Bidirectional Nasal Harmony in Toro Tegu

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Toro Tegu
Mali, West Africa

- Dogon Languages
  - approximately 20 languages
  - Mali and northern Burkina Faso
Toro Tegu
Mali, West Africa

- Dogon Languages
  - approximately 20 languages
  - Mali and northern Burkina Faso

- Dogon Languages Project
  - systematic documentation of Dogon languages by eight fieldworkers since 2004
  - PI: Jeff Heath, U of Michigan
  - funding: NIH, NSF-DEL
  - lexical, grammatical, and textual documentation with cultural undertones
  - http://dogonlanguages.org
Nasalization Hierarchy
Walker 1998

(+) 1 vowels 2 glides 3 liquids 4 fricatives 5 stops 6 (−)

• universal hierarchy for nasalize-ability
  • targets vs. blockers
Nasalization Hierarchy
Walker 1998

(+) 1 vowels 2 glides 3 liquids 4 fricatives 5 stops 6 (−)

• universal hierarchy for nasalize-ability
  • targets vs. blockers
• implicational by ordering *NASSTOP, *NASLIQ, *NASV...
Harmonic Serialism
McCarthy 2009

• OT-internal theory of harmony
  • one change at a time
  • spreading occurs in steps
    • SHARE(F): assign a violation mark for each pair of adjacent segments that are not linked to the same token of the privative feature F.
Harmonic Serialism
McCarthy 2009

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  • privative feature [NAS] rather than binary [±NAS]
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  • privative feature [NAS] rather than binary [±NAS]
  • spread until more spreading = more violations
Harmonic Serialism
McCarthy 2009

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  • one change at a time
  • spreading occurs in steps
    • SHARE(F): assign a violation mark for each pair of adjacent segments that are not linked to the same token of the privative feature F.
  • privative feature [NAS] rather than binary [±NAS]
  • spread until more spreading = more violations

• supported by Walker 1998
“no language [with direction-specific blocking] has ever been reported... Serial Harmony would be threatened if some language had leftward and rightward spreading processes that differed only in their blockers” (McCarthy, 2009:40-43)

• each language has a fixed ordering of *NASSEGMENT constraints and SHARE(F)
• if a violation is incurred by *NASSEGMENT when spreading one way, the same will be true of the opposite way
I argue that Toro Tegu exhibits bidirectional nasal harmony that is asymmetric.
[NAS] Segments in Toro Tegu

- nasal stops /ñ ñ ñ ñj /
- nasal vowels
- nasal sonorants /w y ſ/
Rightward Nasal Harmony

monomorphemic

• vowels, glides, and rhotics are targets:

(1) /mãrej/ $\rightarrow$ [mẽřẽỹ] 'injury'
Rightward Nasal Harmony

monomorphemic

• vowels, glides, and rhotics are targets:

  (1) /ᵐarey/ → [ᵐᵉʳᵉ yı]  ‘injury’

• laterals, fricatives, and stops are blockers:

  (2) /ᵐolu/ → [ᵐõlu]  ‘resin’
Rightward Nasal Harmony
multimorphemic

- vowels, glides, and rhotics are targets:
  (3) /uŋɔ + yara/ → [ũũĩũããã]

  'go up + fut'

  (4) /pẽ + yara/ → [pẽũãã]

  'ripen + fut'
Rightward Nasal Harmony
multimorphemic

• vowels, glides, and rhotics are targets:

  (3) /ũñɔ + yara/ → [ũñĩũروحā] ‘go up + fut’
  (4) /pẽ + yara/ → [pẽũروحā] ‘ripen + fut’

• laterals are also targets and are re-paired to [n]:

  (5) /añña + li/ → [añũũنى] ‘urinate + perf.neg’
Rightward Nasal Harmony
multimorphemic

- vowels, glides, and rhotics are targets:
  (3) /uño + yara/ → [ũñĩũañã] ‘go up + fut’
  (4) /pẽ + yara/ → [pẽỹañã] ‘ripen + fut’

- laterals are also targets and are re-paired to [n]:
  (5) /aњña + li/ → [ãњũũnũ] ‘urinate + perf.neg’

- fricatives and stops are blockers:
  (6) /uño + sɔ/ → [ũñũsɔ] ‘go up + perf’
Leftward Nasal Harmony

monomorphemic

- vowels and glides are targets:

(7) /yaaŋa/ → [ỹãĩã]  ‘night’
Leftward Nasal Harmony

monomorphemic

- vowels and glides are targets:
  
  \( /yaaŋa/ \rightarrow [\tilde{y}a\tilde{a}ŋa] \quad \text{‘night’} \)

- stops, fricatives, rhotics, and laterals are blockers:
  
  \( /leŋe/ \rightarrow [lēŋē] \quad \text{‘sweet’} \)
Leftward Nasal Harmony
multimorphemic

• vowels, glides, and laterals are targets (usually):

(9) /ya + ŭu/ → [ŷărhû]  ‘woman + sg’
(10) /lu + ōo/ → [nūrō]  ‘go in + imperf.neg’
Leftward Nasal Harmony
multimorphemic

• vowels, glides, and laterals are targets (usually):
  (9) /ya + ŕu/ → [ÿã̃ũ] ‘woman + sg’
  (10) /lu + ŕo/ → [ũũũũ] ‘go in + imperf.neg’

• stops, fricatives, and rhotics are blockers:
  (11) /εεεε + ŕu/ → [εεεεũũ] ‘strapping young man + sg’
## Summary

<table>
<thead>
<tr>
<th>segment</th>
<th>rightward mono</th>
<th>multi</th>
<th>leftward mono</th>
<th>multi</th>
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<tbody>
<tr>
<td>stop</td>
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<tr>
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<td>lateral</td>
<td>block</td>
<td>target</td>
<td>block</td>
<td>target</td>
</tr>
</tbody>
</table>
RV-Deletion
overview

- -rv and -řv syllables are deleted before an affix:

(12) /dɔrɔ + tɔ/ → [dɔtɔ] 'sell + imperf'
(13) /zeri + li/ → [ze:li] 'bring + perf.neg'

- multimorphemic words only
RV-Deletion
rightward effects

- rv-deletion does not block rightward nasal harmony onto vowels, glides, or rhotics

(14) /ñaũu + yara/ → [ñãĩããã]  ‘lay mortar + fut’
• rv-deletion **does not** block rightward nasal harmony onto vowels, glides, or rhotics
  
(14) /ñaɾu + yara/ → [ñaãyãɾã] ‘lay mortar + fut’

• rv-deletion **does** block harmony onto laterals

(15) /ñaãɾã + li/ → [ñaãli] ‘chase + perf.neg’
• rv-deletion **does** block leftward nasal harmony onto vowels, glides, or rhotics

(16) /wara + ña/ → [wañã] ‘cultivate + imperf.neg’
RV-Deletion
leftward effects

• rv-deletion **does** block leftward nasal harmony onto vowels, glides, or rhotics

  (16) /wara + ŋa/ → [wañã] ‘cultivate + imperf.neg’

• rv-deletion **does not** block harmony onto laterals, which are re-paired to [n]

  (17) /lurɔ + ŋɔ/ → [ŋũŋũ] ‘be hurt + imperf.neg’
Summary

- stops and fricative are always blockers
Summary

- vowels and glides are always targets:

\[(7) \quad /\text{yaaŋa}/ \rightarrow [\text{yäaŋä}] \quad \text{‘night’}\]
Summary

• vowels and glides are always targets:

(7) /yaaŋा/ → [ỹãųĩã] ‘night’

• unless they’re to the left of rv-deletion:

(16) /wara + ña/ → [wañã] ‘cultivate + imperf.neg’
Summary

• rhotics are targets for rightward nasal harmony:

(1) /مىرى/ → [مىرى]  'injury'
Summary

- Rhotics are targets for rightward nasal harmony:
  \[ /\text{marey}/ \rightarrow [\text{mērḗy}] \quad \text{‘injury’} \]

- But blockers for leftward nasal harmony:
  \[ /\text{erēe} + \text{nu}/ \rightarrow [\text{erēḗnū}] \quad \text{‘strapping young man + sg’} \]
Summary

- Laterals are blockers for monomorphemic nasal harmony in both directions:

\[(8) \quad /\text{leñe}/ \rightarrow [\text{lēñē}] \quad \text{‘sweet’}\]
Summary

• Laterals are blockers for monomorphemic nasal harmony in both directions:

\[(8) \quad /\text{leñ}e/ \rightarrow [\text{lẽñẽ}] \quad \text{‘sweet’}\]

• But targets for multimorphemic harmony:

\[(10) \quad /\text{lu} + \tilde{\text{r}}\tilde{\text{o}}/ \rightarrow [\text{nũũrũ}] \quad \text{‘go in + imperf.neg’}\]
Summary

• laterals are blockers for monomorphemic nasal harmony in both directions:

(8) /leŋje/ → [lẽŋẽ] ‘sweet’

• but targets for multimorphemic harmony:

(10) /lu + ōro/ → [ũũũũo] ‘go in + imperf.neg’

• but rv-deletion blocks rightward harmony:

(15) /nãrã + li/ → [nãli] ‘chase + perf.neg’
Summary

• Laterals are blockers for monomorphemic nasal harmony in both directions:

(8) /leĩje/ → [lẽĩẽ] 'sweet'

• But targets for multimorphemic harmony:

(10) /lu + ŋo/ → [nũũřo] 'go in + imperf.neg'

• But rv-deletion blocks rightward harmony:

(15) /nããrã + li/ → [nãli] 'chase + perf.neg'

• But rv-deletion does not block leftward harmony:

(17) /lurɔ + ŋɔ/ → [nũũŋũ] 'be hurt + imperf.neg'
Implications
Nasalization Hierarchy

(+) 1 vowels 2 glides 3 liquids 4 fricatives 5 stops 6 (−)
- if liquids, then glides
  - not always
  - leftward nasal harmony after rv-deletion
Implications

Nasalization Hierarchy

- distinction between rhotics and laterals
  - impossible to assimilate into nasalization hierarchy
  - multimorphemic rightward harmony: both target
  - monomorphemic leftward harmony: both block
  - monomorphemic rightward harmony: rhotics target, laterals block
  - multimorphemic leftward harmony: rhotics block, laterals target
Implications
Harmonic Serialism

- HS is incompatible with Toro Tegu by nature of the SHARE(F) constraint
- no ranking of the \*NASSEGMENT constraints accounts for the data
Jumping to Conclusions

• languages with different blockers in different directions do exist
• contrary to Walker (1998) and McCarthy (2009)
Jumping to Conclusions

- Walker’s (1998) implicational nasal hierarchy cannot account for nasal harmony in Toro Tegu
Jumping to Conclusions

- McCarthy’s (2009) theory of Harmonic Serialism needs to be reworked
- tweak the SHARE(F) constraint?
Jumping to Conclusions

- harmony is not understood as fully as previously thought
- more creative, outside-the-box accounts are needed
Looking Forward

• account for this data in OT
  • van Oostendorp (2006) Theory of Morphosyntactic Colours
  • McCarthy (2009) Harmonic Serialism
• search for similar languages within nasal harmony
• look for parallel languages within other kinds of feature harmony