

INTRODUCTION

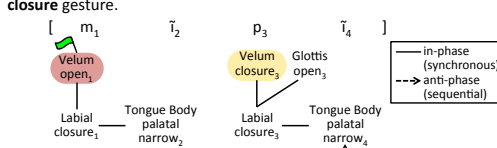
- Analyses of nasal harmony as spreading of feature [+nasal] bring up issues regarding:
 - Locality of spreading
 - Representation of transparency
 - Directionality of spreading
 - Source of the spreading imperative
- Adopting a gestural representation of phonological forms allows us to address these issues.
- Gestures in Articulatory Phonology (Browman & Goldstein 1986 et seq.): representational units calling for the performance of an articulatory task.
- Gestures are spatiotemporal units:
 - Each has inherent duration that can be manipulated to produce spreading.
 - Multiple gestures enlisting the same articulator may be active simultaneously, leading to a novel account of transparency in nasal spreading.

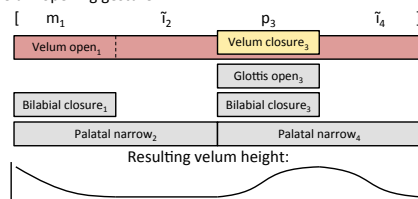
Proposal: Nasal spreading is the prolonged activation of a gesture calling for opening of the velum

TRANSPARENCY IN NASAL SPREADING

- Obstruents can be transparent to nasal spreading, neither undergoing nasalization nor blocking it.
- Tuyuca (Tucanoan, Barnes & Takagi de Silzer (1976)):
 - [mĩpĩ] 'badger' [wãfĩ] 'demon'
 - [ʔũkã] 'yucca soup' [ʔõsõ] 'bird'
- Transparent obstruents in Guaraní are acoustically indistinguishable from oral obstruents, suggesting velum closure (Walker 1999).

Proposal: transparency in nasal spreading results from competition between velum opening and closure gestures

- Oral constriction gestures for obstruents are accompanied by a velum closure gesture.
 
- Gestures are specified for strengths with which they can enlist articulators to achieve tasks.
- When two gestures enlist same articulator, competition ensues with winner based on gestures' strengths (Saltzman & Munhall 1989).
- Transparency: velum closure gesture is sufficiently stronger than velum opening gesture, closing the velum despite the continued activation of the velum opening gesture.



HALLMARKS OF CO-ACTIVATION TRANSPARENCY

- Spreading is local:** single velum opening gesture remains active throughout a word, in line with proposals by Ní Chiosáin & Padgett (2001) & Gafos (1996).
- In Optimal Domains Theory (Cole & Kisseberth 1994, 1995) and Span Theory (McCarthy 2004, O'Keefe 2005) [+nasal] takes entire harmony span as its domain. However, [+nasal] is not present on transparent segments.
- No derivational opacity:** single level of representation contains gestures for velum opening and closure.
- Previous analyses rely on local spreading and denasalization of transparent segments (Piggott 1988, Walker 1998/2000, 2003).
- Special status of obstruents:** only obstruents are predicted to be transparent due to their accompanying velum closure gesture, in line with typology in Walker (1998/2000).
- Constraints in Optimal Domains Theory and Span Theory predict more possible transparent segments than are actually attested.

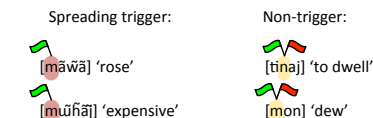
BLOCKING OF NASAL SPREADING

- Nasal spreading may be blocked by consonants based on their incompatibility with nasalization (Walker 1998/2000):
 - nasal sonorant stop > nasal vowel > nasal glide > nasal liquid > nasal fricative > nasal obstruent stop
- Example: non-glide consonants block nasal spreading in Warao (isolate, Osborn (1966)):
 - [mõjõ] 'cormorant' mẽñõkõhi 'shadow'
 - [inãwãñã] 'summer' mõõũpu 'give them to him'

- Defective velum opening gesture is deactivated by the activation of a blocking gesture according to its clock.
- In keeping with previous work, a hierarchy of markedness constraints that follows the above harmony scale will obtain cross-linguistic variation in blocking consonants.

MIXED INVENTORIES OF VELUM GESTURES

- Prediction: both a typical and a defective velum opening gesture could be present in a language's inventory.
- Acehnese (Malayo-Polynesian, Durie (1985)): typical nasal consonants trigger rightward spreading; 'funny nasals' do not.



- Acehnese inventory includes two velum opening gestures: one typical (non-trigger), one defective (trigger).

DIRECTIONALITY OF SPREADING

- Most cases of nasal spreading are progressive/rightward.
- Out of ~80 languages from database in Walker (1998/2000), only 21 spread nasality regressively/leftward.
- Bias toward rightward spreading is predicted by defective deactivation analysis:
 - Prolonged activation of velum opening gesture results in rightward spreading.
 - Re-coupling of velum opening gesture results in leftward spreading, requiring re-ordering of gestures from input linear ordering specifications.

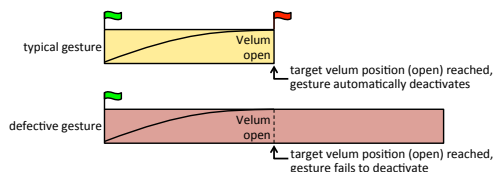
CONCLUSION

- Locality of spreading is maintained even when obstruents behave transparently to nasality.
- Spreading imperative arises from representational units, providing simple analysis of inventories with both trigger and non-trigger nasals.
- Rightward bias in nasal spreading is predicted by defective gestural deactivation.
- Future work: examination of the mechanisms of leftward spreading.

GESTURAL DEACTIVATION AND SPREADING

- Coordination and duration of gestures is determined by their intrinsic clocks.
- A typical clock determines a gesture's start and finish:
 - Start triggers gestural activation according to its coordination with other gestures' clocks.
 - Finish deactivates gesture at a specified phase (roughly corresponding to achievement of target specification).
- Some gestures are **defective**—clock does not determine gesture's finish/deactivation (or its start/activation in other cases).

Proposal: nasal spreading results from the inability of a velum opening gesture to deactivate itself



- Defective gesture remains active indefinitely and overlaps with any following gestures.
- Result: nasality spreads throughout a word.
- Imperative to spread nasality comes from the representational unit (velum opening gesture), not from a rule or constraint.

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