. As for the five pairs that allow both insertion and omission, *here-ear* /hɪə(ɹ)/-/ɪə(ɹ)/ produces the highest number of both omission (17) and insertion (10) of the entire column, the semantic contrast between the words is thus eliminated, since the pair is either produced 17 times as *[ɪəɹ]-[ɪəɹ] and 10 times as [hɪəɹ]-*[hɪəɹ]. In 2 occurrences, both insertion and omission take place, and *here-ear* is produced rather as **ear*-**here*, one of which is produced with an overcompensation in the vowel; *here-ear* is thus incorrectly produced as *[ɪəɹ]-*[hɛəɹ]. To be noted that the test subjects perform similar forms of overcompensation in the vowel in an attempt to keep some sort of semantic contrast: in the case of an insertion, *here-ear* becomes *[hɪəɹ]-*[hɜːɹ] and in the case of an omission, it becomes *[ɪəɹ]-*[ɜːɹ] or [hɪəɹ]-*[heːɹ]. In the case of *eight-hate* /ɛɪt/-/hɛɪt/, the pair is produced with 16 cases of omission and 4 of insertion, 3 of which are performed at the same time as an omission. Similarly to *here-ear*, *eight-hate* sees various types of overcompensation in the form of vowel modifications: in the case of both phenomena, *eight-hate* becomes *[aɪt]-*[heːt] or [ɛɪt]-*[haɪt] in the case of an *h*-omission. Even when no insertion or omission takes place, the test subjects still produce a vowel change in order to accentuate the difference in meaning. In the case of *air-hair*, 8 occurrences of *h*-omission and 6 of *h*-insertion, of which 1 occurrence that combines both insertion and omission. The same vowel overcompensation is made with this pair too, particularly in the case of an omission: *air-hair* becomes [ɛəɹ]-*[ɜːɹ]. *Itch-hitch* /ɪtʃ/-/hɪtʃ/ and *hall-all* /hɔːl/-/ɔːl/ do not showcase both phenomena at once; they respectively have 10 and 11 occurrences of omission and 1 occurrence of insertion each. Vowel overcompensation for those pairs take the form of *[ɛɪt]-*[ɪtʃ] for *itch-hitch* in the case of an *h*-omission, [hɔːl]-*[hal] for *hall-all* in the case of an insertion and *[al]-*[ɔːl] in the case of an omission.

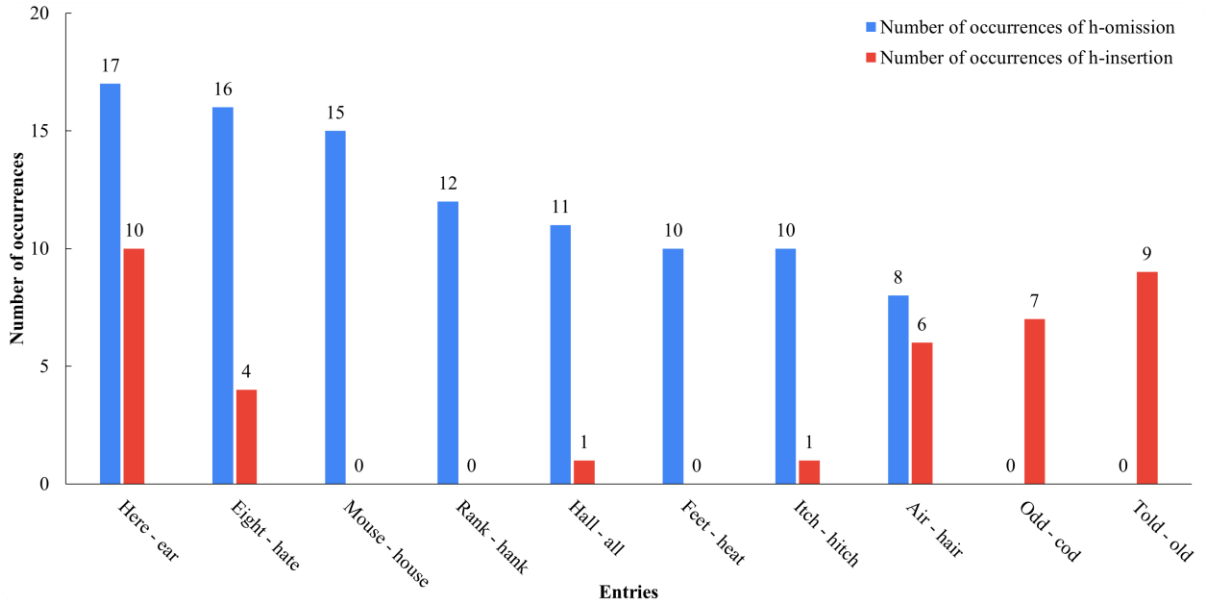

Figure 11: Number of occurrences of *h*-omission (blue) and *h*-insertion (red) in the minimal pairs in the first part of the English production test, organised in a decreasing order according to *h*-omission.

The third column (cfr. section 6.2.1) shows 13 opportunities of omission and 14 for insertion per test subject. The results contain 230 occurrences of *h*-omission, compared to 100 instances of *h*-insertion, which makes omission 230% more prevalent as insertion when discussing absolute values. When normalised in terms of opportunities, *h*-omission is even more prevalent than *h*-insertion (274.7%). In terms of expectations, this third column does not follow the expectations as the rate of insertion (14,3%) is lower than in the column of the minimal pairs (15.5%). The results are seen in Figure 12.

While omission is more prevalent, exceptions subsist and they are: *exhaust fumes* /ɪgzɔːstfjuːmz/ (1 insertion, no omission), *an eyehole* /ənaɪhəʊl/ (13 insertions for 12 omission), *an unhappy man* /ənʌnhæpimæn/ (16 insertions and omission each) and *a few miles ahead* /əfjuːmaɪlzəhɛd/ (7 insertions for 3 omissions). For *an unhappy man* and *an eyehole*, respectively 7 and 4 occurrences of both insertion and omission are observed. In both cases, 1 occurrence of a double *h*-insertion is observed; for the former, it is produced alongside omission: *[hənhʌnæpimæn]. Furthermore, there is a case in which a single occurrence of insertion is observed, yet not on *unhappy*, but on *an*, thus resulting in: *[hənʌnhæpimæn]. As for the entries that count more omission than they do insertions, they include, in rising omission-insertion ratio: *an airhole* /ənɛə(ɹ)həʊl/ (13 omissions for 11 insertions), *an unholy relic* /ənʌnhəʊliɹɛlɪk/ (18 omissions for 12 insertions), *an inhaler* /ənɪnhɛɪlə(ɹ)/ (25 omissions for 11 insertions), *unhip trends* /ʌnhɪptɹɛndz/ (16 omissions for 7 insertions), *enhance something* /ɪnhɑːns(s)ʌmθɪŋ/ (18 omissions for 5 insertions), *inhale-exhale* /ɪnhɛɪl/-/ɛkshɛɪl/

(44 omissions for 9 insertions, albeit only on *inhale*), *uphold a tradition* /ʌphəʊldətɪədɪʃ(ə)n/ (24 omissions for 3 insertions), *an inhuman character* /ɪnhjuːmənkæɹɪktə(ɹ)/ (24 omissions for 3 insertions) and *inherit something* /ɪnhɛɹɪtsʌmθɪŋ/ (24 omissions for 2 insertions). All these entries showcase instances of both insertion and omission, in the aforementioned order: 2, 7, 7, 4, 3, 4, 2, 2 and 1 occurrences. Among these entries, *an unholy relic* in produced once as *[hənhʌnəʊliɹɛlɪk], with omission and double insertion. Additionally, the phenomenon according to which insertion and omission produced in the same entry is observed in all the aforementioned entries. The highest count of such occurrences is 7, in *an unholy relic* and *an inhaler*, and the lowest includes 1 occurrence in *inherit something* and 2 occurrences in *an airhole, uphold a tradition* and *an inhuman character*. Meanwhile, 3 occurrences of both insertion and omission are observed *enhance something* and 4 in *unhip trends* and *inhale-exhale*.

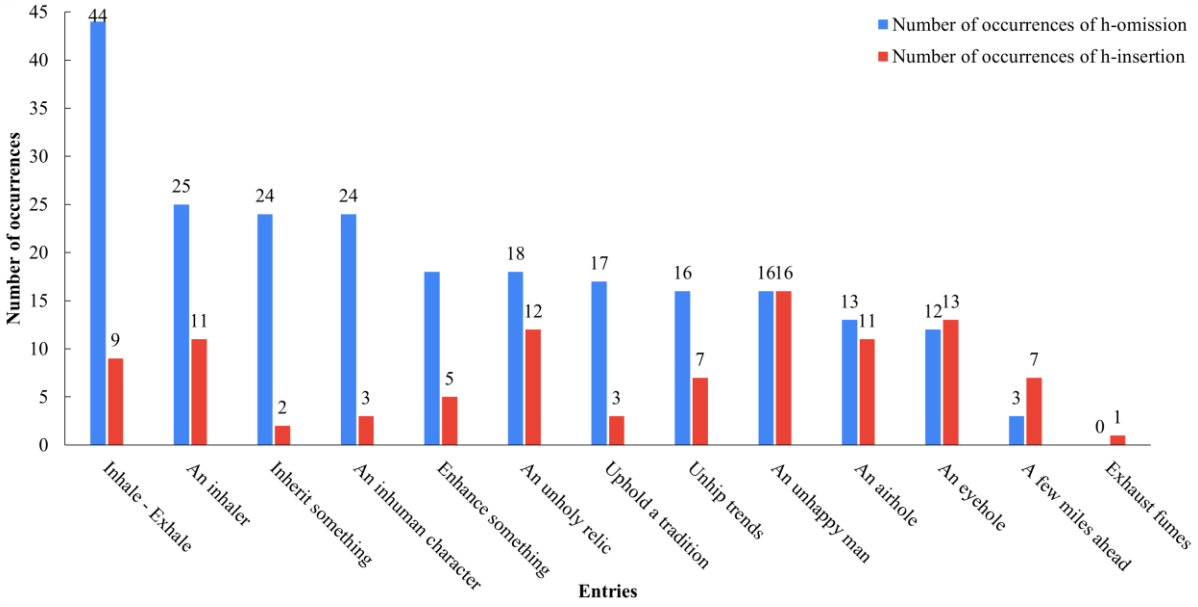

Figure 12: Number of occurrences of *h*-omission (blue) and *h*-insertion (red) in vowel-initial words containing an orthographic *h* in the next syllable in the first part of the English production task, organised in a decreasing order according to *h*-omission.

Additionally, it should be noted that the test subjects produce *uphold* as a variation of *[ʌfɔːld]: under the influence of their first language, they omit *h* by merging in with the *p* in order to form an [f] – which is the phone that is attached to the orthographic cluster *ph* in French – and make a monophthong of the diphthong – since French solely contains monophthongs. On *inhale-exhale*, omission mostly occurs on *exhale* (6 occurrences) than on *inhale* (2 occurrences) while insertion only occurs on *inhale* (5 occurrences). Cases where both words are produced with omission amount to 18, i.e., 36 in total. Overall, it appears that, while both words attract

omission, *exhale* is more likely to be produced with an *h*-omission while *inhale* is more likely to be produced with an *h*-insertion.

As for the entry *exhaust* fumes, a single test subject pronounces *exhaust fumes* with an intrusive *h*, resulting in *[hɛgzɔːstfjuːmz] with a modification of the first vowel (from /ɪ/ to [ɛ]). Similarly, the word *exhale* does not attract *h*-insertion, contrary to the expectations. This is not in line with what has been written by Hiligsmann and Rasier, albeit for Dutch. While there is an *h* in the onset of the second syllable, it appears that the test subjects do not produce an intrusive *h* in front of the word, as was expected.

In the second part of the production task, as seen in section 6.2.2, the results show that *h*-omission is 329.9% more prevalent than *h*-insertion in absolute values, which is significantly higher than in the first part of the production task. When normalised with their number of opportunities (41 for omission, 26 for insertion), the prevalence of omission over insertion is reduced to 209,2%. The score for *h*-retention is slightly higher in this second part of the production task, namely 54.7%, as opposed to the *h*-retention in the words and small verbal and nominal constituents of 53.7%. While the difference is small, this is not in line with the expectations for this part, since the first part was predicted to yield a higher rate of *h*-production. Consequently, the rate of *h*-omission for the second part is 45.3%, which is higher than in the previous part (46.3%). In this second part, 650 occurrences of /h/ are omitted while 785 are retained over a total of 1435. Extended results are represented in appendix 13.2. However, due to the small scope of the study, it might be coincidental that the second part of the production task scores higher in terms of *h*-retention than the first part. As for the intrusive *h*, this second part has a rate of occurrence of 21.6%, which is higher than in the rate of *h*-insertion in the previous part (15.6%). This is in line with the expectations concerning this part. This higher score is in part due to the test subjects producing intrusive *h* in places that have not been accounted for in section 6. This score supports Haycraft's theory that linking words together might indeed correct the error made on the intrusive *h* (Haycraft, 1971) since it appears that the test subjects have a harder time producing the phone /h/ correctly in continuous speech than in smaller constituents as seen in the first part of the production task.

On average, the test subjects omit pronouncing an [h] in 18.7 cases in the second part of the production task, while inserting 5.6 [h]. The normalised averages are respectively 45.3% for omission and 21.6% for insertion. These coincide with the numbers for the total amount of omission and insertion produced by the test subjects in the second part of the production task.

However, the averages that are given vary considerably from test subject to test subject, as the respective values of standard deviation are 10.1 and 5.8. This is visible in Figure 13. Out of a sample of 35 test subjects, 2 of the 5 test subjects that do not follow the trend of producing more *h*-omission than *h*-insertion – i.e.: they have a higher *h*-insertion rate – do not follow the same trend in the first part of the production task. In other words, they exhibit more *h*-omission than *h*-insertion in the first part than in the second part. The remaining 3 test subjects that produce more *h*-insertion in the second part of the production task perform similarly in the first part. The graph also shows that *h*-omission and *h*-insertion are independent phenomena: a test subject who produces high numbers of omission does not necessarily produce high numbers of insertion.

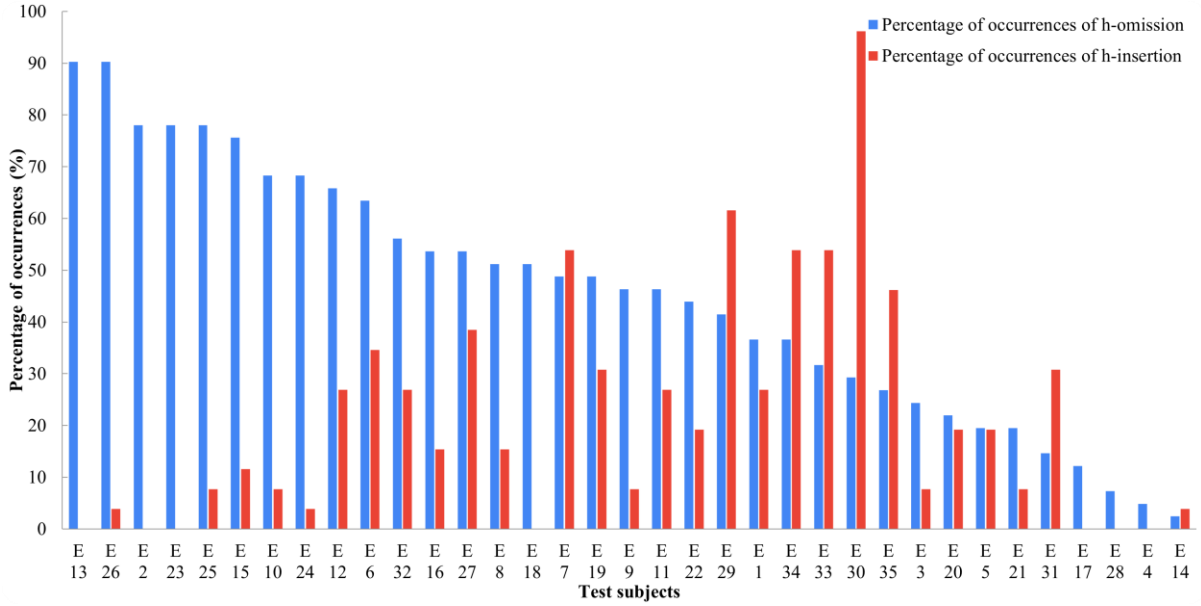

Figure 13: Percentage of *h*-omission (blue) and *h*-insertion (red) produced by the test subjects in the second part of the English production task, organised in a decreasing order according to the rate of *h*-omission. With E = English test subjects.

Detailed results show that the word with the most occurrences of *h*-omission is *has* /hæz/ with 77 occurrences and *his* /hɪz/ with 53 occurrences out of a total of 650, which respectively constitute 11.8% and 8.2% of all omissions. On the other end of the spectrum, *had* /hæd/ and *here* /hɪə(ɹ)/ with 7 and 8 occurrences of *h*-omission, respectively. Contrary to the Dutch part of the experiment, there is no dramatic modification in terms of consonants other than the [h], one of the most notable examples being *Harry* produced with a uvular *r* instead of a retroflex, post-alveolar *r*: /hæɹi/ becomes *[aʁi]; the other is *childhood* /ʧaɪldhʊd/ produced with a *[ʃ] instead of a [ʧ]. Rather, the test subjects tend to modulate the vowels on a more frequent basis. The examples of *hurry* /hʌɹi/ and *exhale* /ɛkshɛɪl/ being produced as *[jyɹi] and *[ɛgzal] on

respectively 2 and 6 occasions show modification both on the consonant and the vowel. Other examples include *inherited* /ɪnhɛɹɪtɪd/ produced as *[ɪnhɛɹaɪtɪd] showcases a modification of the vowel, from [ɪ] to *[aɪ], and *childhood* produced as [tʃi:ldhu:d].

Overall, prevalence in the production task is that *h*-omission is over two and a half times as frequent as *h*-insertion (263.7%) in an absolute manner. When normalised in terms of opportunities over the whole production task (64 for omission, 61 for insertion), this number is brought down to 251.3%. Consequently, it means that, on average, the test subjects produce more *h*-omission than *h*-insertion, however exceptions exist and are significant; 7 test subjects do not follow this trend and produce more intrusive *h* than they omit the phone in question, as visible in Figure 14. This figure also illustrates that *h*-omission and *h*-insertion in the production task do not show any correlation to one another: the test subjects who produce high numbers of *h*-omission do not produce more instances of *h*-insertion, and vice versa; *h*-insertion occurs both in the production by test subjects alongside high and low numbers of *h*-omission.

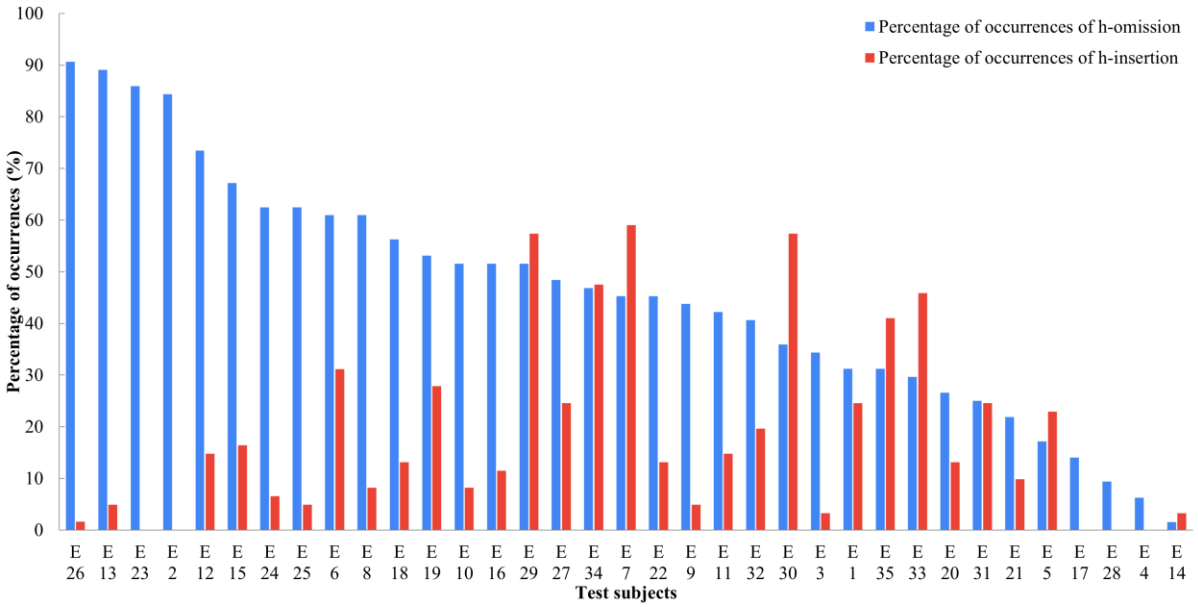

Figure 14: Percentage of occurrences of *h*-omission (blue) and h-insertion (red) per test subject in the English production task, organised in a decreasing order according to the number of *h*-omission. With E = English test subjects.

Over the course of the production task, 1023 [h] are omitted on a total of 2240, which amounts to 45% of [h] being omitted: the retention rate is of 55% as 1252 occurrences of [h] are retained. The total of 388 intrusive *h* being produced out of a total of 2135 possible loci result in a rate of *h*-insertion of 18.2%. All in all, the average count of errors made on the phone /h/ by the test subjects in the production task is of 40.5. Yet, the standard deviation of 17.5 shows that the

average is not representative of the sample; the variation per test subject in the production task is very high in terms of errors committed on the phone /h/. This is reinforced by the fact that the sample of this study is limited – i.e.: 35 test subjects per language. As a matter of fact, a larger group of subjects would yield more reliable averages on the errors made by French-speaking learners of English. As a consequence of this extreme variability from test subject to test subject, the average number of occurrences of *h*-omission is 29.5 [h] during the entire production task, but the number appears incredibly high or low according depending on the person, given that the standard deviation is of 14.9. As for the average insertion of [h], the average does not appear representative of the production of the test subjects either; 11 inserted [h] on average per test subject in the production task appears yet again extremely high for while at the same time being extremely low for others, with a high standard deviation of 10.8. In normalised numbers, the averages of a 46.3% rate of omission in the first part and a 45.3% rate in the second part are shown to not be representative of the sample. The same can be stated about insertion: a 15.6% rate of insertion in the first part and a 21.6% rate in the second part show great variability from test subject to test subject. Figure 15 and Figure 16 illustrate omission and insertion per test subject normalised in terms of their opportunities, as well as the normalised average per phenomenon. The data also shows that the test subjects who produce high numbers of either insertion or omission in the first part of the production task also tend to reproduce similar numbers in the second part, although this trend is less visible for omission.

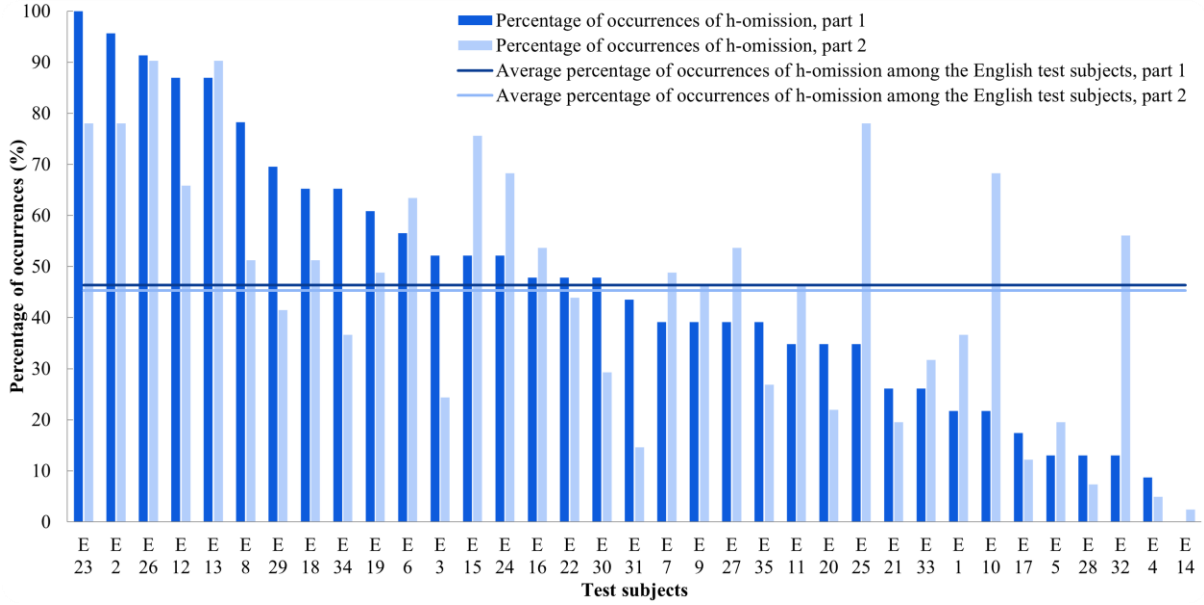

Figure 15: Percentage of occurrences of *h*-omission in first part (deep blue) and second part (light blue) the English production task per test subject, ordered in a decreasing order according to the number of *h*-omission in the first part. The averages for the first part (deep blue) and the second part (light blue) are also given. With E = English test subjects

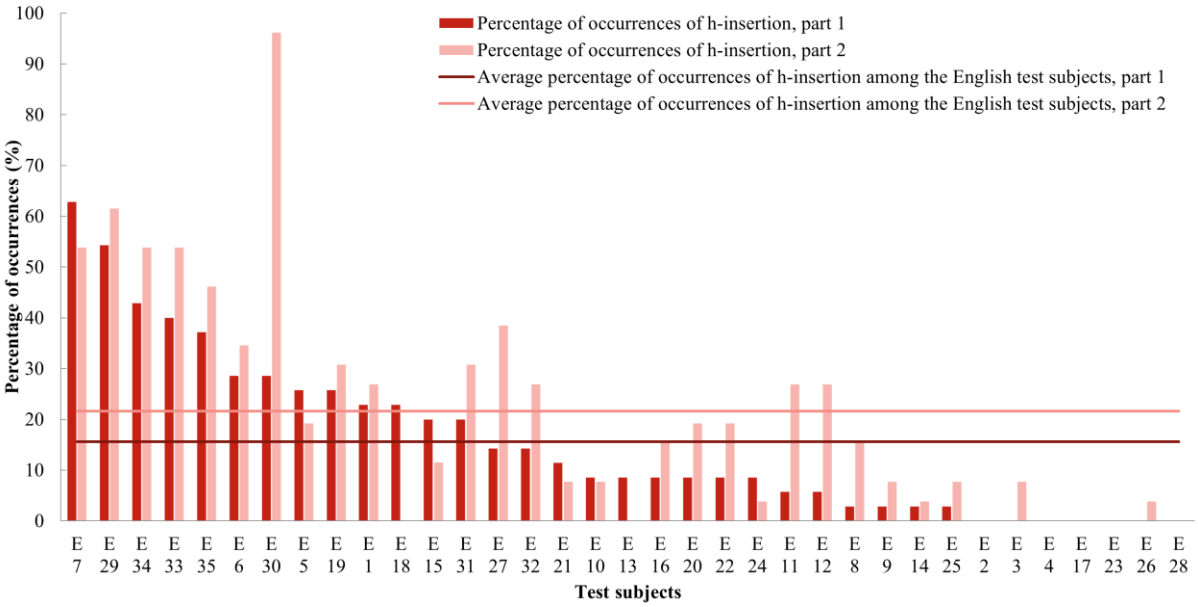

Figure 16: Number of occurrences of *h*-insertion in first part (deep red) and second part (light red) the English production task per test subject, ordered in a decreasing order according to the number of *h*-insertion in the first part. The averages for the first part (deep red) and the second part (light red) are also given. With E = English test subjects.

All in all, the test subjects do not appear to have trouble pronouncing the phone /h/, as they appear physically capable of producing the voiceless laryngeal fricative in their L2. As stated by Fayt and Heeren (2018), the test subjects can recognise the orthographic *h* and act on it accordingly, even if they omit pronouncing it in nearly half the cases. However, they appear to find difficult to know when to pronounce an [h] accurately. Much like in the Dutch part of the experiment, it is speculated that the test subjects might have trouble pronouncing clashing vowels without aspiration, as is made clear in the first column of the experiment, and confirmed by the production of intrusive *h* in similar contexts in the second part of the production task. As it is, it appears that the test subjects incorrectly use the sound [h] as a buffer sound between vowels, particularly between [ɛ] and [ɪ]. However, this is not always the case, as it is observed that the test subjects also produce an [h] without there being a clash between vowels.

Since literature about the phone /h/ in English is limited, the decision was made to draw parallels from already existing literature in Dutch. On the subject of *h*-omission, Fayt and Heeren could not conclude in their article that *h*-omission is influenced by contexts of *liaison* or *élision*,(Fayt & Heeren, 2018), however these findings do not concern the English language. On the the subject of *h*-insertion, Hiligsmann and Rasier's book *Uitspraakleer Nederlands voor Franstaligen* mentions that the intrusive *h* is a form of hypercorrection. Yet, this book is destined as learning and teaching material for teachers and learners of Dutch, not English. Yet, the theory of the four authors could still partly be applied to the type of errors made by the test

subjects during the production task. As discussed in section 4.4, English and Dutch share similarities in terms of word stress and sentence accent, and links could still be drawn between both languages.

In general, the omission of the phone /h/ is hypothesised to be a transfer from the learners' L1 to their L2, regardless of contexts of *élision* and *liaison*, since those do not impact the omission of the /h/. For this reason, *h*-omission is considered a phenomenon stemming purely from learners' first language linguistic features. This transfer is rather prevalent, since omission occurs in roughly half the production of the total amount of /h/. Yet, omission appears positively affected by connected, albeit very slightly, since omission is less prevalent in the second part of the production task.

The fact that the errors made on the intrusive *h* stem from hypercorrection on the test subject's part can be tied down to orthography, as learners who *see* an orthographic *h* might hastily produce an [h], such as in *airhole, inhale* and *inherit*. However, this does not explain other types of error made on the phone /h/. For instance, the fact that the test subjects do not produce an [h] before the word containing an *h*, but rather insert it on words before or after said word, like *an, accidently* and *air* proves that actual L2 production deviates from the hypercorrection theory of Hiligsmann and Rasier. Moreover, the results showcasing the coexistence of *h*-omission and insertion is also proof of a certain deviation from Hiligsmann and Rasier's theory. As a matter of fact, the reoccurring coexistence of *h*-omission and *h*-insertion in the same entry i**s** proof that learners are not only affected by hypercorrection but also by their L1's linguistic aspects. As both phenomena exist independently in a learner's L2 production, it appears difficult to predict whether an [h] is retained and omitted, as well as where an intrusive *h* is produced in front of certain vowels. On the one hand, although the orthographic *n* and *x* appear to be drawing out *h*-omission, one could argue that the L1 has a role to play; the words *inhale, inherit* and *exhale*, due to their similarity with French words, might be a cause of a heightened rate of *h*-omission. On the other hand, the intrusive *h* is much more difficult to predict, as it not only varies from test subject to test subject, but also from one moment in the production to another; the test subjects showcasing a low rate of *h*-insertion in the first part of the production task might very well produce many occurrences of intrusive *h* in the second part of the production (cfr. Figure 16).

Yet, the results in the second part of the production task shed light onto this other form of *h*-insertion that does not fit into the categories that are proposed in section 6; clashing vowels, minimal pairs, *h* as the onset of the second syllable of a word starting with a vowel. It is

speculated that the mere production of vowels in an unaspirated manner might be what causes the test subjects to mistakenly insert [h] where one is not needed – an example of this is *What are* produced with an [h] in between both words, in the context where a vowel is preceded by a consonant. Moreover, it appears that the test subjects that took the English part of the production task also tend to add an [h] when starting words, constituents or sentences with an intrusive *h*, as in *I* being pronounced as *[haɪ] 8 times, or *Elisa* /ɛlɪzə/ being produced as *[hɛlɪzə] 3 times – this is not the case of the Dutch part of the experiment. All in all, it appears that the test subjects have trouble producing vowels in an unaspirated manner. This is of importance, since those types of insertion were not accounted for in the methodology, while accounting for 9.4% of the number of *h*-insertion in the first part – i.e., 18 occurrences out of 191. The second part shows an increased number; 82 occurrences out of 197, thus accounting for 41.6% of the production. Overall, those occurrences account for 25.8% of the entire production. In conclusion, connected speech appears to drastically impact insertion in a negative way. While that was within the expectations laid out in the methodology, research should be carried to cover the actual production of insertion by French-speaking learners of English through new hypotheses.

On the matter of correction, Haycraft's theory on linking words together thus seems particularly on point (Haycraft, 1971), as the higher rate of *h*-insertion proves that the production of unaspirated vowels in all contexts is difficult for the test subjects, whether those contexts are included in the hypotheses or not. Since *h*-insertion has a higher rate of occurrence in the second part of the production task, i.e., connected speech, it appears essential that the test subjects become aware of their overproduction of the [h], in order to correct such error. While omission seems positively affected by connected speech, the difference in occurrence might be a coincidence, due to the small scale of the study.

7.2.2. Awareness test

Concerning the question towards the end of the production task, 23 test subjects reply with a correct answer for the question whether they could guess on which aspect of pronunciation they were being test upon. The absence of a definite answer, such as "I don't know", is counted as an incorrect answer. In order to evaluate whether the awareness of the test subjects could exert influence on the result of the production task, a chi-square test of independence is conducted (cfr.: appendices 13.4). Since $p = 1.84$, the null hypothesis according to which the

results of the production task and the result of the answer to the question are independent, cannot be rejected. For this to be the case, the value of *p* would have to be < 0.05. As a consequence, it can be stated that the test subjects that answer correctly to the question do not perform better than the test subjects that answer incorrectly, or with uncertainty. The data is organised bearing in mind clusters of the number of errors committed by the test subjects in the production task, as well as organising groups of similar sizes. In doing so, it allows for groups to form that are as homogeneous as possible.

7.2.3. Perception task

The average score on the perception task is of 16.7; the highest score attainable by the test subjects is 20. Extended results are represented in appendix 13.3. Overall, the test subjects score rather well on perception; 25 test subjects obtain a score equal to or higher than 15, 3 of whom perform flawlessly on the perception task. The remaining 10 test subjects score between 8 and 15 on the test. The expectations regarding the perception task were that lower results in the production task might be explained through lower results in the perception task. The results of the perception task are not in line with these expectations, since the test subjects who score badly on the production task also have high results in perception compared to the test subjects who score well in production.

Going into more detail, the perception task sheds light on the fact that *odd-cod* is the most problematic pair for the test subject to evaluate whether an [h] can be heard. As a matter of fact, 17 test subjects evaluate hearing no [h] in this pair, which means that more than half the test subjects mishear this pair by indicating that they hear an [h]. Out of the 18 test subjects who report hearing an [h], 13 report hearing it on *odd* and 2 report hearing an [h] in both words, the remaining 3 test subjects report hearing no [h] in *odd* and 1 test subject report hearing it in *cod.* The second most problematic pair is *old-told*, which has a rate of correct evaluation of 60%. Out of the 14 test subjects that report hearing an [h], 10 – i.e.: 71.4% of them – report hearing it on *old*.

It is speculated that the absence of any [h] in a word that is paired with another word that starts in a distinctive manner (in these cases, [k] and [t]), may lead the test subjects to mistakenly expect an [h] where there is none to be heard. This may explain why other pairs such as *rank-hank, feet-heat* and *mouse-house* – in which a word starting with an [h] is paired with a word that starts with another consonant – have high perception results: respectively 91.4%, 88.6%

twice. Other pairs that are evaluated with a high rate of correctness are *air-hair* and *eight-hate* in which 31 test subjects in each pair can correctly identify the [h], thus also yielding correct answers in 88.6% of the cases.

Yet, the other pairs with the contrast [h]-[empty onset] exhibit a tendency among test subjects to not only miss the [h] on the word that has it, but also misidentify it on the word that does not contain it. For instance, 7 test subjects identify the pair *here-ear* (65.7% correctly evaluated) as **ear-here*, while 7 others perceive *hall-all* (65.7% correctly evaluated) as **all-hall*. The switch-up is the most prevalent mistake in both these pairs; respectively 2 and 1 test subjects report hearing an [h] in both words, while 3 and 2 test subjects do not perceive an [h] at all. Lastly, *itch-hitch* (68.6% correctly evaluated) showcases more distributed mistakes in perception: 6 test subjects report hearing an [h] in both words, while 4 report hearing an [h] on *itch* only, the last test subject to make a mistake on this pair reports not hearing any [h] in this pair.

It appears that test subjects perform better in identifying the [h] in pairs in which the word starting with the [h] comes second. This contradicts the results that Fayt has reported in his 2015 Bachelor's thesis as well as his 2018 article with Heeren (Fayt, 2016; Fayt & Heeren, 2018). While the results are written for perception in Dutch, the results in the English task were expected to follow the same trend. This perception task proves otherwise, as it appears that French-speaking learners of English perceive the difference best when the [h] is heard in the second word of minimal pairs.

Conclusion and Outlook

8. Conclusion

According to the results, it can be stated that both phenomena of *h*-insertion and *h*-omission operate independently in the test subjects' L2 production, and the reoccurrence of both phenomena varies depending on the target second language. Before the experiment, more *h*-omission was expected in the second part of the production task. This expectation is respected with regards to the experiment in Dutch only. This is not the case for the English part of the experiment, since it shows an increase in omission. Yet, that increase is so small that it is hard to consider it significant. In terms of *h*-insertion, the expectations were that more occurrences of intrusive *h* would be observed in the second part. This holds true according to the results obtained in the experiments in each language.

In general, the test subjects omit more than they insert, however, about 20 to 25% of the test subjects in each language do not follow this trend. As for the quantities of committed errors, the test subjects who omit high numbers of /h/ do not necessarily produce more intrusive *h* either; the reverse is also true: the test subjects who insert high numbers of [h] do not necessarily omit more /h/ either. However, a slight trend is observed among the test subjects over the course of the production task; those who perform well in the first part are more likely to perform well in the second part of the production task, although, exceptions subsist. As it is, the phenomena of omission and insertion are not only variable from test subject to test subject, but also from one part of the production task to the other. A clear pattern is hard to establish because the variability is high and, at times, nearly random in nature.

Through the awareness test, it can be proven that the awareness of the test subjects about the production task does not have any influence on the number of errors produced by the test subjects. The test subjects who perform well on the production do not guess more accurately that the production task has the phone /h/ as its focus, while the test subjects who do not perform as well as the average test subject, can still grasp that the phone /h/ is being studied.

As for the perception task, the scores are relatively high in both languages, thus confirming that perception precedes production (Ellis, 2015; Escudero, 2007; Fayt, 2016). Furthermore, the scores obtained in the perception task are not correlated to the number of errors committed in the production task. Therefore, the expectations towards the perception task are not fulfilled. The test subjects who perform well on the perception task do not necessarily perform well in the production task; the reverse is also true. All in all, no pattern is observable when linked with the two other parts of the experiment, the production task and the awareness test. Yet,

patterns in perception of the phone /h/ per entry are visible from the results: the test subjects in the Dutch perception task subjects have an easier time discerning the /h/ in entries in which the word starting with the letter *h* comes first while in the English part of the perception task, the test subjects recognise the /h/ best when the word starting with the letter *h* comes second.

Nonetheless, the formulation of the instructions and questions on the perception task could have been opaquer, so as to not reveal the intent of the perception task to the test subjects, this is why it was deemed unnecessary for the test subjects to answer the question on awareness after the perception task. The answers that were voluntarily given by the test subjects were all similar in nature (translated): "the sound 'h' [is being studied]". This is the reason why the "awareness" test is not accounted for with regards to the perception task. Due to the instructions' very explicit language, the test subjects might have been hyperaware about the phone /h/ while listening to the audios. Yet, while it has been established that learners of Dutch are not deaf to the phone /h/ (Fayt, 2016; Fayt & Heeren, 2018) – this study confirms the statement about French-speaking learners of Dutch and provides insight on the perception of French-speaking learners of English – wording the instructions and questions differently might have eliminated a certain bias during the second part of the test.

The limitations in this study are to be mentioned and explained. The first of which concerns the sample of pupils that have taken part in the study. Since the two groups of languages in both schools consist of pupils coming from different options (sciences, mathematics-sciences, languages, Latin etc.), it should be noted that results may differ from pupil to pupil, depending on the option they are in, while studying one or the other target language as a first foreign language. However, because the test subjects have been interrogated anonymously, the extent to which the results are influenced by the option that the pupils have chosen as a major cannot be researched thoroughly. Further research should clarify whether this factor has an influence on the language proficiency among pupils of different options. A second factor that contributes to one of the limitations of this study is the socio-economic levels of the schools and the pupils individually. Those have not been investigated within the scope of this study. While this remains unknown for each test subject individually, the schools involved in the study have a score of 14 and 15 for the Athénée Jules Bara and 19 for the Collège Notre-Dame in the year 2021, according to an *Arrêté* emitted by the French Community published on the 2nd of July 2021 (Arrêté Du 16 Juin 2021 Établissant Un Indice Socio-Économique Par Implantation Scolaire, 2021). The schools located in the area falling under Government of the French Community obtain scores ranging between 1 and 20, depending on various factors elaborated

in the *Arrêté*. Hence, the high scores of both schools that are involved in this study might bias the results obtained in the study. Pupils attending these schools are overall from an upper-intermediate socio-economic class, and their interest and/or performance in foreign languages might be influenced by this. In a similar fashion, both schools are part of the *enseignement général* ("general education") which is more theoretic than the other three types; technical, artistic or professional education). Further research would be needed in order to investigate whether the socio-economic class of the school and/or the pupils individually could exert a significant influence on the pronunciation of the phone /h/ in both Dutch and English. Whether other types of education could influence the production of the phone /h/, might also be an interesting point for further research. The third and last factor that could show significance in this study is the difference between male and female test subjects. The limit of the results is that it does not consider the gender of the test subjects within the interpretation. Rather, the focus lies within the group of pupils in their final year of secondary education. For that matter, if there is any difference in performance depending on gender, no mention has been made about it. Yet, further research into the phone /h/ put into relation with gender might bring trends into the light that could be beneficial for the understanding of the errors made on this phone.

Moreover, while the results obtained in this study showcase the test subjects' visible difficulty with the phone /h/, it is to be noted that some of the word choices might have been too ambitious for pupils in the final year of secondary school. In English, the words *hiatus* and *hierarchy* notably show variable pronunciation, mostly depending on the proficiency of the pupil in English; the pupils with the least pronunciation problems with the phone /h/, and with other aspects of language, showcase less difficulty in pronouncing *hiatus* and *hierarchy*. Many test subjects not only omit the letter *h*, but they also do not know where to put the word stress. This comforts the hypothesis that teaching word stress and sentence accent might help with this problem in language. Examples of incorrect pronunciation often include substituting the English sounds for French ones, such as producing the *-ch-* in *hierarchy* as *[tʃ] instead of [k], and producing the word stress on the final syllable. In Dutch, these words include *beëindigen* ("to finish") and *engheid* ("creepiness"), which test Hiligsmann's and Rasier's hypothesis on adding an [h] before words in which the first syllable starts with a vowel and is followed by another syllable starting with the letter *h*. On these words, many test subjects hesitate, stutter or overcompensate for the letter *h* through the letter *g* preceding it by producing a soft *[ɣ]. They also produce other errors of mispronunciation, such as adding syllables or modifying the vowels and consonants composing the words.

9. Outlook

Concerning the recordings, it should be noted that those have been analysed by ear individually. This is due to the fact that the recordings presented loud background noise, interferences, or both aspects, since a quiet classroom could not always be made available. Consequently, no software, such as *Praat*, could be used in the analyses, particularly due to the background noise. With efficiency as a primary concern, similar research should be carried out in optimal space for recording, in order to perform analyses in a more accurate and automated manner.

All in all, promoting fluency is regarded to be highly valuable for the acquisition of a target language. Strategies, alternative methods can be brought in the classroom to teach pronunciation to pupils learning in secondary schools. Celce-Murcia et al. (1996) mention Gilbert (1994) when discussing the teaching of pronunciation and intonation in second language acquisition:

> [There are] three guiding principles that can assist teachers in moving beyond traditional teaching practices. These include (l) using methods other than mechanical drills or rules, (2) emphasizing the musical aspects of pronunciation more than sounds, and (3) teaching real speech patterns and giving students practice in efficient guessing of what discourse signals imply (Gilbert, 1994, as cited in Celce-Murcia et al., 1996, p. 290)

Nonetheless, it can be argued that it comes across as bizarre that the pupils would be evaluated on their pronunciation (*Evaluation certificative - CE1D - langues modernes - 2021 - grilles évaluation (ressource 16132)*, 2021; *Outils d'évaluation Secondaire 1dg - Néerlandais - Rendez-Vous à La Gare - Dossier Enseignant - (Ressource 5645)*, 2009) given the scarcity, and even lack of teaching of said pronunciation in French-speaking schools (*Socles de Compétences : Langues Modernes*, 2016). As a matter of fact, when preparing for the evaluation, pupils are given the tools to succeed: vocabulary, grammar, relevant input, etc... It is rarely the case that they also receive the explicit pronunciation of either words or sentences that are seen in class, or even have an hour dedicated to pronunciation and intonation. Yet, while the evaluation monitors the degree of mastery of the tools that were given by the teacher to the pupils for an oral task, such as vocabulary and grammar, it is also noticeable that assessing pronunciation and intonation are also a part of the grid. Consequently, how can one assess a pupil's pronunciation and intonation, or rather, how much their accent influences intelligibility, when pronunciation and intonation or other intricacies of spoken language are never explicitly given in the first place? It appears crucial that pronunciation and intonation of any given language should at the very least be explicitly taught to the learners for it to be an adequate explicit object of evaluation.

Additionally, further research could be carried out on the effectiveness of explicit instruction regarding pronunciation, intonation, and more specifically the phone /h/. In doing so, it makes possible the development of strategies specifically designed for the acquisition of this phone by French-speaking learners of Dutch and English. Studies could require monitoring learners over a couple of years, or even for longer periods, in order to assess the effectiveness of various strategies. One of those strategies could include teaching linking sounds, so as to avoid producing intrusive *h* in between clashing vowels. Specifically, the sound [o] followed by [i] and [ɑ], as this is mildly problematic as seen in the present study in section 7. It is to be noted that Hiligsmann and Rasier's book (Hiligsmann & Rasier, 2012) does not provide any linking sounds for transitions from [o] sounds to [i], [ɑ] or [e], which are relatively difficult transitions for French-speaking learners of Dutch, as demonstrated in the present study. While there is no category for linking sounds between clashing vowels, the first of which is an [o], Hiligsmann and Rasier do mention one example with an [o] to [ɑ] transition under the *w*-insertion category, namely the word *boa* [bo.ʷɑ] ("boa") (Hiligsmann & Rasier, 2012, p. 62). It could be argued that adding a third category for transitions in Dutch from [o] to [i] in *zoiets* [zo.ʷits] ("something like this"), from [o] to [ɑ] as in *autoalarm* [ɔutoʷɑlɑrm] ("car alarm") and from [o] to [e] as in *domino-effect* [do.minoʷefɛkt] ("domino effect"), could help learners of Dutch in transitioning sounds with a [w] instead of the [h] that test subjects produce in such contexts. The reasoning behind this being that the roundedness of the [o]-sound is similar to the roundedness of a [w], and thus, inserting a [w] could guide learners into not producing an intrusive *h* between an [o] and another vowel pertaining to another syllable. Moreover, teaching [w] as a transitional sound in a pedagogical context appears crucial, since entries like *you eat* [juːʷiːt] and *new image* [njuːʷɪmɪdʒ], which attracted moderate to high numbers of occurrences of intrusive *h*, might gain in correct production among French-speaking learners of English too.

Similarly, teaching the [j] as a transitional sound might also benefit pupils in their learning of L2 pronunciation, given that entries that are targeted towards the [j]-sound result in the several of the most problematic transitions; *I enjoy it* [aɪʲɛndʒɔɪʲɪt], *see Ed* [siːʲɛd], *mini-emmer* [mi.niʲɛmər] would all gain in correctness in pronunciation if pupils were to replace the intrusive *h* they use as a buffer, by a transitional [j]. While Hiligsmann and Rasier do not provide a transitional sound for the vowels [i]-[ɛ], it could be argued that, since Lee categorises this pair under the clashing vowel pair that benefits from a *j*-insertion in English (Lee, 2018), the Dutch language could also use the insertion of [j] in similar a context.

Lastly, glottal stop insertion could also be considered as another category addition, for clashing vowels that do not fit into the aforementioned categories as established by Hiligsmann and Rasier (2014) and Lee (2018) are problematic according to the results in section 7. The test subjects that have difficulty dealing with clashing vowels [ə]-[a], [a]-[a] and [ɪə]-[ɒ] in words like *ongeacht* [ɔnɣəʔɑxt] ("regardless"), *gala-avond* [ɣa.laʔa.vɔnd] or [ɣa.laʔa.vənd] ("gala evening") and *idea of* [aɪdɪəʔɒf] might benefit from integrating the glottal stops into their oral L2 production. As it is, those transitions are the most problematic for learners in Dutch and English. Consequently, having learners of Dutch train for glottal stops might help reduce the problem of the *h*-insertion. However, further research would be needed in order to confirm present and aforementioned additions as linking sounds categories.

While the glides [j] and [w] between two constituents are not phenomena that occur in Dutch (Hiligsmann & Rasier, 2012), it can be argued that, in a pedagogical context, the teaching of these linking sounds might help reduce *h*-insertion in learners' L2 speech. As it is, the objective of reducing the insertion of [h] could be achieved through replacing that same phone between clashing vowels by linking sounds – glides or glottal stops alike. In cases where the addition of [h] is observed in lieu of a glottal stop between clashing vowels, Hiligsmann hypothesises that the error that learners make, might stem from the place of articulation (Hiligsmann, personal communication, 29 July 2021), i.e., the laryngeal fricative and the glottal stop are both executed in the back of the mouth. As a consequence, the fact that learners pronounce an [h] instead of a glottal stop between clashing vowels where no glide can be inserted, reinforces the idea that learners need to be made aware of linking sounds and how to use them, particularly in connected speech, as seen in the second part of the pronunciation part with the sentences. Further research would be needed in order to propose hypotheses that better encompass the actual production of French-speaking learners of Dutch and English surrounding the phone /h/.

Nonetheless, more than transitioning from vowel to vowel, it also appears that the test subjects have trouble producing vowels without any form of aspiration, whether those be preceded by another vowel, a consonant, or nothing at all. To this end, the results were not expected to yield so many occurrences of intrusive *h*, the test subjects frequently deviating from the hypotheses made on insertion. In Dutch, nearly 1 occurrence out of 5 deviates from the hypotheses, while the same phenomenon can be observed in English for 1 occurrence out of 4. In English, entries like *law and order* or *I enjoy it* showcase that phenomenon well. Those are entries in which the test subjects produce an intrusive *h* in front of *order* and in front of *I*, while the orthographic *h* is absent in the written and spoken form of the entries. That the test subjects produce an

intrusive *h* at the beginning of a sentence, such as *Elisa,* is also very visible in the English part of the production task. In Dutch, the phenomenon appears less prevalent, though occurrences are observed, such as the intrusive *h* in front of the *oog* in the idiom *Oog om oog* and *overkomen* in the sentence *Zoiets was mij nooit overkomen.* In both cases, insertion happens on either a vowel preceded by a consonant and a vowel that constitutes the beginning of a sentence. Consequently, further research is needed to expand on the hypotheses of insertion. As it is, broadening the hypotheses on insertion to encompass the real production of learners might help understand where exactly the problem of insertion stems from and design methods to correct this mispronunciation.

To this end, actively teaching speech patterns, as suggested by Haycraft, might help correct errors on the phone /h/ (Haycraft, 1971), yet further research would have to confirm if an improved word stress pattern and sentence accent could help reduce both *h*-omission and *h*-insertion. This is also supported by Fayt's research, that pupils tend to overemphasise the word containing an *h* (Fayt & Heeren, 2018). Hiligsmann, in a personal communication, hypothesised that the production of intrusive *h* might stem from a will of the test subjects to produce word stress or sentence accent, even if the *h* is orthographically absent from the written material (Hiligsmann, personal communication, 30 July 2021). This would put the teaching of stress and accent in a peculiar position, greatly emphasising the importance of speech patterns in second language teaching and acquisition, particularly that of the authentic acquisition of the phone /h/ by French-speaking learners. Another hypothesis on reducing errors on the /h/, would be raising learners' awareness on the errors they make on this phone, in the sense that they should indeed be pronouncing it. As a matter of fact, raising awareness might help reduce occurrences in their L2 speech and correct this slip in pronunciation, even more so if this is executed alongside explicit teaching (Meritan & Mroz, 2019).

All in all, research on the phone /h/ in second language acquisition, for both Dutch and English as target languages, remains quite limited. While studies have been carried out for Dutch as a second language, they do not, however, take the intrusive *h* into account, even if the phenomenon has been reported in the literature. As for English as a second language, research could be carried out on the acquisition of the phone /h/, not only among French-speaking learners of English, but also among speakers of other Romance languages. It could shed light on the intrusive *h* as a problem that is probably linked to languages that do not contain the phone /h/ in their phonological systems. Exceptions in the family of the Romance languages should be born in mind if those languages include the phone /h/ in their phonology, such as

Romanian. Hypothesis is made that, since the Romanian language contains an /h/ in its language, it is much easier for Romanian learners (of English, and Dutch, theoretically speaking) to integrate it to their target language. As a matter of fact, it is an identical sound, according to Flege, and therefore does not interfere with assimilation, and this is supported by Best's PAM model (Best, 1995; Flege, 1987, 1995). Yet, this is not to say that learners whose first language contains a phone /h/ do not have trouble with this sound in their target language. As a matter of fact, since the study was carried out in Belgium, one point could be made to highlight a contrastive analysis of how Flemish learners of English assimilate the phone /h/ in their target language, compared to their French-speaking fellow Belgians. In conclusion, more contrastive studies could enlighten the manners with which this phone is handled. This might lead to new ways that could be applied to French natives who are learning English and Dutch, in order improve their mastering of the phone /h/.

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Appendices

10. Translation in English of the Dutch experiment

Language: Dutch **Pupil nb.:**

Words

Read the words below.

Continueren	Daar - haar	Iets afhakken
Zoiets	Uur - duur	Iets omhoog houden
Domino-effect	Eerlijk - heerlijk	Een eenheid
Autoalarm	Heel - veel	Iemand ophalen
Ongeacht	Daar - naar	Iets aanhebben
Na-apen	Hoor - oor	Een eihoofd
Gala-avond	Bad - kat	Iets afhalen
Beëindigen	Waar - maar	Uitheemse bloemen
Beïnvloeden	Oog - hoog	De engheid van iets
Reünie	Hand - tand	Iets uithalen
Café-eigenaar	Eet - heet	Ophouden met iets
Mini-emmer	Boog - oog	Een eekhoorn
Zij-ingang	Haan - aan	Iets aanhalen

Language: Dutch **Pupil nb.:**

Sentences

Read the sentences below.

1. Ik heb het meerdere keren aangehaald: je hond zal je houding na-apen, je moet daarmee opletten.
2. Helaas zingt de zangeres niet in harmonie met het koor.
3. Ik voel dat we bij elkaar horen, ongeacht de uitkomst.
4. Ik heb haar moeten tegenhouden.
5. Eerlijk gezegd vind ik haar helemaal niet aardig.
6. Hoe oud ben je? Ik ben achttien jaar oud.
7. Wij hebben een mooi huis met acht slaapkamers.
8. Je zou aandacht moeten hechten aan je uitspraak.
9. De zijtakken afhakken houdt de bomen gezond.
10. De leraar zal de les grammatica beëindigen en continueren met een les Nederlandse woordenschat.
11. De haan kraait elke dag rond vier uur ’s morgens.
12. Oog om oog, tand om tand.
13. Het vlindereffect is een soort domino-effect, het kan heel veel gebeurtenissen beïnvloeden.
14. We komen aan rond acht uur ’s avonds. Kom je ons ophalen?
15. Zoiets was mij nooit overkomen.
16. Uitheemse bloemen zou je moeten uithalen omdat die het lokale ecosysteem kunnen vernietigen.

In this first part of the test, what do you think was the aspect of pronunciation you have been evaluated on? _____

Language: Dutch **Pupil nb.:**

Listening: Minimal Pairs

Do you hear an *h*? The number 1 corresponds to the first word that is pronounced, the number 2 corresponds to the second word that is pronounced. Cross out the number if you do not hear an *h* or circle the number if you hear one.

Words	**Do I hear an *h*?**
A.	1 ---- 2
B.	1 ---- 2
C.	1 ---- 2
D.	1 ---- 2
E.	1 ---- 2
F.	1 ---- 2
G.	1 ---- 2
H.	1 ---- 2
I.	1 ---- 2
J.	1 ---- 2
K.	1 ---- 2
L.	1 ---- 2
M.	1 ---- 2

In this listening test, what is the aspect of language that has been studied, according to you?

_____

11. Translation in English of the English experiment

Language: English **Pupil nb.:**

Words

Read the words below.

Hiatus	Odd - cod	Enhance something
Triumph	Here - ear	Unhip trends
Hierarchy	Rank - hank	An eyehole
See Ed	Row - bow	An unholy relic
I enjoy it	Mouse - house	Exhaust fumes
Doing	Told - old	An inhaler
Fluid	Feet - heat	Inhale - Exhale
You eat	Rash - bash	Inherit something
New image	Itch - hitch	An unhappy man
Idea of	Eight - hate	An airhole
visa office	Bold - mold	Uphold a tradition
Law and order	Hall - all	An inhuman character
Awe-inspiring	Air - hair	A few miles ahead

Language: English **Pupil nb.:**

Sentences

Read the sentences below.

1. He is blowing air through the airhole.
2. Space X has enhanced its rockets; but it still needs to work on how to reduce the exhaust fumes.
3. I hate the idea of hierarchy and law and order.
4. Have you heard about Harry? – Who do you mean? Harry Potter?
5. How old are you? I am eighteen years old.
6. Do you eat healthy food?
7. Last year, I inherited grandma's fortune when she passed away, and this makes grandpa unhappy, because he wanted to have it all.
8. I accidently overheard his conversation with her.
9. He has a habit of biting his nails.
10. I had a happy childhood.
11. What are you doing here? Are you in a hurry?
12. When you feel anxious, inhale deeply and slowly exhale – use an inhaler if you need to.
13. I see Ed has damaged his hair because of the heat.
14. Elisa told me that the criminal was apprehended in his own house.
15. Bungee jumping? I enjoy it very much.
16. Thomas has a skin rash, it is itchy.

In this first part of the test, what do you think was the aspect of pronunciation you have been evaluated on? _____

Language: English **Pupil nb.:**

Listening: Minimal Pairs

Do you hear an *h*? The number 1 corresponds to the first word that is pronounced, the number 2 corresponds to the second word that is pronounced. Cross out the number if you do not hear an *h* or circle the number if you hear one.

Words	**Do I hear an *h*?**
A.	1 ---- 2
B.	1 ---- 2
C.	1 ---- 2
D.	1 ---- 2
E.	1 ---- 2
F.	1 ---- 2
G.	1 ---- 2
H.	1 ---- 2
I.	1 ---- 2
J.	1 ---- 2
K.	1 ---- 2
L.	1 ---- 2
M.	1 ---- 2

In this listening test, what is the aspect of language that has been studied, according to you?

_____

12. Results of the Dutch part of the study

12.1. First part of the production task: Words

Entries	**Omission**	**Insertion**
Continueren	/	0
Zoiets	/	0
Domino-effect	/	1
Autoalarm	/	3
Ongeacht	/	10
Na-apen	/	10
Gala-avond	/	17
Beëindigen	/	11
Beïnvloeden	/	3
Reünie	/	0
Café-eigenaar	/	1
Mini-emmer	/	10
Zij-ingang	/	2
Total first column	**/**	**68**
Daar - haar	15	/
Uur - duur	/	2
Eerlijk - heerlijk	17	1
Heel - veel	8	/
Hoor - oor	22	2
Oog - hoog	20	2
Hand - tand	13	/
Eet - heet	4	2
Boog - oog	/	3
Haan - aan	9	3
Total second column	**108**	**15**
Iets afhakken	11	5
Iets omhoog houden	46	3
Een eenheid	8	13
Iemand ophalen	8	19
Iets aanhebben	12	9
Een eihoofd	17	6
Iets afhalen	9	14
Uitheemse bloemen	21	0
De engheid van iets	3	6
Iets uithalen	13	5
Ophouden met iets	11	7
Een eekhoorn	25	2
Iets aanhalen	12	12
Total third column	**196**	**101**
Total	**304**	**184**

12.2. Second part of the production task: Sentences

Sentences	Omission	Insertion
Ik heb het meerdere keren aangehaald: je hond zal je houding na-apen, je moet daarmee opletten.	90	18
Helaas zingt de zangeres niet in harmonie met het koor.	77	0
Ik voel dat we bij elkaar horen, ongeacht de uitkomst.	24	10
Ik heb haar moeten tegenhouden.	61	0
Eerlijk gezegd vind ik haar helemaal niet aardig.	38	4
Hoe oud ben je? Ik ben achttien jaar oud.	22	29
Wij hebben een mooi huis met acht slaapkamers.	38	1
Je zou aandacht moeten hechten aan je uitspraak.	29	1
De zijtakken afhakken houdt de bomen gezond.	34	0
De leraar zal de les grammatica beëindigen en continueren met een les Nederlandse woordenschat.	0	14
De haan kraait elke dag rond vier uur ’s morgens.	13	5
Oog om oog, tand om tand.	0	14
Het vlinder-effect is een soort domino-effect, het kan heel veel gebeurtenissen beïnvloeden.	60	11
We komen aan rond acht uur ’s avonds. Kom je ons ophalen?	13	15
Zoiets was mij nooit overkomen.	0	2
Uitheemse bloemen zou je moeten uithalen omdat die het lokale ecosysteem kunnen vernietigen.	63	6
Total	**562**	**130**

12.3. Perception task

Entries	D 1	D 2	D 3	D 4	D 5	D 6	D 7	D 8	D 9	D 10	D 11	D 12	D 13	D 14	D 15	D 16	D 17	D 18	D 19	D 20	D 21	D 22	D 23	D 24	D 25	D 26	D 27	D 28	D 29	D 30	D 31	D 32	D 33	D 34	D 35	Total	#0	#1	#2
A. haar-aan	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	70	0	0	35
B. uur-duur	1	1	1	1	2	2	1	1	1	1	1	1	1	1	1	2	1	1	1	1	2	1	2	2	1	1	1	2	1	2	2	2	1	2	2	47	0	23	12
C. boog-oog	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	2	2	1	1	1	1	37	0	33	2
D. eerlijk-heerlijk	2	2	2	2	2	2	2	2	0	2	2	2	2	2	2	2	2	2	2	0	2	2	2	2	0	0	2	2	2	2	2	2	2	2	2	60	5	0	30
F. heel-veel	2	2	2	2	2	2	2	2	2	0	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	68	1	0	34
G. oor-hoor	2	0	0	2	2	2	2	2	2	2	2	2	0	2	0	0	2	2	0	0	2	2	2	1	2	2	2	2	2	2	2	2	0	2	2	52	8	2	25
I. eet-heet	2	2	2	2	2	2	2	2	0	2	0	2	2	0	2	2	2	2	0	2	2	2	2	1	0	2	2	2	2	2	2	2	2	2	2	59	5	1	29
J. hand-tand	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	1	1	2	2	2	2	2	2	2	2	2	2	68	0	2	33
L. oog-hoog	2	2	0	0	2	2	2	0	2	2	2	0	2	2	0	2	0	2	2	0	2	2	2	2	0	0	2	2	2	0	2	2	0	2	2	44	13	0	22
M. daar-haar	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	70	0	0	35
Total	18	16	14	16	19	19	18	15	14	16	16	16	16	16	14	17	16	18	14	12	17	14	19	19	11	11	18	19	18	18	20	19	14	19	19	o -	- o	- -	o o
o - haar-aan	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	19	4		
- - uur-duur	o -	o -	- o	- o	o -	- o	o -	o -	o -	o -	o -	- o	o -	o -	o -	2	o -	o -	2	- o	o -	o -	2	2	o -	o -	- o	- o	2	2	2	o -	o -	2	8	25		
- - boog-oog	- o	o -	- o	o -	- o	o -	- o	o -	- o	- o	- o	- o	o -	- o	- o	- o	o -	- o	- o	- o	o -	- o	- o	- o	- -	- -	- o	- o	2	2	- o	- o	o -	- o	5			
- o eerlijk-heerlijk	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	5	1		
o - heel-veel	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2				
- o oor-hoor	2	0	0	2	2	2	2	- -	2	2	2	2	2	2	0	2	2	2	2	2	2	2	2	2	2	o o	2	2	2	2	2	2	2	2	2	8		1	1
- o eet-heet	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	- -	0	2	2	2	2	2	2	2	2	5		1	
o - hand-tand	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	- -	- -	2	2	2	2	2	2	2	2			2	
- o oog-hoog	2	2	0	0	2	2	2	2	2	2	2	0	2	2	0	2	0	2	2	0	0	0	2	2	0	0	2	2	2	0	2	2	0	2	2	13			
o - daar-haar	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2				

12.4. Chi-square test of independence

Results

	≤ 31	≤ 43	≤ 53	**total**
incorrect	8	6	6	20
correct	7	6	2	15
total	15	12	8	**35**

Expected value

	≤ 31	≤ 43	≤ 53	**total**
incorrect	8.571	6.857	4.571	20
correct	6.429	5.143	3.429	15
total	15	12	8	**35**

$(O-E)^2/E$

	≤ 31	≤ 43	≤ 53	**total**
incorrect	0.038	0.107	0.446	20
correct	0.051	0.143	0.595	15
total	15	12	8	**35**

$X^2 =$ 1.381

$p =$ 0.501 > 0.05

13. Results of the English part of the study

13.1. First part of the production task: Words

Entries	**Omission**	**Insertion**
Hiatus	14	0
Triumph	/	0
Hierarchy	30	0
See Ed	/	16
I enjoy it	/	7
Doing	/	0
Fluid	/	0
You eat	/	8
New image	/	1
visa office	/	4
Law and order	/	4
Idea [of	/	8
Awe-inspiring	/	5
Total first column	**44**	**53**
Odd - cod	/	7
Here - ear	17	10
Rank - hank	12	/
Mouse - house	15	/
Told - old	/	9
Feet - heat	10	/
Itch - hitch	10	1
Eight - hate	16	4
Hall - all	11	1
Air - hair	8	6
Total second column	**99**	**38**
Enhance something	18	5
Unhip trends	16	7
An eyehole	12	13
An unholy relic	18	12
Exhaust fumes	0	1
An inhaler	25	11
Inhale - Exhale	44	9
Inherit something	24	2
An unhappy man	16	16
An airhole	13	11
Uphold a tradition	17	3
An inhuman character	24	3
A few miles ahead	3	7
Total third column	**230**	**100**
Total	**373**	**191**

13.2. Second part of the production task: Sentences

Sentences	Omission	Insertion
He is blowing air through the airhole.	10	37
Space X has enhanced its rockets; but it still needs to work on how to reduce the exhaust fumes.	52	12
I hate the idea of hierarchy and law and order.	38	18
Have you heard about Harry? – Who do you mean? Harry Potter?	81	1
How old are you? I am eighteen years old.	13	25
Do you eat healthy food?	20	8
Last year, I inherited grandma's fortune when she passed away, and this makes grandpa unhappy, because he wanted to have it all.	67	30
I accidently overheard his conversation with her.	44	5
He has a habit of biting his nails.	44	0
I had a happy childhood.	28	2
What are you doing here? Are you in a hurry?	28	6
When you feel anxious, inhale deeply and slowly exhale – use an inhaler if you need to.	80	12
I see Ed has damaged his hair because of the heat.	65	19
Elisa told me that the criminal was apprehended in his own house.	61	12
Bungee jumping? I enjoy it very much.	0	7
Thomas has a skin rash, it is itchy.	19	3

13.3. Perception task

Entries	E1	E2	E3	E4	E5	E6	E7	E8	E9	E10	E11	E12	E13	E14	E15	E16	E17	E18	E19	E20	E21	E22	E23	E24	E25	E26	E27	E28	E29	E30	E31	E32	E33	E34	E35	Total	#0	#1	#2
A. air-hair	2	0	2	2	2	2	2	2	2	2	2	0	2	2	2	2	2	2	2	0	2	2	2	2	2	2	2	2	2	2	1	2	2	2	2	133	3	1	31
B. old-told	1	1	2	2	2	1	2	2	1	2	1	1	2	2	1	1	2	1	2	2	2	2	1	2	2	1	2	1	1	1	2	2	2	2	2	121	0	14	21
C. rank-hank	2	2	2	2	2	0	2	2	2	2	2	0	2	2	2	2	2	2	2	2	2	2	2	2	2	2	0	2	2	2	2	2	2	2	0	136	4	0	31
D. eight-hate	2	2	2	2	2	0	2	2	2	2	2	2	2	2	2	1	2	2	0	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	1	136	2	2	31
F. odd-cod	0	1	1	2	2	1	2	2	1	0	2	1	2	2	2	1	1	2	1	2	2	1	1	2	1	1	2	1	1	1	2	2	2	2	1	109	2	16	17
G. here-ear	0	0	2	2	2	2	2	1	0	2	2	1	2	0	2	2	2	1	2	2	2	2	2	1	2	2	2	2	0	2	1	2	2	2	2	110	7	5	23
I. hall-all	2	0	2	2	2	2	0	2	0	2	2	1	2	0	2	2	2	1	2	2	2	2	0	1	2	2	2	2	2	2	2	0	2	2	2	112	7	3	25
J. feet-heat	2	2	2	2	2	2	2	2	2	2	2	2	1	2	2	2	2	2	2	2	2	2	2	2	2	1	1	2	2	2	1	2	2	2	2	144	0	4	31
L. hitch-itch	2	2	2	2	2	2	2	2	1	2	2	0	2	1	2	1	2	2	2	0	2	2	2	2	2	2	0	1	2	0	2	2	2	1	1	117	4	7	24
M. mouse-house	2	2	2	2	2	2	2	2	2	2	2	0	2	2	2	1	2	2	2	1	2	2	2	2	2	2	0	2	2	2	2	2	2	1	2	139	2	1	32
	15	12	19	20	20	14	18	19	13	18	19	8	17	17	18	15	19	16	17	15	20	19	16	18	17	17	15	17	16	14	18	17	20	19	13	o -	- o	- -	o o
o - air-hair	2	0	2	2	2	2	2	2	2	2	2	0	2	2	2	2	2	2	2	0	2	2	2	2	2	2	2	2	2	2	2	- -	2	2	2	3		1	
- - old-told	-o	o -	2	2	2	-o	2	2	o -	2	o -	-o	2	2	o -	o -	2	o -	2	2	2	o -	o -	2	2	-o	2	o -	o -	o -	2	2	2	2	2	10	4		
- o rank-hank	2	2	2	2	2	0	2	2	2	2	2	0	2	2	2	2	2	2	2	2	2	2	2	2	2	2	0	2	2	o -	2	2	2	2	0	4			
- o eight-hate	2	2	2	2	2	0	2	2	2	2	2	2	2	2	2	- -	2	2	0	2	2	2	2	2	2	2	2	2	2	o -	2	2	2	2	- -	2		2	
- - odd-cod	0	o -	o -	2	2	o -	2	2	o -	0	2	-o	2	2	2	o -	o -	2	-o	2	2	o -	o -	2	-o	o -	2	o -	o -	o -	2	2	2	2	o -	13	3		2
o - here-ear	0	0	2	2	2	2	2	- -	0	2	2	o o	0	2	2	o o	2	0	2	2	2	2	2	- -	2	2	2	2	0	- -	2	2	2	2	2		7	3	2
o - hall-all	2	0	2	2	2	2	0	2	0	2	2	o o	2	0	2	2	- -	- -	2	2	2	2	0	- -	2	2	2	2	2	2	2	0	2	2	2		7	2	1
- o feet-heat	2	2	2	2	2	2	2	2	2	2	2	2	- -	2	2	2	2	2	2	2	2	2	2	2	2	- -	- -	2	2	2	- -	2	2	2	2			4	
o - hitch-itch	2	2	2	2	2	2	2	2	o o	2	2	0	2	o o	- -	o o	2	2	2	0	2	2	2	2	0	2	2	o o	2	0	2	2	2	o o		4	1	6
- o mouse-house	2	2	2	2	2	2	2	2	2	2	2	0	2	2	2	2	2	2	2	- -	2	2	2	2	2	2	0	2	2	2	2	2	2	2	2	2		1	

13.4. Chi-square test of independence

Results

	≤ 38	≤ 54	≤ 68	**total**
incorrect	8	8	7	23
correct	7	3	2	12
total	15	11	9	**35**

Expected value

	≤ 38	≤ 54	≤ 68	**total**
incorrect	9.857	7.229	5.914	20
correct	5.143	3.771	3.086	15
total	15	11	9	**35**

$(O-E)^2/E$

	≤ 38	≤ 54	≤ 68	**total**
incorrect	0.350	0.082	0.199	20
correct	0.671	0.158	0.382	15
total	15	11	9	**35**

$X^2 =$ 1.8420

$p =$ 0.3981 > 0.05

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