Realisation, elision and intrusion of /h/ in French learners of English

Réalisation, élision et intrusion de /h/ chez les apprenants francophones en anglais

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Résumé : Comme les systèmes phonologiques de l'anglais et du français se distinguent à bien des égards, à la fois au niveau segmental et au niveau prosodique, les apprenants francophones rencontrent d'importantes difficultés avec la prononciation anglaise comme, par exemple, la fricative glottale /h/, absente de l'inventaire phonémique du français – à l'exception de l'onomatopée *haha* qui traduit le rire. À la suite des études d'Exare (2017) et de Kamiyama *et al.* (2011), l'objectif de cet article est d'apporter des preuves empiriques de la réalisation, l'élision et l'intrusion de /h/ dans des productions d'anglais d'étudiants francophones non-spécialistes de l'anglais. L'analyse auditive du corpus, composé de trois tâches (lecture de mots, lecture de phrases et discours spontané), fait ressortir quatre profils d'apprenants : (1) le /h/ est absent ; (2) le /h/ est correctement réalisé ; (3) le /h/ est correctement réalisé et le /h/ intrusif est récurrent ; (4) seul le /h/ intrusif est produit. L'étude montre une certaine cohérence intra-locuteur, mais il existe en parallèle une variabilité importante selon le type de tâche, ainsi qu'une différence entre les femmes et les hommes. Ces résultats mettent en exergue l'intérêt d'adapter les stratégies d'apprentissage à ces différents profils.
Mots clés : acquisition L2, anglais, français, fricative glottale, consonne

Abstract: As the phonological systems of English and French diverge both at the segmental level and at the prosodic level, French learners encounter difficulties with English pronunciation. One example is the glottal fricative /h/ since it is absent from the French phonemic inventory–with the exception of the onomatopoeia "*haha*" to express laughter. Following studies by Exare (2017) and Kamiyama *et al.* (2011), this paper aims to provide further empirical evidence of the realisation, elision, and intrusion of /h/ in French speakers' English productions. The learners were university students who did not major in English. The participants were given three tasks, i.e., word reading, sentence reading, and spontaneous speech. Auditory analyses were then carried out by the researcher. Results show four speaker-profiles: (1) /h/ is absent altogether; (2) /h/ is accurately realised; (3) /h/ is accurately realised in addition to regular occurrences of intrusive /h/; (4) only intrusive /h/ occurs. Although the speaking task has an influence on intra-speaker variability, intra-speaker consistency has been observed, with participants belonging to one of the above learner-profiles. Also of interest were the differences between men and women. These results suggest that different teaching strategies should be established to better suit the needs of the different profiles.
Keywords: L2 acquisition, English, French, glottal fricative, consonant

Introduction

Over the last few decades, there has been an increasing interest in research on the acquisition of English phonology by non-native speakers. Despite a geographical and historical proximity, the phonological systems of English and French diverge in many ways, both at the segmental level (i.e., vowels and consonants) and at the prosodic level (i.e., stress, rhythm and intonation). French speakers encounter major difficulties with English pronunciation, resulting in stereotypes and mockery such as replacing the English post-alveolar approximant /ɹ/ by the French uvular fricative /ʁ/ in the realisation of the grapheme <r>, and systematically omitting the glottal fricative /h/ as this sound is not part of the French phonemic inventory. Indeed, the consonant <h> is problematic on many levels; not only is it always silent in French, but teachers and researchers have also observed that some French learners add a [h] sound in front of vowel-initial words. However, there is still a need for empirical evidence, along with qualitative and quantitative measurements of these elision and intrusion phenomena.

First, we will present an overview of research on the acquisition of English phonemes by French speakers by comparing the phonological systems of the two languages and introducing theoretical frameworks of L2 (i.e., second/foreign language) segmental acquisition. We will then focus on the case of the glottal fricative /h/ and the graphic consonant <h>. We have attempted to quantify the realisation of /h/ and compare its systematic omission and intrusion in French speakers' English productions through an auditory analysis of spoken data that were collected from a cohort of French students. Finally, we will discuss our observations, including a comparison of female and male students' performances, drawing conclusions regarding the implications for the teaching of English as a foreign language.

1. The voiceless glottal fricative /h/

1.1. The phonemic inventories of English and French

English and French have diverging phonemic inventories despite sharing the same alphabet. Standard British English has 44 phonemes, including 22 consonants and two semi-consonants, whereas Standard Parisian French has 37, including 18 consonants and three semi-consonants. Not only are their vowel systems different in number and quality, their consonants also present major phonological and phonetic differences (Capliez, 2011). The typical examples that are used to illustrate the differences between the consonants of the two languages are the post-alveolar approximant /ɹ/ (commonly represented by the IPA symbol /r/) in Southern British English

(SBE), or the retroflex approximant /ɻ/ in General American (as in *red*), and the dental fricatives /θ/ and /ð/ (as in *thing* and *this*, respectively), which are absent in the French phonemic inventory– although the latter sounds are phonetically produced by speakers with a lisp (i.e., *cette* "this" will be pronounced [θɛt] instead of /sɛt/). Likewise, the sound /h/ is not a contrastive sound and therefore, not part of the French phonemic inventory.

The graphophonemic rules of English and French have little in common. When the grapheme <h> combines with another grapheme, the resulting sounds often differ. For example, the complex grapheme <ch> is pronounced /tʃ/ in English (e.g., *check* /tʃek/) and /ʃ/ in French (e.g., *chose* "thing" /ʃoz/), and the grapheme <th> corresponds to the dental fricatives /θ/ and /ð/ in English, but to the voiceless plosive /t/ in French. Silent consonants also occur in different contexts; thus, <l> is automatically silent in the sequences <alk>, <alf> and <alm> in English (e.g., *walk*, *half*, *calm*), whereas it is rarely silent in French. As far as the simple grapheme <h> is concerned, it is present in both languages. However, it does not behave in a similar way. While it is realised as a voiceless glottal fricative /h/ in English, it is always silent in French.

1.2. The case of the grapheme <h>

The letter <h> is silent in French, excluding breathlessness and onomatopoeias expressing such emotions as exasperation or relief where a [h] sound can be heard (e.g., *ha!*). However, a distinction is traditionally made between unaspirated "h" and aspirated "h". Although the latter has no phonetic reality nowadays, contrary to English so-called "aspirated" plosive consonants, it represents a hiatus involving the final vowel of the preceding word and the initial vowel of the "h" word (see Encrevé, 1988 for more details). Accordingly, the contraction and liaison phenomena do not occur with a word beginning with an aspirated "h", whereas they do with unaspirated "h". For example, the masculine noun *homme* "man" /ɔm/ begins with an unaspirated "h", and thus the definite article le will become *l'* (*l'homme* "the man") as it always does before a vowel (cf. Encrevé, 1988). Similarly, the indefinite article *un*, normally pronounced as the nasal vowel / œ̃ / (or increasingly /ɛ̃/), will have an audible /n/ representing the liaison and avoiding the hiatus (*un homme* "a man" / œ̃ n ɔm/), French usually preferring a CV (i.e., onset consonant + vowel) syllable structure (Adda-Decker *et al*, 2002). On the contrary, the word *héros* has an aspirated "h"; in that case, the definite article will remain *le* and no consonant is added at the end of the indefinite article (i.e., *le héros* "the hero" /lə eʁo/, *un héros* "a hero" / œ̃ eʁo/). As in any other words beginning with

a vowel sound, a glottal stop may be added in order to give it more emphasis. Some dictionaries indicate aspiration with the diacritic ˈ, even though it is not related to lexical stress.

In SBE, <h> is seldom silent. Most of the time, it corresponds to the voiceless glottal fricative /h/, as explained above. Only a few exceptions are to be found, in the onset of the words *hour*, *honest*, *hono(u)r*, *heir* (and their derived words: *hourly*, *honesty*, *honourable*, *heirloom*, etc.) and in medial position in some words such as *vehicle*. In those words, the <h> is silent, thus requiring the indefinite article *an* instead of *a*, and the weak form of the definite article *the* is pronounced /ðɪ/ instead of /ðə/. To that list can be added the word *herb* in General American, some words beginning with an unstressed syllable (e.g., sometimes *an hisˈtorian*), and direct French loanwords such as *haute couture* and *hors d'oeuvre*. Excluding the natural reduction of unstressed grammatical words such as *her* and *have*, there are a few English accents where "h-dropping" occurs, such as Scouse English, Cockney English and Welsh English (see Wells, 1970), but this phenomenon is usually stigmatised (Roach, 2009).

1.3. The acquisition of /h/ by French speakers

The acquisition of the phonemes of a foreign or second language (L2) has been widely studied. Flege's Speech Learning Model (SLM) has been developed to account for the influence of the mother tongue (L1) in the acquisition process of the L2. According to this model (Flege, 1995), L2 phonemes are easier to acquire for a speaker whose L1 phonemic inventory does not have any similar phonemes, whereas L2 phonemes which are closer to L1 phonemes are more difficult to acquire. Hence, the acquisition of /h/ should be easier to acquire for French learners because it is not part of the French inventory. However, according to Eckman's Markedness Differential Hypothesis (MDH, Eckman, 1977; Eckman, 2008), the "markedness" of a linguistic phenomenon, that is to say the degree of rarity of its occurrence within or between languages, is a factor of difficulty in L2 acquisition, and therefore an unmarked sound (that is, a sound that can be found in most languages) is easier to produce for a non-native speaker than a marked sound (i.e., more specific to one language). Based on this model, /h/ should be difficult to acquire for French learners of English.

Considering these models of L2 phonology acquisition, one may predict that the acquisition of the phoneme /h/ is bound to be problematic for French learners (see Janda & Auger, 1992). De Launay (1993) presented some French learners with pairs of English words such as *hair*/*air* and concludes: "students usually find it both illuminating and fun to discover these words" (*Ibid.*, p. 134). Brown (1988, 1991) developed the idea of functional load of the members of a minimal

pair, based on the cumulative frequency of the two members. Considering that pairs of words such as *hair/air* or *hate/ate* bear relatively high functional load, their perception and production by non-native speakers will be all the more difficult. Although some pairs are unlikely to cause misperception or misunderstanding because of their different uses or natures (e.g., the noun *hat* vs. the preposition *at*), others may lead to misinterpretations which may hinder communication (e.g., *ate* vs. *hate*; Capliez and Guendouz, 2021).

The absence of phonemic /h/ in French is bound to result in its elision in French speakers' English productions, particularly if one considers the influence of the spelling and graphophonemic rules of the L1. Kamiyama, Kühnert and Vaissière (2011) asked some French learners of English to read aloud the nursery rhyme *Humpty Dumpty* and found that out of 37 students, 14 of them dropped /h/ at least once in the word "Humpty". More surprisingly, a widespread phenomenon among French learners of English consists in inserting /h/ between a word ending in a vowel and a word beginning with a vowel (*hiatus*); that is known as "intrusive /h/", or "h-epenthesis" (De Launay, 1993; Exare, 2017; Janda & Auger, 1992). As explained above, the French language normally prefers a CV(C) syllable structure (Adda-Decker *et al*, 2002) and often resorts to linking phenomena in hiatuses, such as the pronunciation of the <n> in a final nasal vowel before another vowel (e.g., *un homme* "a man" / œ̃ n ɔm/, *mon amour* "my love" /mɔ̃ n amuʁ/; see Encrevé, 1988). Furthermore, liaison can result in the addition of a graphic <t> as in the interrogative form of *il y a* "there is" → *y a-t-il* "is there", or *il va* "he is going" → *va-t-il* "is he going", which avoids the sequence of vowels. Some erroneous instances can thus be heard; for example, some French speakers are tempted to avoid a hiatus by inserting a consonant sound in a phrase such as *les gens qui ont* "the people who have", becoming *les gens qui z'ont*, and even humorously in *moi aussi* "me too", becoming *moi z'aussi*.

As is noted in Capliez and Guendouz (2021), intrusive /h/ is a commonly observed phenomenon among French learners of English, and it may be seen as evidence of a certain amount of effort from the learner who is attempting to pronounce the target language accurately; Janda and Auger (1992) categorise it as being a form of "qualitative hypercorrection". Exare's study (2017) focused on glottalisation and aspiration in French learners' L2 speech and hypothesised that these occurrences of hypercorrection may result from a lack of assimilation of the [ʔ] ~ [h] contrast, phonological repair of vowel-initial environments, or an articulatory process involving the intrusive gesture of glottal opening.

The extent of the intrusive /h/ phenomenon along with the expected elision of phonemic /h/ deserve particular attention in empirical studies involving the acquisition of English phonology by

French speakers. The present study investigates the realisation, elision and intrusion of the sound /h/ in French speakers' L2 English pronunciation based on an auditory analysis.

2. Methodology

2.1. Participants

The recordings of 94 French learners of English as a foreign language were collected and analysed. Among the cohort of French speakers were 42 men and 52 women, aged between 18 and 23. All of them were undergraduate students who had been learning English since secondary school, ranging from eight to ten years of learning in total. They specialised in mathematics, physics, chemistry, or computer science. None of them were English majors or familiar with the study of English phonetics and phonology. Their academic exposure to English at the time of recording was limited to two weekly hours and included listening, speaking, writing, and speaking activities. All the students took a test called ELAO (Efficient Language Assessment Online), revealing that their levels of English proficiency were situated between B1 and B2, according to the Common European Framework of Reference for Languages.

2.2. Data collection

As is suggested by John and Cardoso (2009), the extent of the /h/ problem may differ depending on the type of speech. Thus, every student of our study was asked to take part in three types of recording sessions, presented as part of their English course: word reading, sentence reading and spontaneous speech. They were not informed of the objectives of the experiment.

For the first task, they had to read aloud 30 isolated words that randomly appeared one by one on a computer screen. The words included 12 words beginning with vowels (e.g., *eat*, *actor*, *either*, *old*, etc.), 12 words beginning with a phonemic /h/ (e.g., *hand*, *home*, *hut*, etc.) and 6 distractors, that is, words beginning with other consonants than <h> (e.g., *dog*, *leave*, *book*, etc.). The former two categories included such pairs as *ill* and *hill*. No exceptional word where <h> is silent (e.g., *hour*, *heir*) was included. For the sentence-reading task, the students had to read aloud 10 sentences that randomly appeared one by one on a computer screen. In addition to a few distractors and grammatical words beginning with vowels (e.g., *My cousin now lives in London*), some sentences contained target lexical words beginning with vowels (e.g., *The author of the book is under arrest*), some contained target words beginning with /h/ (e.g., *A horrible thing happened to Mary's husband*), and other sentences included both (e.g., *His name is Harry Evison*). Special care was taken to ensure that

no sentence resulted in a tongue twister that even a native or experienced speaker might have difficulty in uttering. The full list of stimuli for both reading tasks is provided in the appendix.

In order to collect spontaneous speech from the students, they were asked to describe their "ideal trip" for approximately two minutes. They were free to speak about a planned trip, an imaginary journey, or even a past travelling experience. They had a few minutes to think about it and take some notes on a piece of paper, but not entire sentences. Despite the presence of the author to give the students instructions and start the recording device, they were not interrupted while they spoke.

In total, 3,290 files were collected and used for auditory analysis, which corresponded to the following data (distractors excluded) and targets:

- 24 words (times 94 students = 2,256 sound files).

Targets: initial vowels = 12 (total = 1128); initial <h> = 12 (total = 1128).

- 10 sentences (times 94 students = 940 sound files).

Targets: initial vowels = 20 (total = 1,880); initial <h> = 16 (total = 1,504).

- 94 spontaneous speech samples.

2.3. Research questions

Based on Flege's SLM, one may hypothesise that the acquisition of the English phoneme /h/ by L1 French speakers should be facilitated by its absence in their native language. However, grapho-phonemic rules regarding <h> in French along with the avoidance of a hiatus in French should be factored in since cross-linguistic transfers are likely to occur. How far do these linguistic transfers take place and what strategies do learners use to avoid hiatus?

3. Results

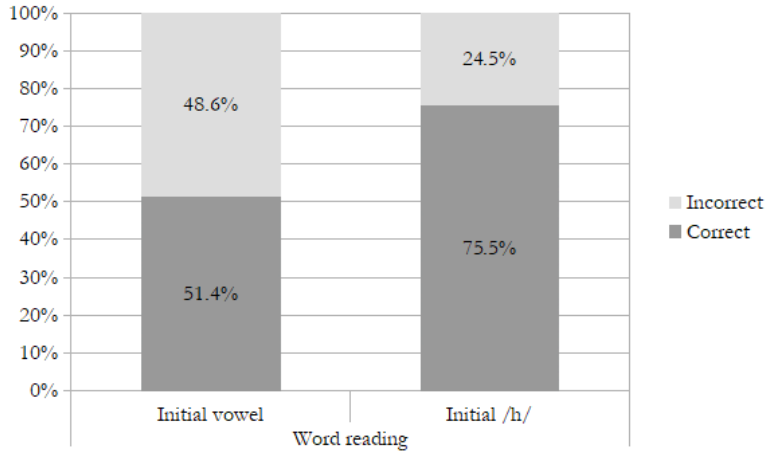
In this section, we will present the results and statistics[1] of the auditory analyses conducted on the sound files that we collected, first for word reading, second for sentence reading, and third for spontaneous speech. We will also look at the number of speakers concerned by the different phenomena (i.e., the accurate realisation of the targets, the dropping of /h/, and the intrusive /h/ phenomenon).

1 Many thanks to Maelle Amand, who significantly helped us in the statistical analyses of our results.

3.1. Word reading

Out of the 2,256 sound files that were collected from the word-reading task, 1,128 contained target initial vowels and 1,128 target <h> graphemes (i.e., for each type, 12 targets times 94 students). The following graph shows the realisations of the target initial vowels and target /h/.

Figure 1. Realisations of initial vowels and initial /h/ (word reading)

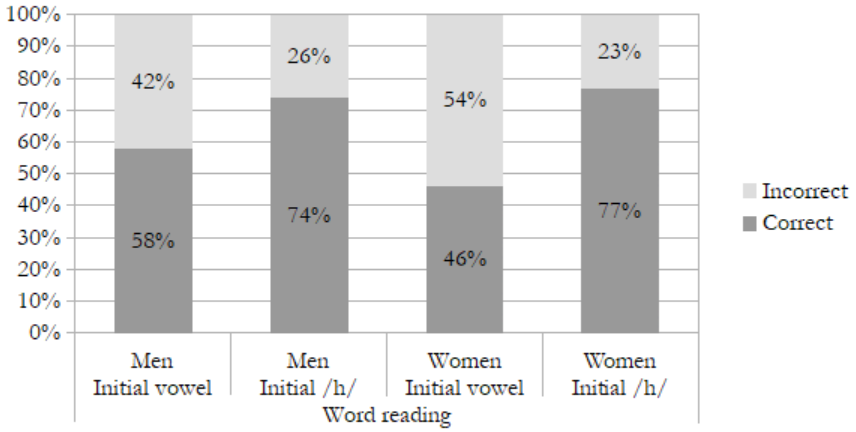


The auditory analyses revealed that 580 target vowels were produced correctly (i.e., 51.4%; 288 by female speakers and 292 by male speakers), that is to say the initial vowels were respected, whereas 548 words contained an initial intrusive /h/ instead (i.e., 48.6%; 336 by female speakers and 212 by male speakers). A proportion test allowed us to conclude that the difference between the two types of realisation was not significant, $z = 1.34$, $p = 0.17$.

Out of 1,128 target initial /h/ tokens, 852 (i.e., 75.5%; 480 by female speakers and 372 by male speakers) were correctly produced, that is to say the target /h/ phoneme was accurately realised. In 276 words (i.e., 24.5%; 144 by female speakers and 132 by male speakers), however, the target /h/ was dropped. A proportion test allowed us to conclude that the difference between the two types of realisation was significant, $z = 24.25$, $p < 0.00001$.

Figure 2 below shows the performances of men and women.

Figure 2. Men vs women (word reading)



The difference between the male speakers' and the female speakers' realisations of initial vowels is significant: $z = -3.93$, $p = 0.00008$. However, the difference is not significant in their realisations of initial /h/: $z = 1.21$, $p = 0.22$.

3.2. Sentence reading

The 940 sentences of the second production task contained 3,384 targets, which included 1,880 initial vowels (being the context where the intrusive /h/ phenomenon can be observed and measured) and 1,504 words with an initial <h> /h/.

Figure 3 below shows the realisations of the target initial vowels and target /h/.

Figure 3. Realisations of initial vowels and initial /h/ (sentence reading)

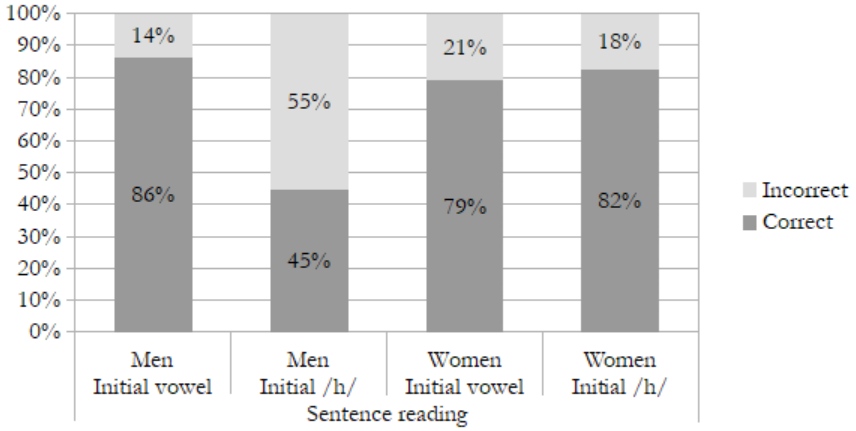
Out of 1,880 targets initial vowels (i.e., 20 targets times 94 speakers), 1,545 (i.e., 82.2%; 821 by female speakers and 724 by male speakers) were correctly realised, whereas 335 (i.e., 17.8%; 219 by female speakers and 116 by male speakers) contained an intrusive /h/. A proportion test allowed

us to conclude that the difference between the two types of realisation was significant, $\chi = 39.46$, $p < 0.00001$.

Out of 1,504 target initial /h/ tokens (i.e., 16 targets times 94 speakers), 986 (i.e., 65.6%; 685 by female speakers and 301 by male speakers) were correct, which means that the speakers accurately produced /h/ at the beginning of the words; in 518 words (i.e., 34.4%; 147 by female speakers and 371 by male speakers) the /h/ was systematically dropped. A proportion test allowed us to conclude that the difference between the two types of realisation was significant, $\chi = 17.06$, $p < 0.00001$.

Figure 4 below shows the performances of men and women.

Figure 4. Men vs women (sentence reading)



The difference between the male speakers' and the female speakers' realisations of initial vowels is significant: $\chi = 15.23$, $p < 0.00001$. It is also significant in their realisations of initial /h/: $\chi = -4.08$, $p < 0.00001$.

3.3. Spontaneous speech

The auditory analyses of the 94 spontaneous speech samples enabled us to observe a considerable amount of intra-speaker consistency. Indeed, four recurring patterns of occurrences of /h/ and realisation of initial vowels emerged in the speakers' L2 productions, resulting in the following typology:

- Pattern 1: the /h/ sound is altogether absent.
- Pattern 2: the initial grapheme <h> is correctly realised as the voiceless glottal fricative /h/.

- Pattern 3: the initial grapheme <h> is correctly realised and intrusive /h/ regularly occurs.
- Pattern 4: only intrusive /h/ occurs; target /h/ (i.e., the realisation of the grapheme <h>) is absent.

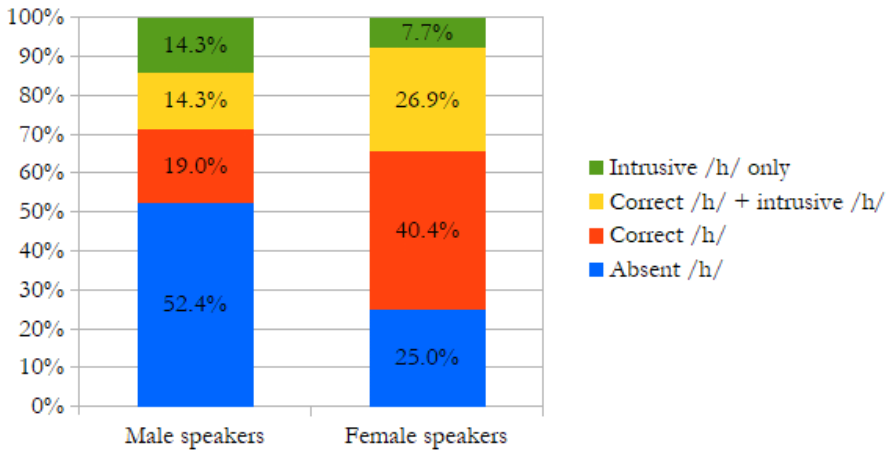
In Table 1 below, the numbers of speakers concerned by each of the four patterns are provided. For clarity and comparison purposes, the numbers have also been converted to percentages, and the difference between male and female speakers is given.

Table 1. Distribution of /h/ in the learners' L2 speech

	Absent /h/	**Correct /h/**	**Correct /h/ + intrusive /h/**	**Intrusive /h/ only**	**Total**
Speakers	35 (37.2%)	29 (30.9%)	20 (21.3%)	10 (10.6%)	94
Male speakers	22 (52.4%)	8 (19%)	6 (14.3%)	6 (14.3%)	42
Female speakers	13 (25%)	21 (40.4%)	14 (26.9%)	4 (7.7%)	52

The following graph illustrates the different patterns that were observed:

Figure 5. Distribution of /h/ in the learners' L2 speech



Overall, the prominent pattern of /h/ realisation is Pattern 1, which means that a majority of the speakers (i.e., 37.2%) produced no /h/ at all, followed by 30.9% who realised /h/ correctly (Pattern 2), 21.3% who produced both correct /h/ and intrusive /h/ (Pattern 3), and 10.6% who exhibited intrusive /h/ only, in vowel-initial words (Pattern 4). Various proportion tests allowed us to observe a significant difference between Pattern 1 and Pattern 3 ($\chi = 2.40$, $p = 0.016$), Pattern 1 and Pattern 4 ($\chi = 4.27$, $p < 0.0001$), Pattern 2 and Pattern 4 ($\chi = 3.41$, $p = 0.0006$), and

Pattern 3 and Pattern 4 ($z = 1.99$, $p = 0.04$). The differences between Pattern 1 and Pattern 2, and between Pattern 2 and Pattern 3 were not significant (respectively: $z = 0.92$, $p = 0.35$ and $z = 1.49$, $p = 0.13$).

A chi-square test of independence was performed to examine the relation between gender and the different realisations of /h/. The relation between these variables was significant, $X^2(3, N = 84) = 10.8$, $p = 0.012$.

3.4. Discussion

According to predictions based on the SLM and the Markedness Hypothesis, the acquisition of the English glottal fricative /h/ should not be problematic for French speakers, whose L1 phonemic inventory does not possess that phoneme, and therefore a new mental category should be created. Nevertheless, the fact that the participants in our study were late learners and had been exposed to English for several years was bound to have an impact on their production. Our auditory analyses revealed notable variability depending on the type of speech (i.e., word reading, sentence reading, spontaneous speech), and the widespread observation of the intrusive /h/ phenomenon by some English teachers and researchers has indeed been verified (De Launay, 1993; Exare, 2017). Our results confirm John and Cardoso's findings (2009), which showed that h-epenthesis was more frequent in more formal styles of speech (i.e., laboratory-controlled reading tasks) among French learners of English. Another significant factor appeared in this study: proportions of correct realisations seemed to depend on the learners' gender.

The auditory analyses of the **word-reading task** did not reveal a significant difference between the correct realisations of initial vowels and the intrusive /h/ occurrences. Furthermore, most speakers seemed to be able to realise the correct target /h/ sounds (75.5%). The fact that this was a word-reading task may explain those results; the learners' attention was focused on precise items which may have helped them realise the targets more accurately.

For the **sentence reading task**, there were significantly fewer occurrences of intrusive /h/ than correct realisations of initial vowels (82.2%). Similarly, a significant number of words beginning with <h> were pronounced with /h/ (65.6%). In other words, there were more correct realisations in both reading tasks than there were errors. The participants' motivation and level of English may explain these results.

The intrusive /h/ phenomenon occurred more in female speakers, and so did the correct realisation of the target /h/, in both reading tasks. This observation may suggest that female speakers are more likely to aim at a more English-sounding pronunciation, /h/ being a "typically

English" sound to French learners. It is impossible to generalise, however, and future studies should further examine the impact of the gender effect, taking into account other factors such as age and level of proficiency.

The analyses of the **spontaneous speech** samples showed a general tendency for the French speakers to drop the /h/ at the beginning of words. Contrary to the previous two controlled tasks involving carefully-selected stimuli, the spontaneity, the lack of preparation and mental correction, and the influence of the L1 seem to have played an important role in the French speakers' productions. Although the intrusive /h/ phenomenon often occurred alongside correct realisations of /h/, its sole occurrence (i.e., what we have named Pattern 4), however unlikely it may have seemed, could still be heard from a noteworthy number of speakers. Such an observation is all the more unexpected as one may be inclined to believe that a French speaker, whose L1 does not include the /h/ phoneme, will either omit it altogether, or realise it–at least partly–accurately in natural, unprepared L2 speech.

As regards the difference in performance between male and female speakers, it was also significant in spontaneous speech, the latter being more likely to exhibit an intrusive /h/ as well as having a correct realisation of /h/. Once again, we believe that the amount of personal effort to make L2 pronunciation sound more accurate may explain these results. By contrast, many male speakers exhibited systematic dropping of /h/. The feeling of embarrassment and the possible difference in proficiency level might explain this gender difference. It is worth noting, however, that a considerable number of male speakers who did not produce /h/ systematically added an audible glottal stop [ʔ] before vowel-initial words in all three tasks; we did not observe that in female speakers. In some participants' productions, the phenomenon even occurred in vowel-initial grammatical words (e.g., *he is* pronounced [ʔi ʔiz] or [hi hiz]).

Drawing a parallel between intrusive /h/ in female speakers and glottal stops in male speakers, both seem to result from a special effort on the part of the learners to reach a native-like pronunciation. Vaissière (1986, p. 537) indeed points out that aspiration and glottalisation "have a common characteristic: a greater tensing of at least one of the articulators, the vocal folds [...]". The frequency of intrusive /h/ found in the data suggests that it is not an articulatory difficulty, despite its absence from the French phonemic inventory. However, using the sound in the right place in English is a challenge.

One of the first steps for the EFL teacher is to simply make learners aware of the existence of the phoneme as early as possible, including by giving minimal pairs–words and phrases–as examples. Certain exercises may help learners improve their pronunciation at whatever their level. Practising

linking may prove to be effective to avoid intrusive /h/ or glottal stops in vowel-initial words and make speech more natural (Capliez & Guendouz, 2021). Such exercises involve the pronunciation of two words as one by inserting a semi-vowel that will avoid /h/ or /ʔ/ epenthesis. For example, the teacher can suggest inserting /j/ in the phrase *my eyes* and using the final consonant /z/ as the first one for the following word, resulting in *my eyes are blue* /maɪ jaɪzə bluː/. The consonant /h/ should therefore be regarded as a teaching priority (Collins & Mees, 2008; Diana, 2010; Exare, 2017), because many words, like *ate*/*hate*, bear high functional load (Brown, 1988, 1991).

Conclusion

This study has attempted to explore the challenge that the consonant <h> represents for French learners of English as a foreign language. The quantitative and qualitative analyses of our recordings have revealed that L2 speech cannot be reduced to one phenomenon; despite a certain amount of intra-speaker consistency, different speech patterns emerged, ranging from the total absence of /h/ through its systematic accurate realisation to the sole presence of intrusive /h/ before initial vowels. The analysis also revealed a significant effect of gender on correct productions of /h/, with higher scores of correct realisations amongst women as well as more occurrences of intrusive /h/, where men produce glottal stops. Such an effect should be investigated further and correlated with the learners' precise language level.

While the impact of L2 misproductions on communication can be relatively strong depending on the origin of the errors (i.e., consonant, vowel, or suprasegmental) or the functional load of the target items (Brown, 1988, 1991), future studies should focus on the consequences of the /h/ phenomena under study from the point of view of native listeners. Furthermore, the correlation between learners' L2 production and L2 perception deserves to be investigated in order to determine whether–and how–English production difficulties are related to comprehension, which is as problematic for learners as target pronunciation. Finally, the parallel between such studies and L2 teaching practices should be reinforced by providing teachers with both awareness of the phenomena and tools for helping learners to overcome their difficulties.

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Annexes

Word list

hat, hand, haze, head, heat, heart, hen, hill, hollow, home, huge, hut, actor, apron, art, eat, either, ice, ill, inner, old, opera, over, umbrella.

Sentence list

Nb. The targets are underlined (initial vowels = 20; initial <h> /h/ = 16).

His name is Harry Evison.

How old is your uncle now?

Hannah asked for a hamster.

She had her hair cut in April.

I really hope they agree with us.

Emily always hates eating alone.

The author of the book is under arrest.

Hailey had a headache yesterday evening.

A horrible thing happened to Mary's husband.

We arrived at Oliver's house eight minutes after the others.