ORAL AND NASAL OUTPUTS FOR VOWELS IN NON-NASAL CONTEXTS

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Several studies have shown that the soft palate is lower for low vowels than for high ones. Vowels with the tongue high in the oral cavity are more susceptible to nasalisation than are those in which the tongue is low, for a given coupling area at the velopharyngeal port, on acoustic grounds, as demonstrated by Fant (1960, 43). But it may also be that the coupling area between nasal and oral tracts is greater for open vowels because the low jaw position drags down the soft palate. Hyde (1968) used a 'nose trumpet' to record separately the acoustic outputs from nose and mouth. He showed that there was a significant nasal output in sounds not requiring a raised velum.

In this study, oral and nasal outputs were obtained using adjacent recording rooms connected by a nose-shaped opening. The speakers were 8 young 'normal' British adults. From the sentences recorded, words containing open and close vowels away from nasal consonants were selected. Separated airflow outputs for these vowels showed many clear cases of aerodynamically non-nasal vowels in these non-nasal contexts. Peak intensity was measured for the oral and nasal acoustic outputs. Two speakers produced the same oral-nasal ratio for both 'open' and 'close' vowels (as judged auditorily), with a mean value of 20 dB. The other 6 speakers gave a smaller oral-nasal ratio of 17 dB for 'open' vowels, with an oral-nasal ratio of 21 dB for 'close' vowels. The results suggest that the soft palate is not severely dragged down, except perhaps for the diphthong /ai/. Some speakers, at least, appear to maintain a constant ratio of oral to nasal acoustic output. The oral output alone sounded 'denasalised'. It seems that the output from the nose may be significant, even in cases where the sounds are apparently transmitted across a raised soft palate.

References

Fant, G. (1960): Acoustic theory of speech production, The Hague: Mouton.

Hyde, S.R. (1968): "Nose trumpet: apparatus for separating the oral and nasal outputs in speech", Nature 219, 763-765.