

Phonological consequences of high front vowel nasalization in French

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Due to its phonotactic restrictions against adjacent nasal vowels + nasal consonants, French is often described as completely lacking regressive nasalization. While experimental evidence confirms this to a degree, in that mid and low vowels show negligent rates of nasality before nasal consonants, high vowels show significantly higher rates in the same context (e.g., Delvaux et al. 2008, Rochet & Rochet 1991), often exceeding 50% nasal. However, such phonetic findings are difficult to translate into a phonological framework because of vowel-specific factors favouring certain nasalized vowels over others (e.g., Hajek & Maeda 2000). As a first point, this paper presents new evidence that high front vowel nasalization must be considered phonological in French. This paper then pursues the resulting paradox this process introduces into the grammar of French, using Preservation of Contrast (PC) Theory (Łubowicz 2012) to provide a formal account.

High front vowel nasalization is established by applying a vowel-specific nasality threshold in a Solé-esque (1992, 2007) comparison of nasal phase vs. overall vowel duration. The data come from a nasometric corpus of European French containing the vowels /a, e, ø, o, i, y, u/ in real words preceding both oral and nasal contexts, e.g., /fis/ ‘son’ vs. /fin/ ‘fine (f.)’ ($n = 2,759$). The results show that nasal phase duration increases proportionately with overall duration only for pre-nasal /i, y/, suggesting alignment of nasality in reference to the vowel itself. Meanwhile, all other vowels show constant nasal phase duration, indicative of gestural alignment with the nasal consonant. These results strongly suggest that nasalization of only high front vowels is active in French.

In light of morphophonological evidence for lowering of underlying high nasal vowels (e.g., /fiⁿ/ → [fɛ̃] ‘fine (m.)’), these findings lead to a curious disparity in French where high nasal vowels are favoured as the output of assimilation but actively avoided in inventory production. This paradox is especially salient in output-oriented frameworks, where the latter cannot be reduced to restrictions on input structure. In this paper, I argue that contrast plays an active role in blocking regressive nasalization on other vowels and must be encoded as part of the grammar of French. In order to account for this formally, I present an analysis in PC Theory, an optimality theoretic framework where contrast is built into the evaluation of scenario-candidates.

In this analysis, markedness pressures drive lowering of input high nasal vowels, which creates a partial height neutralization. By eliminating [ĩ] in contrastive positions, this process creates a gap in the inventory where regressive nasalization may apply; however, where oral-nasal contrast does exist, nasalization is blocked. High back vowel nasalization is blocked by markedness, whether motivated by a general front-back disparity in nasal vowels (e.g., Beddor 1982) or their phonetic particularities (Hajek 1997).

These effects are captured principally by a ranking in which *VN (“No oral vowel + nasal consonant sequences”) is dominated by PC_{OUT}(nasal), which is violated when identical outputs correspond to segments which are distinct in nasality in the input (e.g., [ɛ̃] ← /ε, εⁿ/). The full constraint ranking provided in (1), where *ĩ is a simplified markedness constraint against high front nasal vowels and *ũ against high back nasal vowels. (Lower-ranked markedness constraints are excluded for space.)

(1) French ranking, PC analysis

PC_{OUT}(nasal), *ũ ≫ *VN ≫ *ĩ, PC_{IN}(nasal), PC_{OUT}(high), PC_{IN}(high)

In short, nasalization seeks to occur on all vowels, but is impeded where contrast exists. Ultimately, this analysis provides further evidence for the utility of contrast as visible, if not central, to phonological grammar.

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