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A Preliminary Investigation into the Perception of Nasal Vowels in French by Malaysian Learners of French as a Foreign Language

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Abstract

This article examines the perception of nasal vowels in French among Malay FFL (French as Foreign Language) students, focusing on those at novice and intermediate levels. Conducted at the Center for Research in Language and Linguistics, Faculty of Social Sciences and Humanities, National University of Malaysia, the study involved twenty participants who had no prior exposure to the French language before university enrolment. The research pursued two primary objectives: firstly, to explore the nasal vowel perception between the two student groups, and secondly, to assess the impact of vowel position within words on their identification. To address these objectives, two perception tests were employed. The first test comprised 30-word pairs, each containing either an oral vowel [ɛ, a, o/ɔ] or a nasal vowel [ɛ̃, ɑ̃, ɔ̃], whereas the second test encompassed 30 words, featuring each nasal vowel [ɑ̃], [ɛ̃], [ɔ̃] in three positions within the word (initial, interconsonantal, and absolute final). Participants were tasked with selecting the accurate oral or nasal vowel based on the aural input. The findings reveal that Malay FFL students exhibit the ability to differentiate oral/nasal features, yet tend to substitute nasal vowels with alternative vowels, with variations depending on vowel position and student group.

Keywords: linguistics; French vowels; French as Foreign Language (FFL); phonetics; pronunciation

Kajian Awal Persepsi Vokal Nasal Bahasa Perancis oleh Pelajar - pelajar di Malaysia

Artikel ini mengkaji persepsi vokal nasal dalam bahasa Perancis dalam kalangan pelajar Melayu yang mempelajari bahasa Perancis sebagai bahasa asing (FFL), dengan fokus kepada mereka yang berada di peringkat permulaan dan pertengahan. Kajian ini dijalankan di Pusat Kajian Bahasa dan Linguistik, Fakulti Sains Sosial dan Kemanusiaan, Universiti Kebangsaan Malaysia. Ia melibatkan dua puluh orang peserta yang tidak mempunyai pendedahan terhadap bahasa Perancis sebelum mendaftar di universiti. Penyelidikan ini bertujuan untuk mencapai dua objektif utama: pertama, mengkaji persepsi vokal nasal antara dua kumpulan pelajar, dan kedua, menilai kesan kedudukan vokal dalam perkataan terhadap pengecamannya. Bagi mencapai objektif ini, dua ujian persepsi telah digunakan. Ujian pertama terdiri daripada 30 pasang perkataan, yang setiap satunya mengandungi sama ada vokal oral [ɛ, a, o/ɔ] atau vokal nasal [ɛ̃, ɑ̃, ɔ̃], manakala ujian kedua melibatkan 30 perkataan, yang mengandungi setiap vokal nasal [ɑ̃], [ɛ̃], [ɔ̃] dalam tiga kedudukan dalam perkataan

(permulaan, antara konsonan, dan akhir mutlak). Para peserta diminta untuk memilih vokal oral atau nasal yang tepat berdasarkan input pendengaran. Dapatan kajian menunjukkan bahawa pelajar FFL Melayu mampu membezakan ciri oral/nasal, namun cenderung menggantikan vokal nasal dengan vokal lain, dengan variasi bergantung pada kedudukan vokal dan kumpulan pelajar.

Kata kunci : linguistik; vokal bahasa Perancis; bahasa Perancis sebagai bahasa Asing (FFL); fonetik sebutan.

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1. Introduction

The perceptual magnet theory explains the stages of sound acquisition in children: infants are able to perceive and discriminate the sounds of any language they hear in their surroundings, and this characteristic is universal. But, starting from the sixth month, they begin to save the sounds of their mother tongue, creating mental maps of them with the prototypes of the sounds. From then on, their ability to discriminate between foreign language sounds begins to decline. At 12 months, they classify the sounds heard in the prototypes, which function as magnets, i.e., they attract sounds close to the prototype. Thus, learning a foreign language and producing new sounds is difficult.

With regard to the possibility of acquiring a new language, Flege (2003) considers that the abilities relating to the acquisition of phonetic categories for vowels and consonants decrease with age. Lauret (2007) in his study comparing the acquisition of a second language between younger and older learners. He notes that older learners tend to process the L2 signal linguistically, while younger learners process it aurally, without relying on existing linguistic knowledge. This indicates that older learners are not inherently less successful at acquiring new sounds, and that age is not a determining factor.

Based on the perceptual assimilation model, the perception of the sounds of a foreign language depends on the articulatory and acoustic similarities and differences that exist between the mother tongue and the foreign language (Best, 1991). The listener will assimilate the sounds of the foreign language to the category existing in their mother tongue if they perceive them as similar, while noting, however, that they are not identical sounds. On the other hand, if there are no articulatory resemblances between the sounds of the mother tongue and the foreign language, the learner will perceive the differences and will not be able to assimilate the sounds of the foreign language into the mother tongue system (Best, 1991). The author then proposes four possible models of perceptual assimilation: 1. Two different phonemes of a foreign language can be assimilated to two categories of the mother tongue; 2. Two phonemes of a foreign language can be assimilated to a single category of the mother tongue; 3. Two different phonemes of a foreign language, one of which looks more like the phoneme of the mother tongue, can be assimilated to a single category of the mother tongue; 4. If the articulation of the phonemes of a foreign language is different from that of the mother tongue, the phonemes cannot be perceived, and therefore they are not assimilated (Best, 1991).

1.2 Problem statement

Difficulties in perceiving and pronouncing sounds when learning a foreign language are most often attributed to differences between the phonological systems of the native language and the foreign language. “We only hear and recognize what we are used to hearing and recognizing” (Lhote, 1995, in Cornaire, 1998). That is to say that if certain sounds are not in the repertoire of our mother tongue, they are, by default, difficult to identify. We perceive sounds through a phonological screen, which allows us to distinguish only the known sounds to which we were accustomed during the acquisition of the mother tongue, while the sounds of the foreign language, passed through the filter of the mother tongue, are badly encoded (Best, 1995; Kuhl & Iverson, 1995; Derwing & Munro, 2015; Celce-Mucia et al., 2010).

French and Malay are two languages that originated from different families; hence, the language system and structure of the two are totally different. The acquisition of French nasal vowels presents a significant challenge for Malaysian learners, particularly due to the phonological disparities between their native language systems and French. Studies on the phonological interference between first language (L1) and second language (L2) in other languages have been conducted by many scholars, but the specific challenges faced by Malaysian learners in perceiving and producing French nasal

vowels remain understudied. This is particularly significant given Malaysia's multilingual context, where learners often navigate between multiple language systems (Winskel, 2020; Abdul Malek, 2024)."

Flege's Speech Learning Model (2003) suggests that learners' ability to acquire new phonetic categories is influenced by the relationship between L1 and L2 sounds. When learning foreign nasal vowels, Malaysian learners must contend with both assimilation and dissimilation processes, which can lead to pronunciation difficulties and the potential fossilization of errors. Research by Baker & Trofimovich (2005), Kartushina & Frauenfelder (2014) has further supported this model, demonstrating how L1 phonological systems influence L2 sound acquisition. Previous studies examining issues related to the acquisition of the French language by Malay students have largely focused on errors in the use of certain grammar aspects, such as the use of affixes, prepositions, verbs, conjunctions, gendered nouns, and adjectives in French (Choi, 1986; Hassan, 1997; Lim, 2001; Teh, 2006; Azhar, 2006 & Abdul Halim, 2008). Besides the study by Hassan (2015) on the acquisition of French oral vowels by Malay students, no other research has been conducted on the perception of the French nasal vowels by Malaysian students. Research specifically addressing nasal vowel acquisition in French remains limited. This gap is particularly problematic given that accurate pronunciation of nasal vowels is crucial for effective communication in many target languages. Malaysia's unique multilingual environment creates distinct patterns of phonological transfer that may affect the acquisition of nasal vowels in French, yet these patterns remain largely unexplored.

Therefore, this study addresses the specific challenges Malaysian learners face in perceiving and producing nasal vowels, considering both the theoretical implications for second language phonology and the practical applications for language teaching. The findings will contribute to developing more effective pedagogical approaches that specifically target the needs of Malaysian learners in mastering nasal vowel perception and pronunciation.

1.3 Objective

This study has two main objectives:

1. To explore the differences in the perception of nasal vowels between two groups of Malaysian students learning French;

2. To assess how the position of nasal vowels within words affects perception across both groups.

The findings from this study aim to help French language learners in Malaysia develop greater awareness of nasal vowels, ultimately improving their pronunciation skills. This approach aligns with previous research suggesting that comparative studies help learners develop a better understanding of target language features and minimize errors (Malik, Hassan & Hamzah, 2019).

1.4 French and Malay Vocalic Systems

According to Guimbretière (1996), French is characterized by anteriority, labiality, nasality and muscular tension. The sound system of the French language is made up of 36 phonemes, including 16 vowels, 3 semi-vowels, and 17 consonants. The vowel system is made up of 16 vowels, including 12 oral and 4 nasal vowels. According to articulatory characteristics, all vowels can be divided as follows: very closed [i, u, y], closed [e, ø, o, õ], medium [ə], open [ɛ, œ, ɔ, ɛ̃, and very open [a, ɑ, ɑ̃] (Léon & Léon, 2009). As we can see, some oral vowels are distinguished by their openness; the vowel /ɛ/ has its closed and open realizations [e, ɛ], just like the vowel /O/ [o, ɔ], and the vowel /Œ/ [ø, œ]. The central vowel [ə] is a vowel pronounced with the position of the tongue being in the central part of the mouth. The front vowel [a] replaced the pronunciation of [ɑ] posterior, except in cases where it is an 8 question of distinctive phonological oppositions, if one refers to the pronunciation of standard French. The [ɑ] posterior is pronounced in regional dialects and in Quebec French (Gudurić, 2009). The articulation of nasal vowels can be described as follows: the nasal vowel [œ̃] is half-open, front, rounded; the nasal vowel [ɛ̃] is half-open, front, unrounded; the vowel [ɑ̃] is open, back, unrounded; the vowel [ɔ̃] is half-open, posterior, rounded. The four nasal vowels, as well as the [ɑ] posterior, the closed [o] and the

closed [ø], have the natural duration, that is, these vowels are long in the stressed closed syllable, before any pronounced consonant, while the other vowels possess the combinatorial duration: they are lengthened before the consonants [ʀ, z, v, ʒ] or before the consonant cluster [vʀ] or [vl]. It should be noted that this does not concern the closed [e] and the unstable [ə], since they are never found in a stressed closed syllable (Gudurić 2009).

Among the four nasal vowels [ɑ̃, œ̃, ɛ̃, ɔ̃], the vowel [œ̃] is replaced by [ɛ̃], because the number of words in which this phoneme has a phonological and distinctive value is very limited (Gudurić, 2009). In the media, we hear the pronunciation of the vowel [ɛ̃] instead of the [œ̃], the latter being completely replaced (Detey et al., 2010). The replacement of the nasal [œ̃] is also due to the low frequency of the sound in the French, as stated in Catach (2016): the frequency of the four nasal vowels is as follows: [ɑ̃] – 3.3%, [ɔ̃] – 2%, [ɛ̃] – 1.4%, [œ̃] – 0.5%.

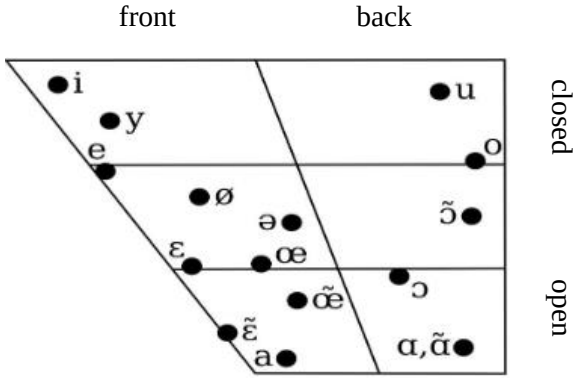

Figure 1. Vowels chart of French vowels (adapted from Collins & Mees, 2013)

The sound system of the Malay language is composed of 35 phonemes, including six oral vowels [a, e, ə, i, o, u]. According to the aperture, we distinguish the closed vowels [i, u], the middle vowels [e, ə, o] and the open vowel [a], while according to the point of articulation, we classify them in three categories: front [i, e], central [ə, a], and back [u, o]. The back vowels are labialized, while the lips are neutral if one pronounces the front vowel [e], slightly apart for the vowel [i] and finally open, if one pronounces the middle vowel [a] (Hassan, 2020). The Standard Malay vowel system, which has only six vowels, represents an obstacle to learning foreign languages, especially French, because at the level of auditory perception, native speakers of Malay have difficulty distinguishing double-timbral vowels.

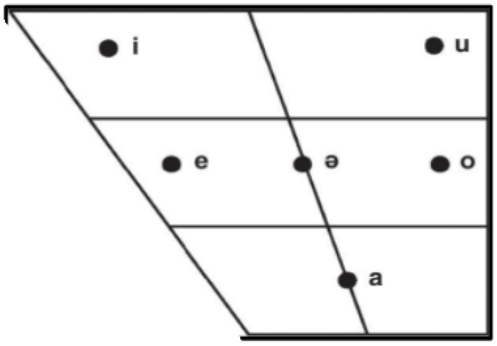

Figure 2. Vowel chart of the Standard Malay vowels (Maris, 1980)

Therefore, in the vowel system of the Malay language there are no nasal vowels, which makes it an obvious contrast to the vowel system of French. The nasal vowels of French are characterized by the presence of the nasal resonance, while in other languages the nasal resonance is the result of the proximity of the nasal consonants [m] or [n], or it is the individual characteristics without linguistic or

semantic value (Malmberg, 1963). This means that the nasal vowels of French are phonemes of the vowel system, while in Malay they are combinatorial variants linked to coarticulation, as evidenced by the pronunciation of the word *pandai* [pandai], *pendek* [pendeʔ], and *sombong* [somboŋ] where one has the realization of the nasalized vowel in contact with the nasal consonant. The lack of similar phonemes in Malay may make it difficult for Malay learners to perceive and produce French nasal vowels. However, the fact that Malay has the nasalized realizations in context could be a facilitating factor in the appropriation of this parameter.

2. Literature Review

As mentioned earlier, the production and perception of French nasal vowels pose significant challenges for learners, particularly those whose native languages do not feature similar phonetic distinctions. Research indicates that learners from different linguistic backgrounds encounter unique obstacles in mastering French nasal vowels. The research conducted by Kakoyianny-Doa et al. (2017) demonstrates the difficulties encountered by Cypriot students of French as a foreign language when learning the nasal vowels [ɑ̃] and [ɛ̃], through analysis of the two vowel systems of French and of their mother tongue, the analysis of perception, as well as proposals for overcoming these difficulties. According to these results, the nasal vowels [ɑ̃] and [ɛ̃] were correctly discriminated in two-thirds of words of the corpus. The students distinguished the oral vowel from the nasal vowel [ɑ̃] in 91% of occurrences and the oral vowel from the nasal [ɛ̃] in 70-84% of occurrences. The authors consider it important to link the sounds with the corresponding spellings to better acquire the nasal vowels. Study by Brkan et al. (2012) on the production of the nasal vowels by the Bosnian speakers shows that they are able to distinguish between the three nasal vowels and the oral vowels. They conclude that the findings are due to their advanced proficiency at levels B2 and C1. As for the duration of vowels, they find that the speakers surveyed tend to lengthen nasal vowels more than native speakers (Brkan et al., 2012).

Even though Polish and French both have nasal vowels, Gajos (2019) showed that Polish students still have trouble hearing and producing French nasal vowels. This means we need more research on how to teach French sounds to people learning the language as a second language. A different study by Correa, Ferreira-Gonçalves, and Brum-de-Paula (2017) looked at how Brazilian students say French nasal vowels (ɛ̃, ã, ɔ̃). They used ultrasound to compare the students' tongues to those of native French speakers. The study showed differences and that ultrasound is a good way to study how people make nasal sounds.

Agnes (2013) conducted a descriptive study in Indonesia investigating pronunciation errors among secondary school learners of French. The study focused on the nasal vowels [ɑ̃] and [ɔ̃], though the underlying reasons for these errors were not explored. Separately, Hassan (2015) investigated Malaysian students' ability to discriminate and produce French vowels, examining the role of the students' first language (L1) in this process. This research challenged the assumption that L1 interference solely accounts for difficulties in acquiring the French sound system. Instead, Hassan (2015) attributed these difficulties to the French spelling system, finding that inconsistencies in representing French vowels were a major source of production errors.

3. Methods

Participants

The research was conducted at the Centre for Research in Language and Linguistics, Faculty of Social Sciences and Humanities, National University of Malaysia. Twenty students (10 beginners and 10 intermediates) for the academic year 2021/ 2022 have participated in this research. Students at the beginner level have attended classes for 56 hours over the course of one semester, whereas those at the intermediate level have attended classes for 112 hours over the course of two semesters. This research had two objectives: 1) to explore the differences in the perception of nasal vowels by two groups of students; 2) to assess the results of two groups with respect to the position of nasal vowels in words.

Beginner students were grouped under Group 1, and intermediate students under Group 2. All participants began learning French as a second language only after enrolling in university, indicating that they had no prior exposure to the language.

Instruments

Two perception tests were employed to collect the data, which consist of: a) The first perception test consisted of 10-word pairs per vowel, distinguished by a single oral or nasal vowel in the interconsonantal position and in the absolute final, totalling 30-word pairs. The participants were then instructed to select the correct answer based on the heard word, which contained either the oral vowel [ɛ, a, o/ɔ] or the nasal vowel [ɛ̃, ɑ̃, ɔ̃]. b) The second perception test consisted of three nasal vowel categorization tasks, consisting of 10 words per nasal vowel [ɑ̃], [ɛ̃], [ɔ̃], or 30 words in total, with one of the three nasal vowels present in each of the three positions of the word (initial, interconsonantal, and absolute final).

In the context of this current study on French nasal vowels, the decision to exclude the phoneme [œ̃] is supported by recent studies indicating a decreasing frequency of [œ̃] and an increasing merger with [ɛ̃] in contemporary French (Hansen, 2001; Martin, 2023; Park & Kim, 2023; Correa, Ferreira-Gonçalves & Brum-de-Paula, 2017). This decision is further supported by educational considerations; focusing on the most relevant and distinct nasal vowels for learners is crucial. Studies emphasize the need for teaching methods to adapt to the evolving nature of these sounds (Granget et al., 2024; Martinez, 2016). By concentrating on [ɛ̃], [ɑ̃], and /ɔ̃/, educators can provide more effective instruction. Learners benefit more from mastering distinctions actively used in contemporary speech.

Procedure

The study focuses on the discrimination of vowels as oral or nasal and the identification of nasal vowels. For the first test, participants were given a binary choice between two words where one of the two words has an oral or nasal vowel in the interconsonantal position or in the absolute final, for example: *cette/sainte, mais/main; chasse/chance; chat/chant; mode/monde; peau/pont*. They were asked to identify which words have the nasal vowels. For the second test, we provided participants with a list of words read by native speakers and asked them to select the right answer based on the vowels they heard. The word list consisted of 10 words per nasal vowel for the three-word positions: initial, interconsonantal, and absolute final, and the task was to tick the boxes according to the nasal vowel heard, with the API symbols of the nasal vowels being inscribed in the respective columns. Here are some examples of proposed words having one of the nasal vowels in the initial position: *instable, ombrage, ambitieux*; at the interconsonantal position: *simple, mentir, tondre*, and in the absolute final: *main, vent, long*.

4. Results and Findings

4.1 The perception of nasal vowels

The first perception test consisted of identifying oral or nasal vowels in two positions of the word: in the interconsonantal and in the absolute final.

The results of the first perception test show that 92.6% of the students in Group 1 were able to correctly differentiate the three nasal vowels from the oral vowels at the interconsonantal position and in the absolute final. For the oral vowel [a] and the nasal vowel [ɑ̃], 96% of the students perceived them correctly in both positions. While for vowels [ɛ] and [ɛ̃], 96% correctly located those vowels at the absolute final position, while only 88% were correctly identified in the interconsonantal position. The results also show that the students in Group 1 had difficulty discriminating between the oral vowel [o/ɔ] and the nasal vowel [ɔ̃] found in the interconsonantal position. Among the five pairs of words proposed, six correct answers were noted. At the final position, we noted 9/10 correct answers, apart from the

opposition *mélo/melon* where eight students correctly identified the nasal vowel of the word listed, while two students ticked the wrong answer, the words *mélo*.

As for Group 2, the first perception test revealed that all the students were able to differentiate the three nasal vowels from the oral vowels at the interconsonantal position, and in the absolute final, the success amounted to 97.3%, slightly higher than Group 1 students. The results show that the students of Group 2 perceive the difference between the oral vowel [a] and the nasal vowel [ɑ̃] in both positions of the word, the success being 100%. 100% of the participants in Group 2 identified the vowels [ɔ] and [ɔ̃] in the final position correctly, and 96% were able to discriminate those vowels in the interconsonantal position. The Group 2 students had the most difficulty discriminating between the oral vowel [e] and the nasal vowel [ɛ̃] found in the interconsonantal position; only 60% of the students correctly identified the oral/nasal vowel. At the final position, we noted 9/10 correct answers, apart from the opposition *fait/faim* where eight students correctly identified the nasal vowel of the word listed, while two students ticked the wrong answer, the word *fait*.

4.2 The position of the nasal vowel in the word.

The second perception test consisted of words having the three nasal vowels in three different positions: at the initial, at the interconsonantal, and at the absolute final of the word. First, the perception of the nasal vowel [ɛ̃], 33% of the participants in Group 1 perceived correctly this nasal vowel, while 66% of participants in Group 2 perceived it correctly. In the initial position and the absolute final, the two groups experienced almost the same success rate; that is to say, in total, for the two groups, the average values make up 60% of occurrences in the initial and 55% in the absolute final. In total, including the three positions, this vowel was correctly perceived in 43.3% of occurrences (Group 1) and 66.3% (Group 2), or almost 55% success for the two groups, the average value in the three positions. Unlike the vowel [ɑ̃], the nasal vowel [ɛ̃] is rarely perceived as the nasal vowel [ɔ̃], and this is demonstrated by the results of two groups of students in the three positions. If replaced by the vowel [ɑ̃], this is most evident at interconsonantal position in half of occurrences, precisely 50.5% for both groups, then in absolute final the mean value for both groups is 45%, and finally at initial it is 36% for the two groups. In total, for the two groups and in the three positions, the vowel [ɛ̃] was perceived as the nasal vowel [ɑ̃] in 43.8% of occurrences. These results allow us to see that the discrimination of this phoneme is the most problematic for both groups of students.

Table 1. Perception of nasal vowel [ɛ̃]

Position of vowel	**[ɛ̃] initial**		**[ɛ̃] interconsonantal**		**[ɛ̃] final**	
	Group 1	Group 2	Group 1	Group 2	Group 1	Group 2
[ɛ̃]	52%	68%	33%	66%	45%	65%
[ɑ̃]	42%	30%	67%	34%	55%	35%
[ɔ̃]	6%	2%	0%	0%	0%	0%

As for the nasal vowel [ɑ̃], we notice rather a balance in its perception at the initial position between the two groups of subjects: it was correctly identified in 55% of occurrences by Group 1 and 53% by Group 2. In interconsonantal position, Group 2 was more successful than Group 1: 85% of occurrences against 70%, while in the absolute final position of the word, Group 1 correctly identified the nasal vowel [ɑ̃] in 66% of occurrences, but for Group 2, 78% of occurrences were noted. In total, the average value of perception of this vowel, including the three positions, amounts to 63.7% of occurrences (Group 1) and 72% of occurrences (Group 2), i.e., 67.9%, the average value for the two groups. That is to say that the two groups have quite a gap in the rate of success in discriminating this phoneme. As for the discrimination test, if we compare the results of two groups, we can see that the

nasal vowel [ɑ̃] is replaced by the nasal vowel [ɛ̃] in 20.3% of occurrences by Group 1, including the three positions, while the average value for Group 2 is 4.7%, noting that there is a minimal error made by the students in identifying those vowels in interconsonantal position. The average values where this vowel is replaced by the nasal vowel [ɔ̃] are 16% (Group 1) and 23.3% (Group 2), so these are very approximate results. If we compare the results between these two groups according to the errors made and the position of the word, we can see that Group 1 tended to replace this vowel with [ɛ̃] in the initial position as well as in the interconsonantal position in most cases, while Group 2 showed the greatest number of errors in the initial by replacing the vowel [ɑ̃] with the vowel [ɔ̃]. Finally, if we compare the rate of errors experienced by the two groups in total by position of the word, we can clearly see that the highest values are found at the initial position where the vowel [ɑ̃] is replaced by [ɔ̃] and in the absolute final where it is replaced by [ɛ̃].

Table 2. Perception of nasal vowel [ɑ̃]

Position of vowel	[ɑ̃] **initial**		[ɑ̃] **interconsonantal**		[ɑ̃] **final**	
	Group 1	Group 2	Group 1	Group 2	Group 1	Group 2
[ɑ̃]	55%	53%	70%	85%	66%	78%
[ɛ̃]	25%	7%	12%	0%	24%	7%
[ɔ̃]	20%	40%	18%	15%	10%	15%

By comparing the perception results of the two preceding vowels with those of the nasal vowel [ɔ̃], we can clearly see that the latter was perceived most correctly in three positions, with the average values being 88% to 98% of occurrences per position. We also notice an imbalance in the identification of this phoneme at the interconsonantal position between the two groups: 88% of occurrences (Group 1) and 98% (Group 2). There is therefore a slight advantage in favour of the second group, because in the three positions the success amounts to 99%, whereas for Group 1, it is 93%. It is also noted that Group 1 tended to replace this nasal with the nasal [ɑ̃] in 5% of cases, which represents the average value for the three positions, while this was not the case with the second group. Therefore, this vowel was the best perceived by the two groups of students in all three positions of the word.

Table 3. Perception of nasal vowel [ɔ̃]

Position of vowel	**[ɔ̃] initial**		**[ɔ̃] interconsonantal**		**[ɔ̃] final**	
	Group 1	Group 2	Group 1	Group 2	Group 1	Group 2
[ɔ̃]	93%	100%	88%	98%	98%	100%
[ɑ̃]	5%	0%	10%	2%	0%	0%
[ɛ̃]	2%	0%	2%	0%	0%	0%

If we look at the results of the perception of the three nasal vowels in three positions by two groups of students, we can clearly see that the vowel [ɔ̃] comes first with 96.2% success, then the vowel [ɑ̃] with 67.8% success, and at the end the nasal vowel [ɛ̃] with 54.8% success.

4.3 Discussion

The results of the perception of the three nasal vowels by the two groups of students [ɑ̃, ɛ̃, ɔ̃] show that they perceive and distinguish well between the oral and nasal vowels. There are two possible reasons

for this: First, the distinctive feature of orality or nasality of vowels represents a parameter that Malay students noticed with ease, which is due to the fact that nasalized realizations exist in their mother tongue. These are not identical sounds, but rather ones that are similar enough to be classified in the prototypes of their mother tongue. Then there are students who have already integrated this trait into their perceptual system while learning French. In addition, to perform this task, the students had a binary test, i.e., they had been offered two spelled words and had to choose the correct answer based on the function of the words heard, so they had to relate the word heard with its representation graph, linking auditory perception with the graphs, which contributed to their success.

On the other hand, the difficulties turn out to be significant if the students must identify the vowel heard among the three vowels proposed. Here they had to check the box where the API symbols for the three vowels appeared. As a result, we wanted to test the discrimination of nasal vowels between them without written support, and we did not use the spelled words to facilitate this task because we are aware that learners are typically more focused on writing than on speaking.

The results show that they better discriminate the posterior nasal vowels [ɔ̃] and [ɑ̃] than the anterior nasal vowel [ɛ̃]. The nasal vowel that is most confused with the others is the [ɑ̃], while the one that is least correctly discriminated and is particularly replaced by the vowel [ɑ̃] is the [ɛ̃]. The average perception values of the vowel [ɛ̃], by the two groups of students, in three positions of the word (initial, interconsonantal, and final), show that this nasal was correctly identified in 54.8% of occurrences, while it was replaced by [ɑ̃] in 43.8% of cases, and by [ɔ̃] in 1.3% of cases, in total. According to the position of the word, we see that this nasal is replaced by [ɑ̃], especially in interconsonantal position, where the average value for the two groups is 50.5%, and in absolute final position, where the average value for the two groups is 45.5%.

The average perception values of the vowel [ɑ̃] by the two groups of students in the three positions of the word show that this nasal was correctly perceived in 67.8% of occurrences, while it was replaced by [ɛ̃] in 12.5% of cases and by [ɔ̃] in 19.7% of cases, in total. According to the position of the word, the vowel [ɑ̃] is replaced by [ɔ̃], in particular in the initial and interconsonantal positions, where the average value is 30% and 33% for the two groups, respectively. We can explain these results as follows: The nasality of the vowel [ɑ̃] distinguishes it from the Malay oral vowel /a/, and the latter is centralized while the vowel [ɑ̃] is posterior. This indicates that these learners had difficulty acquiring the parameter of posteriority for this vowel, so they initially replaced it with the nasal [ɔ̃], because in Malay, posteriority is a characteristic specific to the vowel /o/. This is not an insignificant percentage, especially for the second group (23.3%).

This confusion between [ɛ̃] and [ɑ̃], especially in cases where the vowel [ɛ̃] is replaced by [ɑ̃] in the interconsonantal and in the final position, can be explained as follows: These two nasal vowels are characterized by the common features of nasality and non-labialization and by distinctive features: open or half-open, posterior or anterior vowel. To pronounce the nasal [ɛ̃], the lips are moved apart, while for the Malay /e/, the lips remain neutral, which allows us to see that this is a parameter not acquired by the Malay learners, because the spacing is not a feature specific to the vowel /e/ of the Malay language. In addition, we studied the words where the students confused the vowels [ɛ̃] and [ɑ̃] in most cases. Words where the vowel [ɛ̃] is replaced by [ɑ̃] in the absolute final: *main* and *pain*; interconsonantally, *simple* and *teindre*. The nasal [ɑ̃] is replaced by [ɛ̃] in initial position in the greatest number of occurrences, and these are the words *angle* and *endive*. Then, in most instances, it is replaced by [ɔ̃] in the initial; these are the words *envoyer*, *ampleur*, and *envers*.

The average perception values of the vowel [ɔ̃] by the two groups of students in three positions of the word show that the nasal vowel [ɔ̃] was correctly perceived in 96.2% of occurences, while it was replaced by [ɑ̃] in 2.8% of cases and by [ɛ̃] in 0.7% of cases, in total. The very high success rate in identifying the nasal [ɔ̃] can be explained by the fact that this phoneme has been assimilated into the similar category of the students' mother tongue; the common characteristics that the nasal vowel [ɔ̃] has

with the oral vowel /o/ of Malay are the middle aperture, the posteriority, and the rounding; the only difference lies in nasality.

This result shows resemblance with a study by Detey et al. (2010) on the Spanish and Japanese speakers acquiring French nasal vowels, where the nasal vowels perceived with the greatest success are the nasal [ɔ̃], then [ɑ̃], and at the end [ɛ̃]. Additional study involving Spanish and Colombian speakers by Bustamante et al.(2018) demonstrated that the nasal [ɔ̃] is better perceived than the merged [ɑ̃] and [ɛ̃].

This study suggests that even if nasal vowels do not exist in the native language of the learners, they can still distinguish these phonemes of the target language by clearly differentiating between oral and nasal vowels. This capability stems from two factors: first, the contrast with Malay, which lacks nasal vowels as distinct phonemes; second, the speakers of Malay incorporate nasalized realizations into their perceptual system. This adaptation can lead to a unique approach to learning and perceiving nasalized vowels, often resulting in a reliance on contextual cues rather than phonemic distinctions (Azmi, 2014; Sulong, 2016).

5. Conclusion

This study investigates the ability of the Malaysian students to perceive the French nasal vowels. The study was conducted on two groups of students from two different levels of proficiency. The findings show that the two groups of students were able to discriminate well the posterior nasal vowels [ɔ̃] and [ɑ̃], but they had difficulty discriminating the anterior nasal vowel [ɛ̃]. The results also demonstrate the ability to discriminate the sounds depending on the amount of time the learners are exposed to the sounds. Participants from the higher level performed better in the discrimination and perception tests.

It is shown in the results that the students had assimilated these vowels into the existing categories in their mother tongue, most often by common features. In addition, the study of the perception of the three nasal vowels found in the initial position, the interconsonantal position, and the absolute final position of the proposed words yielded very interesting results, when compared to the results of other studies conducted and discussed in this article.

This study's findings directly support the initial research aim of improving French pronunciation among Malaysian learners. The high accuracy rates in perceiving nasal vowels, especially [ɔ̃], demonstrate that despite the absence of nasal vowels in their native language, Malaysian learners can achieve a high level of accuracy. This directly suggests that targeted instruction focusing on nasal vowel distinctions can significantly improve their pronunciation. These findings provide valuable insights into the challenges faced by Malaysian learners in acquiring French nasal vowels and offer a data-driven basis for developing targeted pedagogical interventions to improve pronunciation.

To further expand this line of research, a comparative study incorporating the phoneme /œ̃/ should be conducted. This would involve analyzing the relative difficulty of /œ̃/, [ɛ̃], [ɑ̃], and [ɔ̃] for Malaysian learners, identifying both shared and unique challenges in their acquisition. This broadened scope would offer a more comprehensive understanding of the difficulties posed by the full range of French nasal vowels for this learner population. Furthermore, incorporating a larger and more homogenous sample of learners, stratified by proficiency level and hours of instruction, would allow for a more robust analysis of the acquisition trajectory for each nasal vowel.

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who participated in this study was obtained prior to the study being conducted. The authors declare that they have no conflict of interest.

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