

One common historical development in languages that have distinctively nasalized vowels is the excrescence of coda velar nasals after nasalized vowels (e.g. Midi French [savɔne] "to soap up", [savɔŋ] "soap"; see Posner, 1997). More generally, there is a tendency for the unmarked place of articulation for coda nasals and perhaps also for stops to be velar (Rice, 1996). In four experiments, we explored why the cross-linguistically unmarked place for excrescent nasals is velar. The experiments test Ohala's (1975) acoustic explanation: that velar nasals, having no oral antiformants, are acoustically more similar to nasalized vowels than are bilabial or alveolar nasals. The experiments also tested an explanation based on visual phonetics: velar nasals having no visible consonant articulation are visually more similar to nasalized vowels than are bilabial or alveolar nasals. American English listeners (16 listeners per experiment) gave place of articulation judgments for audio-only and audio-visual tokens ending in nasal consonants or nasalized vowels. In the first and second experiments, we obscured the last portion of CVN (N = /m/, /n/, or /ŋ/) and C $\bar{x}$  syllables with white noise. These experiments were designed to force listeners to assume the existence of a final consonant and to rely primarily on visual cues to determine the place of articulation. Factors influencing listeners' labeling performance were tested in logistic regression models which found that [ŋ] and [x̄] (nasalized vowel) tokens were more likely to be labeled "ng" in both audio-only and audio-visual tokens. Experiment 2 used an "ng" detection task rather than a three-alternative forced choice task and found that listener could distinguish [x̄] from [ŋ].

Table 1. Percent responses in Experiments 1-4 (columns) to different types of stimuli (rows).

		Exp 1			Exp 2	Exp 3			Exp 4
		"m"	"n"	"ng"	"ng"	"m"	"n"	"ng"	"ng"
audio	[m]	25	55	22	33	34	35	31	42
	[n]	21	56	23	33	19	56	23	28
	[ŋ]	17	40	42	47	17	28	54	62
	[x̄]	28	31	42	39	26	33	41	46
video	[m]	92	5	3	4	97	1	2	3
	[n]	4	75	22	45	5	79	16	21
	[ŋ]	4	38	59	69	3	18	79	89
	[x̄]	7	38	56	47	6	40	54	60

The third and fourth experiments extended these results using a different speaker and a less destructive form of noise masking. In a more direct test of Ohala's acoustic theory, we also synthesized "placeless" nasals by repeating pitch periods from the nasalized vowel of syllables ending in [m]. The results suggest that excrescent coda nasals tend to be velar in both audio-only and audio-visual presentations. The paper concludes with a discussion of phonetic modality and phonological markedness.

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