A Dispersion-Theoretic Account of Taiwanese CV phonotactics
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**PROBLEM**
- Phonotactics in languages with phonemic nasal vowels (e.g., in Taiwanese, pʰ³ sàd vs. pʰ⁵ side)
  - Taiwanese: no contrast between nasal stops and voiced stops
    - before oral vowels: /b̥/ ‘cat’ vs. /ˈm̥a/ before nasal vowels: /b̥ː/ vs. /m̥aː/ ‘mom’
  - French and Portuguese: all these combinations are attested, e.g., in French (Delvaux et al., 2008): before oral vowels: /b̥/ ‘low’ vs. /ˈm̥a/ ‘my’ before nasal vowels: /b̥ː/ ‘bench’ vs. /ˈm̥aː/ ‘he lies’
- Phonetic findings
  - Chang et al. (2011): Taiwanese ČV has nasal airflow that starts almost simultaneously with voicing (97.1%), while French ČV has a delay of nasal onset (88.3%).
  - Other reports of delayed nasal onset in nasal vowels in French and Portuguese (Delvaux et al., 2008; Parkinson, 1983)

**Framework**
- The analysis is couched within Flemming’s (2008) Dispersion Theory framework.
  - Inventory Selection: \textsc{Mindist}=\textsc{Burst}:1.5 for the scales in (1), with the contexts averaged
  - Phonetic Realization: categories from Inventory Selection as input, phonemic forms (candidates for actual speech production) as output
  - Align(NAS, EDGE, V) and Align(NAS, -EDGE, V): Align nasalization to the edge of the vowel or not

**Analysis**

**Inventory Selection in Taiwanese: /b,m,a,\tilde{a}/**

**Phonetic Realization in Taiwanese:***
- For unattested /b̥ː/, the realization of nasal vowels is inferred from the attested surface patterns for [pʰ³] and [pʰ⁵]
- Coarticulation and alignment constraints make the vowel of /ma/ fully nasalized.

**Evaluation of Surface Contrasts in Taiwanese**

**Inventory Selection in French: /b,m,a,\tilde{a}/**

**Phonetic Realization in French:***
- Nasality does not align to the edges of the vowels.

**Evaluation of Surface Contrasts in French**

**Discussion**
- The main analysis has the following predictions:
  - Typology:
    - MD=\textsc{Burst}:1.5: b, m
      - Same perception for Taiwanese and French on nasal vs. oral voiced stops when the vocalic context is controlled
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- The alternative analysis explicitly refers to oral-nasal contrast in two dimensions: vowels and stops
  - More explicit predictions on the perception of vocalic nasal contrast across languages
  - Justifications for only evaluating /b̥ː/ and /m̥a/?

**Proposal**
- Taiwanese requires alignment of nasality at the edges of nasal and nasalized vowels, while French and Portuguese do not.
- Lack of /b̥ː/ in Taiwanese: Full nasality makes voiced stops difficult to distinguish from nasal stops.
  - In oral context, cues to [m̥a]-[b̥ːa] contrast: difference in release and vowel onset
  - In nasal context, cues to [m³]-[b³ːa] contrast: difference in release
  - The reduced distinctiveness is not enough to support a contrast between /b̥/ and /m̥/ in the nasal context.
  - French /m̥aː/-/b̥ːə/ contrast exists as [m̥aː]-[b³ːa] contrast in vowel onset and release.
- Lack of /m̥a/ in Taiwanese: result of compulsory nasal coarticulation in NV and the requirement for nasality to align with the edges of vowels.

**Alternative Analysis**
- Evaluate possible realizations of /b̥ː/ and /m̥a/:
  - \textsc{Mindist}=V-V constraint on nasal contrast (Stanton, 2016)
  - Taiwanese, \textsc{Mindist}=V-V_{100%}

- French, \textsc{Mindist}=V-V_{50%}

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