Suffix independence in Paraguayan Guarani nasal harmony

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1 Introduction

- Crosslinguistically, phonological processes may apply equally to prefixes and suffixes, or these may show asymmetries in their participation in phonological rules.

(1) *Prefix independence in Yaka nasal consonant harmony* (Ruttenberg, 1970; Hyman, 1995)

a.	b.	c.
tsúb-idi	tsúm-ini	ma-dáfú, *ma-náfú
'to wander'	'to sew'	'palm wine'

- This talk investigates the behavior of affixes in nasal harmony in Paraguayan Guarani.
- The nasal harmony system of Guarani has been described for decades, and has significantly contributed to developments in phonological theory (Gregores & Suárez, 1967; Walker, 1998; Beckman, 1998; Piggott, 2003; Estigarribia, 2020; to name a few).
- However, its interaction with the morphological and prosodic structure of the language remain relatively understudied.
- This work introduces two empirical findings regarding the behavior of affixes in Guarani nasal harmony, from original fieldwork.

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⇒ Suffixes show **independence** in **regressive** (leftward) nasal harmony.

(2)

a.	b.	c.
*ja-jero**ky***	*ña-kosi**na***	*e-ju-**na***, **e-ñu-na*
[ʤa-ʤeroˈkɨ]	[ɲã-kõsĩˈnã]	[e-ˈʤu-nã]
'we dance'	'we cook'	'please come!'

⇒ There is **variation** across dialects on the independence of suffixes to **progressive** (rightward) harmony.

(3)

a.	b.	c.
Both	***Oviedo***	***"Urban"***
jagua-kuéra	*mitã-nguéra*	*mitã-kuéra*
[ʤaɣʷa-ˈkʷeɾa]	[mĩtã-ˈŋgʷeɾa]	[mĩtã-ˈkʷeɾa]
'dogs'	'children'	'children'

* I speculate that the prefix/suffix asymmetry falls from the prosodic structure of the language: suffixes are their own prosodic words.

Roadmap

§2: Overview of Paraguayan Guarani
§3: Regressive nasal harmony in roots and prefixes
§4: Regressive harmony in suffixes
§5: Progressive nasal harmony (*Coronel Oviedo* speakers)
§6: Dialectal variation in progressive harmony
§7: Discussion on sources of suffix independence

2 Overview of Paraguayan Guarani

2.1 Background

- Paraguayan Guarani is spoken by around 5-6 million people in Paraguay and neighboring areas of Argentina.

- It is the official language of Paraguay since 1992, along with Spanish. It is the only language in the Americas spoken by a majority that isn't exclusively indigenous.

- The data were collected in in-situ and virtual fieldwork.

(4)

in-situ	***virtual***
6 speakers ages 24-70 Coronel Oviedo bilingual Guarani, Spanish	2 speakers ages 50, 60 Concepción, Asunción bilingual Guarani, Spanish, L2 English

📍 Coronel Oviedo • central-east Paraguay • ~50K

📍 Concepción • north-central Paraguay • ~258K

📍 Asunción • the capital • western Paraguay • ~2.3M

2.2 Basic phonology

- 12 phonemic vowels, all contrastive for nasality.

(5)

	front	central	back
high	i, ĩ	ɨ, ɨ̃ (*y*, *ỹ*)	u, ũ
mid	e, ẽ		o, õ
low		a, ã	

- Guarani has voiceless stops, nasal-oral stops, and full nasal consonants.[2]

(6) a. *poty* [poˈtɨ] 'flower'
b. *mboty* [mᵇoˈtɨ] 'to close'
c. *motyarõ* [mõtɨ̃ãˈɾõ] 'to season'

- Guarani is predominantly stress-final.[3]

- In morphologically complex words, primary stress shifts to the rightmost lexically stressed syllable. Prefixes are never stressed.

(7) a. *a-karu-se* [a-kaɾu-ˈse] 1SG-eat-DES 'I want to eat'
b. *a-karú-ta* [a-kaˈɾu-ta] 1SG-eat-FUT 'I will eat'

3 Roots and prefixes in regressive harmony

- In Guarani, nasality is contrastive only at the stressed syllable. The nasality of preceding unstressed syllables is completely predictable from the nasality of the stressed syllable.

(8) a. *tupa* [tuˈpa] 'bed'
b. *tupã* [tũˈpã] 'god'
c. *[tuˈpã]
d. *[tũˈpa]

→ Voiced segments nasalize, voiceless segments are *transparent*.

- Nasal-oral stops are also triggers in any position.

(9) a. *panambi* [pãnãˈmᵇi] 'butterfly'
b. *angiru* [ãŋᵍiˈɾu] 'friend'

[2] Guarani nasal-oral stops are frequently characterized as "prenasalized stops" (Kaiser, 2008; Estigarribia, 2020; Thomas, 2014 for Mbya, among others) and even argued to be phonologically voiced oral stops (Piggott, 2003). However, I gloss nasal-oral stops as "post-oralized" stops ([mᵇ], rather than [ᵐb]) since we will see later on that these trigger regressive nasal spread.

[3] However, I assume stress is lexically specified: there are a handful of stress-based minimal pairs, and suffixes are unpredictably stressed or unstressed.

- Some voiced consonants alternate due to regressive nasal spread.

(10)

mb ~ *m*	*nd* ~ *n*	*ng* ~ *g̃*	*j* ~ *ñ*
m^b ~ m	n^d ~ n	$ŋ^g$ ~ ŋ	ʤ ~ ɲ

(11) a. *mbo'a*
[m^bo'ʔa]
'position'

b. *mo'ã*
[mõ'ʔã]
'almost'; NEG.FUT

(12) a. *aja*
[a'ʤa]
'during'

b. *añã*
[ã'ñã]
'evil, bad'

⇒ ***Prefixes undergo*** nasal harmony: their vowels nasalize, and they show the same alternations found in roots.

(13) a. *nd-a-karú-i*
[n^d-a-ka'ɾu-^{i}]
NEG-1SG-eat-NEG
'I don't eat'

b. *n-ai-pytyvõ-i*
[n-ãĩ-pɨtɨĩũõ-^{ĩ}]
NEG-1SG-help-NEG
'I don't help'

(14) a. *ij-yvate*
[iʤ-ɨva'te]
3-tall
'he is tall'

b. *iñ-akãporã*
[ĩŋ-ãkãpõ'ɾã]
3-smart
'he is smart'

- And, various prefix alternations may stack at a long distance from the nasal trigger.

(15) a. *ñande nda-ja-jo-h-ayhú-i*
[ɲã'n^de] [n^da-ʤa-ʤo-ha^i'hu-^{i}]
1PL.INCL NEG-1PL.IN-REC-love-NEG
'we don't love each other'

b. *ñande n-a-ñ-a-ñ-o-hendú-i*
[ɲã'n^de] [nã-ɲã-ɲõ-hẽ'n^du-^{i}]
1PL.INCL NEG-1PL.IN-REC-listen-NEG
'we don't listen to each other'

⇒ ***Prefixes also trigger*** regressive nasal harmony.

(16) a. *nd-a-puká-i*
[n^d-a-pu'ka-^{i}]
NEG-1SG-laugh-NEG
'I don't laugh'

b. *n-a-mbo-puká-i* *ichúpe*
[n-ã-m^bo-pu'ka-^{i}]
NEG-1SG-CAUS-laugh-NEG 3
'I didn't make him laugh'

Takeaways:

- Regressive harmony is triggered by stressed nasal vowels and nasal-oral stops (in any position).
- Regressive spread induces segment alternations: nasal-oral stops ~ nasal consonants, and *j* [ʤ] ~ *ñ* [ɲ].

∗ Prefixes fully participate in regressive harmony: they **trigger and undergo** nasalization.

4 Suffixes in regressive harmony

- ***Recall...***

  → Stress shifts to the rightmost lexically stressed syllable ((7), §2).

  → The nasality of preceding unstressed syllables is determined by the nasality of the stressed syllable ((8), §3).

- However, underlyingly stressed vowels still trigger regressive nasal harmony even when stress has shifted onto an oral suffix.[4]

[4] The stress rule and regressive nasalization are in a counterbleeding interaction: the

(17) a. *n-ai-pytyvõ-i*
[n-ãĩ-pɨtɨˈʊ̃õ-ĩ]
NEG-1SG-help-NEG
'I don't help'

b. *n-ai-pytyvõ-sé-i*
[n-ãĩ-pɨtɨˈʊ̃õ-ˈse-ĩ]
NEG-1SG-help-DES-NEG
'I don't want to help'

- Suffixes retain the oral/nasal contrast, even when they are lexically unstressed.

(18)

-mba [mᵇa]	*-ma* [mã]	*-ta* [ta]	*-na* [nã]
TOT	CMPL	FUT	REQ

- Lexically unstressed nasal suffixes fail to trigger regressive spread onto preceding roots and prefixes.

(19) a. *a-j-apó-ma*
[a-ʤaˈpo-mã]
1SG-work-CMPL
'I already worked'

b. **a-ñ-apo-ma*
*[ã-ɲãpõ-mã]

c. *e-j-ú-na*
[e-ˈʤu-nã]
IMP-come-REQ
'please come!'

d. **e-ñ-u-na*
*[ẽ-ɲũ-nã]

- Even stressed nasal suffixes fail to trigger regressive spread onto *roots and prefixes*.

(20) a. *h-end-u-'ỹ*
[h-ẽnᵈu-ˈʔɨ̃]
3POS-listen-PRV
'deafness'

b. **h-en-u-'ỹ*
*[h-ẽnũ-ˈʔɨ̃]

c. *o-j-ehu-rõ*
[o-ʤehuˈ-ɾ̃õ]
3-happen-if
'if it happens'

d. **o-ñ-ehu-rõ*
*[õ-ɲẽhũ-ˈɾ̃õ]

- And, all nasal suffixes fail to trigger spread onto preceding *suffixes*, even when preceding suffixes are lexically unstressed.

stress rule bleeds regressive nasalization, but regressive nasalization must precede the stress rule.

(21) a. *o-ñe'ẽ-mba-ma*
[õ-ɲẽʔẽ-ˈmba-mã]
3-talk-TOT-CMPL
'he finished talking'

b. *a-japó-ta-ma*
[a-ʤaˈpo-ta-mã]
1SG-work-FUT-CMPL
'I will already work'

∗ However, suffixes still trigger regressive harmony within their morphological boundary, even when unstressed.[5]

(22) a. *nd-a-ikatu-mo'ã-i*
[nᵈa-ĩkatu-mõˈʔãĩ]
NEG-1SG-able-NEG.FUT-NEG
'I won't be able to'

b. *che-r-end-ú-ramo*
[ʃẽ-ɾ̃-ẽˈnᵈu-ɾ̃ãmõ]
1SG-POSS-listen-if
'if you hear me'

Takeaways:

- Although prefixes both trigger and undergo regressive nasal harmony, suffixes are independent:

1. A nasal element in a root still triggers leftward nasal spread even if stress shifted onto a suffix.
2. Lexically all suffixes must be specified for nasality, even the lexically unstressed.
   → They retain the oral/nasal contrast
   → They trigger regressive spread within their suffix boundary
3. All suffixes fail to undergo nasalization from following nasal elements.

[5] Thomas (2014) notes that suffixes in Mbya (Tupi-Guarani) fail to trigger regressive nasalization. It is unclear from this work if this is indeed a failure to trigger, as opposed to a failure for preceding suffixes to undergo nasalization.

5 Progressive nasal harmony

- Progressive harmony in Guarani has received some attention recently due to its striking differences from regressive harmony (Russell, 2022).

(23)

	Regressive	**Progressive**
Triggers	(stressed) nasal vowels, nasal-oral stops	(stressed) nasal vowels
Targets	voiced segments	voiceless stops
Locality	local	non-local
Productivity	exceptionless	lexically-specific

∗ The data in this section are from ***Coronel Oviedo*** speakers.

- **Recall:** suffixes do not undergo regressive nasalization, and they trigger leftward spread up to the suffix boundary.

⇒ However, ***some suffixes undergo*** progressive harmony.

→ Some suffixes with initial voiceless stops see an alternation to either an initial nasal-oral stop or a nasal consonant.

→ This occurs even if stress has shifted away from the nasal trigger.

(24) a. *óga-pe*
[ˈoɣa-pe]
house-LOC
'at the house'

b. *kosin**a**-me*
[kõsĩˈnã-mẽ]
kitchen-LOC
'at the kitchen'

(25) a. *jagua-kuéra*
[ʤaɣʷa-ˈkʷeɾa]
dog-PL
'dogs'

b. *mit**ã**-nguéra*
[mĩtã-ˈŋᵍʷeɾa]
child-PL
'children'

- Although nasal-oral stops trigger regressive nasalization in any position, they fail to trigger progressive harmony alternations.

(26) a. *panambi-kuéra*
[pãnãmᵇi-ˈkʷeɾa]
butterfly-PL
'butterflies'

b. **pana**m**b**i-nguéra*
*[pãnãmᵇi-ˈŋᵍʷeRa]

- However, other suffixes with initial voiceless stops never alternate in the presence of roots with stressed nasal vowels.[6]

(27) a. *a-karú-ta*
[a-kaˈɾu-ta]
1SG-eat-FUT
'I will eat'

b. *ai-pytyv**õ**-ta*
[ãˈ-pɨtɨˈṽõ-ta]
1SG-help-FUT
'I will help'

- The alternations induced by progressive harmony may stack and occur non-locally.

(28) a. *jagua-kuéra-pe*
[ʤaɣʷa-ˈkʷeɾa-pe]
dog-PL-DOM
'dogs'

b. *mit**ã**-nguéra-me*
[mĩtã-ˈŋᵍʷeɾa-mẽ]
child-PL-DOM
'children'

(29) a. *o-karu-se-pa-pota-pe**'**ve*
[o-kaɾu-se-pa-pota-ˈpeve]
3-eat-DES-TOT-INCIP-until
'until he is about to finish wanting to eat'

b. *o-ñe'**ẽ**-se-mba-mbota-me**'**ve*
[o-ɲẽʔẽ-se-mᵇa-mᵇota-ˈmẽve]
3-talk-DES-TOT-INCIP-until
'until he is about to finish wanting to talk'

[6] See Russell (2022) for a more detailed description of which elements show progressive harmony alternations and possible patterns about their distribution.

⇒ Verbal and nominal roots may also show progressive harmony alternations.

→ Some roots show alternations in compounds when the first root of the compound is nasal.

(30) a. *h-as**ẽ**-ng**y***
[h-ãsẽ-ˈŋᵍɨ]
3POSS-cry-rain
'weep'

b. *am**a**-ng**y***
[ãmã-ˈŋᵍɨ]
rain-rain
'rain'[7]

c. *k**y***
[kɨ]
'rain'

→ In some causative constructions, the nasal causative prefix *mo-* alternates the initial voiceless stop of its following root.

(31) a. *o-p**áy***
[o-ˈpaʲ]
3-wake-up
'he/they woke up'

b. *o-**mo**-mb**áy** diego-pe*
[õ-mõ-mᵇaʲ]
3-CAUS-wake.up diego-DOM
'they woke up Diego'

(32) a. *che-k**aigue***
[ʃe-kaʲˈɣʷe]
1SG-bored
'I'm bored'

b. *nde che-**mo**-ng**aigue***
[ʃẽ-mõ-ŋᵍaʲˈɣʷe]
2 1SG-CAUS-bore
'you bored me'

- However, as with suffixes, other roots fail to show the alternation of the initial voiceless stop in the presence of nasal elements to the left.

→ In these, regressive harmony proceeds as expected.

(33) a. *a-**mb**o-pupu nde-'y*
[ã-mᵇo-puˈpu]
1SG-CAUS-hot 2SG-water
'I boiled your water'

b. *a-m**o**-k**ane'õ***
[ã-mõ-kãnẽˈʔõ]
1SG-CAUS-tired
'I made (someone) tired'

Takeaways:

- Regressive and progressive nasal harmony are different phonological processes.
- In Guarani progressive nasal harmony, the initial voiceless stop of some roots and suffixes alternates to either a nasal-oral stop or a nasal consonant.
- Progressive harmony is lexically-specific: only some roots and suffixes show alternations.

6 Dialectal variation

- The two speakers from Asución and Concepción show the same regressive harmony pattern as Coronel Oviedo speakers.

⇒ However, they show ***limited progressive harmony onto suffixes***.

(34) a. *panambi-k**uéra***
[pãnãmᵇi-ˈkʷeɾa]
butterfly-PL
'butterflies'

b. *mit**ã**-k**uéra***
[mĩtã-ˈkʷeɾa]
child-PL
'children'

(35) *o-ñe'**ẽ**-se-p**a**-p**ota**-p**éve***
[o-ɲẽʔẽ-se-pa-pota-ˈpeʋe]
3-talk-DES-TOT-INCIP-until
'until he is about to finish wanting to talk'

- And, sometimes they may vary in their production of alternations, even in the same form.

(36) a. ***Coronel Oviedo***
mitã-nguéra-me
[mĩtã-ˈŋᵍʷera-mẽ]
child-PL-DOM
'children'

b. ***"Urban"***
mitã-nguéra-pe
[mĩtã-ˈŋᵍʷera-pe]
child-PL-DOM
'children'

⇒ These two speakers still show the same progressive harmony alternations in roots as those of Coronel Oviedo speakers, with no variation.

→ (31) *o-mo-mbáy*; (32) *che-mo-ngaigue*.

→ (30) *h-asẽ-ngy*, *ama-ngy*.

(37) a. *o-ky*
[o-ˈkɨ]
3-rain
'it rains'

b. *a-mo-ngy*
[ã-mõ-ˈŋᵍɨ]
1SG-CAUS-rain
'I made it rain'

∗ Therefore, speakers of more urban areas show limited progressive harmony alternations, but only for suffixes.

7 Implications

- This work finds that Paraguayan Guarani suffixes are independent to the nasality of roots and prefixes in regressive harmony, and only in certain dialects in progressive harmony.
- However, the claim of independence made here across the two processes is an *empirical* one.
- Recall that regressive and progressive harmony are distinct phonological processes of nasalization (table in (23)). So, the *source* of independence might also be distinct.

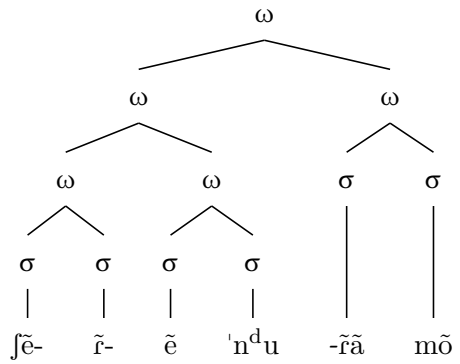
⇒ The independence of suffixes in **regressive** harmony is likely due to the morphological or prosodic structure of Guarani.

→ Suffixes are their own prosodic constituent.

→ Prefixes form a constituent with roots.

→ The domain of regressive spread is such prosodic constituent.

(38)



∗ That suffixes are a constituent outside of roots and prefixes is consistent with previous work on the stress system of Guarani (Dąbkowski, 2021).[8]

- The independence of suffixes in **progressive** harmony (in certain dialects) might also be due to prosodic structure.

  → This would explain why only suffixes, not roots, fail to alternate in "urban" dialects.

- But it may alternatively be due to *morphological regularization*.

  → Speakers of more "urban" dialects of Guarani increasingly treat exceptional (alternating) elements as non-exceptional.

  → Doesn't explain why we see "regularization" only for suffixes in this dialect.

[8] The structure in (38) might pose problems for the stress rule, since *ramo*, an unstressed suffix, is its own prosodic word. However, Dąbkowski (2021) argues that lexically unstressed suffixes are "non-prosodified" elements, which also explains why they are consistently ordered after stressed suffixes.

8 Closing

- An investigation of prefixes and suffixes in Paraguayan Guarani reveals that suffixes show differential behavior in nasal harmony.

  → Regressive and progressive nasal harmony (from roots and prefixes) proceed even when primary stress has shifted away from the nasal trigger.

  → Suffixes retain the oral/nasal contrast even when lexically unstressed.

  → Suffixes fail to undergo regressive nasalization from other suffixes to their right (but suffixes do trigger regressive spread)

  → In certain dialects, it is only suffixes (and not roots) that fail to show progressive harmony alternations.

- It also reveals ***dialectal variation*** in progressive harmony alternations.

  → Coronel Oviedo speakers show progressive harmony alternations in roots and suffixes.

  → The remaining two speakers (Asunción and Concepción) have limited alternations in suffixes, but show the same alternations in roots as Coronel Oviedo speakers.

- This work is among the first at studying variation across dialects of Paraguayan Guarani.

  → "Urban" vs. "rural" is an oversimplification.

  → I invite more principled studies on the distribution of the variation.

* **More broadly:** this work suggests that the morphological and prosodic structure of the language plays a large role in its phonology:

  → it bounds the leftward spread of nasality.

  → it potentially explains why certain speakers fail to show progressive harmony alternations in suffixes but not in roots.

  → it provides additional evidence that Guarani suffixes are their own prosodic constituents (Dąbkowski, 2021).

Aguyjevete!

Thank you!

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