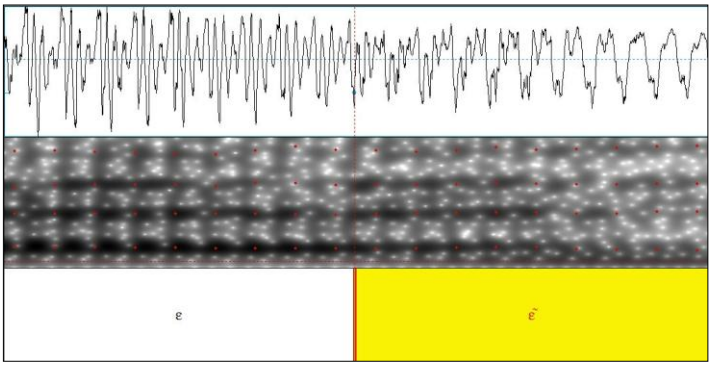
Categorical Nasal Vowel Acquisition in L2 French Learners

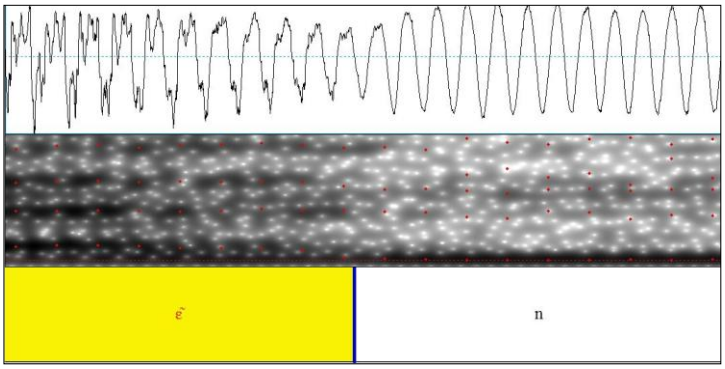
In this paper, I examine how native English speakers, who do not make a categorical distinction between oral and nasal or nasalized vowels, produce French nasal and nasalized vowels at different stages of L2 French learning. An issue raised in the analysis is the difficulty of isolating and identifying the phonetic features of nasal and nasalized vowels, due to the complex interactions of the oral formants, nasal formants, and anti-formants produced in the acoustically coupled oral-nasal cavity. Due to the complex interactions created by this configuration, the amount of literature on isolating visible acoustic features in spectrograms has been relatively limited and widely inconsistent (Delattre 1954, 1965, Maeda 1993, Delvaux et al. 2002). The phonetic analysis performed in this study shows that F1/F2 shifts and waveform complexity features can identified as potential cues for L2 French learners to produce nasal vowels.

Data consist of English and French tokens produced by 3 beginner, intermediate, and advanced female L2 French speakers, representative of three stages in L2 French acquisition. Spectrogram and waveform analysis was conducted using Praat; differences in waveform complexity are shown to act as a cue for oral/nasalized/nasal segmentation- a technique which is not used in any previous literature.
Example 1 from the intermediate speaker shows noticeable differences between the waveforms of (a) an oral vowel and nasalized vowel, and (b) a nasalized vowel and a nasal consonant.

1a. Oral vowel [ɛ] and nasalized vowel [ɛ̃]



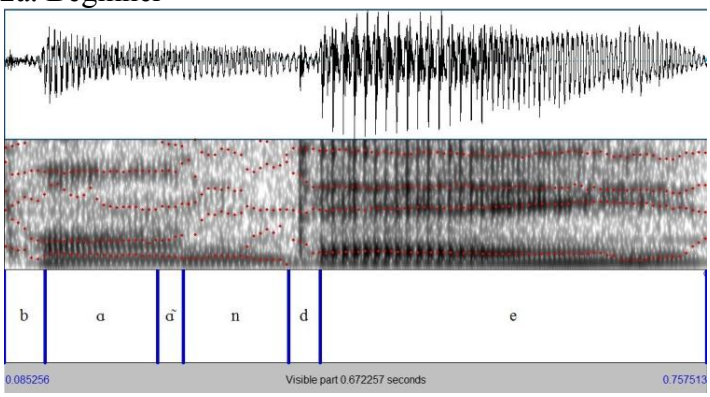
b. Nasalized vowel [ɛ̃] and nasal consonant [n]



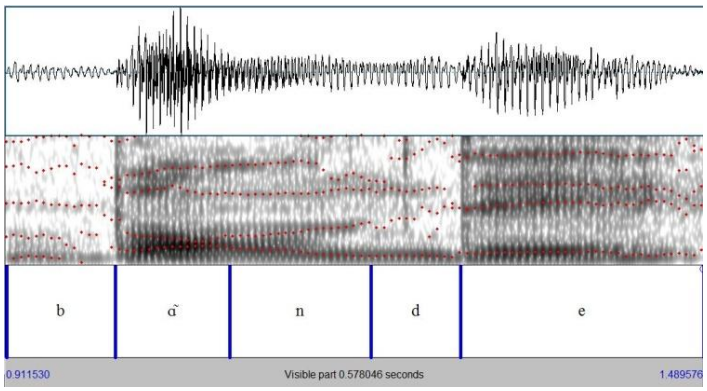
The results show a gradual lessening of French co-articulatory nasalization in oral vowels in contexts where English displays high rates of nasalization from beginner to advanced speakers. More advanced speakers are better able to suppress nasalization in order to preserve the categorical contrast between oral vowels and their nasal counterparts. The acquisition of this coarticulation suppression is more gradual than the nasal/oral vowel categorical contrast, which even the beginning speaker could successfully produce word-finally, suggesting speakers more easily acquire gross categorical differences than gradient differences.

For nasal vowels in pre-consonantal position, such as the French [bɑ̃de], advanced L2 speakers are better able to control velum gestures to make closing the velar port coincide with the oral consonant closure without producing an intermediate nasal consonant. This gestural coordination is modeled using gestural scores. Example 2 shows the gradual acquisition of [ɑ̃], with a gradual decrease in an epenthesized [n]:

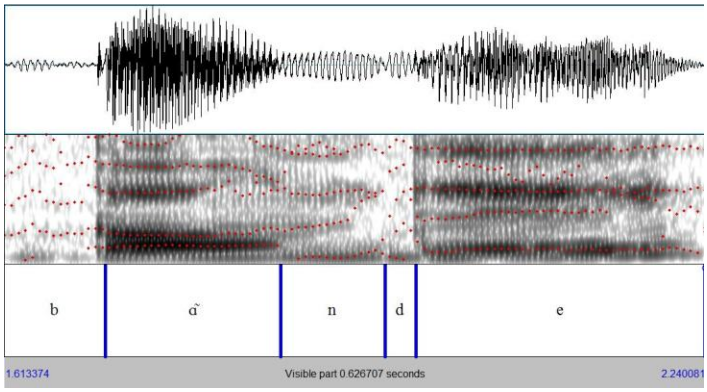
2a. Beginner



b. Intermediate



3. Advanced



For formant cues, F1 and F2 come closer together in nasal vowels than in either nasalized vowel or oral vowel counterparts. This supports Maeda (1993)'s results, wherein the degree of distance between F1 and F2 corresponds to the perceived degree of nasalization. For all speakers, the nasal F2 was either lower or equivalent to the F2 in the oral vowel, whereas F1 varied across places of articulation and levels of acquisition. This F2 behavior in the nasal vowels is consistent with Delavaux et al. (2002), suggesting F2 lowering may be the most significant factor in producing and perceiving nasal vowels.

Word Count: 498

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