Production of [m] and [n] in Codas by Brazilian Students: an Acoustic Analysis

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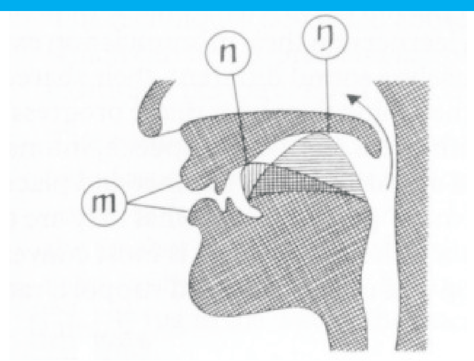
Objectives of the Research

Through acoustic analysis, to observe and describe what is really produced in the sequence *vowe*l + *nasal consonant* in codas of monosyllables by Brazilian students of English.

Nasal Consonants

bilabial(/m/) and alveolar (/n/)

In Portuguese: These phonemes do not occur in codas
(the graphemes 'm' and 'n' occur at the end of syllables [li*m*po; ta*n*to], and at the end of words [te*m*])
In English: These phonemes appear anywhere inside the syllable



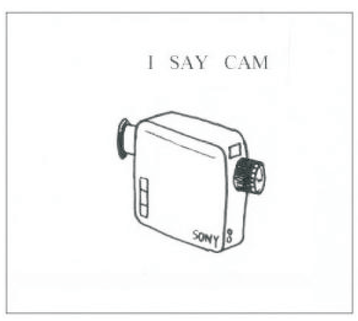
Source: Underhill, 1994

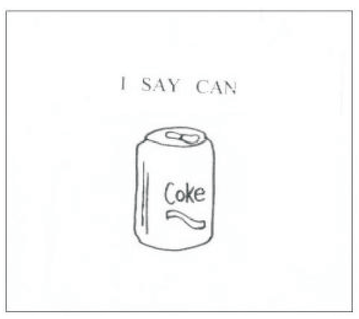
Methodology

Environment surrounding the nasals: Antecedent Vowels: / æ / and / ɪ /;
Nasal Consonants followed by silence.

Use of booklets: each page with the carrier sentence *I say...* And the target word with its corresponding drawing. Pages alternated with distractors (1:1).
Use of minimal pairs.

Pages of the booklets





Control group: 2 American adolescents (a boy and a girl); sentence duration; target word duration; first four vowel formants; nasal duration; first four nasal formants

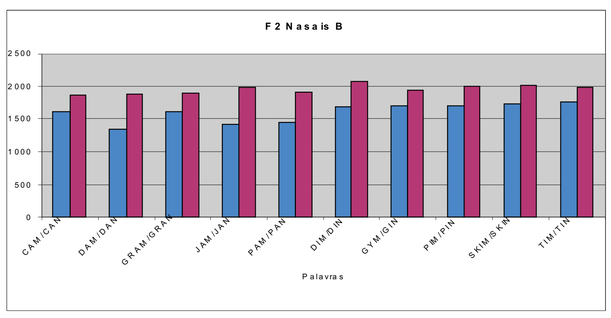
Informants: 10 adolescents(5 boys; 5 girls) at pre-intermediate level; target word duration; nasal duration; first four nasal formants

Data collection and analysis: Reading and recording in professional studio(at 44kHz). Use of PRAAT.

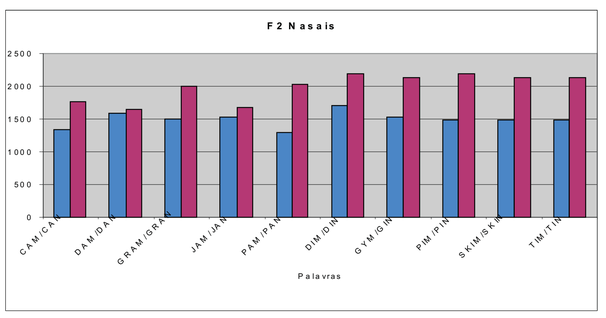
Results:

Through the data from the control group, F2 of the nasal murmur was chosen as the comparative parameter.

F2 - native speaker (girl)



F2 - native speaker (boy)



All pairs, for both native speakers, showed consistently F2 [n] bigger than F2[m]

Summary of the Results for Boys and Girls - [æ]

	CAMxCAN	*DAMxDAN*	*GRAMxGRAN*	*JAMxJAN*	*PAMxPAN*	*% GERAL*
% ✓	40	30	40	30	40	36
% ☒	30	0	30	20	10	18
% =	30	70	30	50	50	46

Summary of the Results for Boys and Girls - [ɪ]

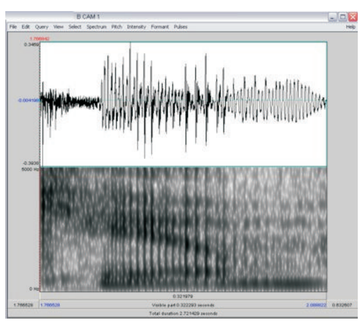
	DIMxDIN	*GYMxGIN*	*PIMxPIN*	*SKIMxSKIN*	*TIMxTIN*	*% GERAL*
% ✓	60	40	30	50	40	44
% ☒	30	20	40	40	50	36
% =	10	40	30	10	10	20

Conclusions:

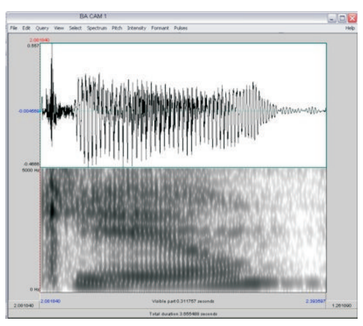
40% of the students' productions were similar to the productions of the native speakers;
33%(one third of the total) showed [m] and [n] not acoustically distinguishable (nasalization of the previous vowel?);
Boys and girls got better results with the previous vowel [ɪ]: girls: 56%(against 52% for the pairs [æ]); boys: 32% (against 20%for the pairs [æ]).

Spectrograms - samples:

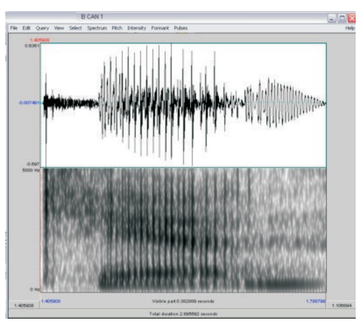
1. Native speaker (girl)
Target Word: CAM



2. Informant (girl)
Target Word : CAM
Production similar to that of the native speaker's



3. Native speaker (girl)
Target Word: CAN



4. Informant (girl)
Target Word: CAN
Production similar to that of the native speaker's