The relationship between oral and nasalised vowels in Australian English /æ/ change.

In many languages /æ/ is maximally affected by nasal contexts (Beddor 1993). In low vowels (with high F1), nasalisation contributes a spectral peak below the first formant, creating a first spectral prominence with increased bandwidth leading to the percept of a higher vowel than that without nasal coupling. There is also potential coincident velum lowering and tongue body raising brought about by palatoglossal activity (DeDecker & Nycs 2006).

In Australian English (AusE), nasalisation of /æ/ and the raised quality of the nasal allophone has been the subject of comment for over 100 years. Cox et al. (2004), in an acoustic study of historical data, found nasalised /æ/ to be phonetically raised relative to oral /æ/ but did not observe excessive allophonic separation. Over the past 20 years, a change in /æ/ has seen this vowel lower to occupy the extreme open position of the inverted triangular vowel space (Cox & Palethorpe 2007). The lowering of /æ/ appears to be coincident with a newly initiated allophonic split whereby nasalised /æ/ may be raised to overlap with /e/ but oral /æ/ remains low. In this paper we explore oral and nasalised /æ/ and /e/ to investigate the strategies speakers use to ensure maintenance of this highly functional contrast.

Oral and nasal allophones of 18 vowels including /æ/ and /e/ were collected from 30 females in short phrases and isolated /CVn, CVd/ words repeated three times in random order. Cluster analysis based on F1 and F2 (Emu: http://emu.sourceforge.net/) confirmed the presence of two groups of speakers: those who produce an oral/nasal allophonic split for /æ/ and those who do not. Figure 1 shows the results from two speakers to illustrate these speaker differences. Mixed model analysis reveals that the important contrast between /æ/ and /e/ is maintained by duration for those speakers who exhibit allophonic split. Figure 2 shows the length effect for oral and nasalised vowels and indicates that two binary features (nasality and length) generate a four way contrast at the raised vowel location. A length distinction is observed between oral [e] *head* and [eː] *haired* and between nasalised [ẽ] *Ben* and [æ̃] *ban*.

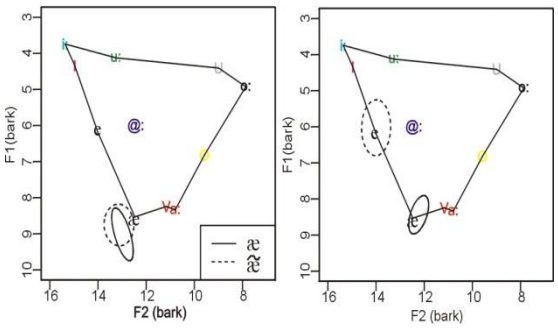

Figure 1: Oral and nasalised /æ/. Overlapping allophones (left) and allophonic split (right).

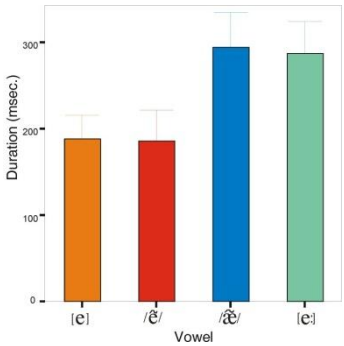

Figure 2: Duration of oral and nasalised vowels in the vicinity of /e/. Contrast is achieved by nasalisation and length

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