

# Prosody Drives Paraguayan Guaraní Suffix Order

Maksymilian Dąbkowski  
*University of California, Berkeley*

## 1 Introduction

In Paraguayan Guaraní (Tupian ISO, 639-3: *gug*), suffix order is determined by several factors, including syntactic scope, morphotactic restrictions, free variation, and prosody. Paraguayan Guaraní suffixes form two syntactic classes: predicate-level suffixes and clause-level suffixes. Both syntactic classes include stressable and stressless suffixes. Predicate-level suffixes typically precede clause-level suffixes. However, stressable suffixes always precede stressless ones. Furthermore, within both groups (stressable or stressless), the order of suffixes is largely free.

I propose that stressable suffixes are independently prosodified phonological words and stressless suffixes are non-prosodified. I analyze the Paraguayan Guaraní suffix order as an interaction of mirroring between the order of suffixes and the order of syntactic operations, on the one hand, and prosodic subcategorization and demands on phonological well-formedness, on the other. Thus, I document and analyze an unusual agglutinating system, whose highly non-prototypical prosodified and freely-ordered suffixes challenge the notion of a phonological word, contributing to ongoing research on phonological and syntactic domains as well as the interfaces of phonology, morphology, and syntax.

The rest of the paper is organized as follows. Section 2 gives background on the language and its speakers. Section 3 analyses the prosodic structure of Paraguayan Guaraní verbs, accounts for free suffix order as a matter of prosodic subcategorization, and captures the precedence of stressable suffixes over stressless ones as a matter of prosodic well-formedness. Section 4 presents and analyzes other factors responsible for suffix order, including the mirroring between syntax and phonology and templatic restrictions. Section 5 concludes.

## 2 Background

Paraguayan Guaraní (or PG) is a Tupian language of the Tupí–Guaraní branch, which is the most widely distributed branch of the family. Paraguayan Guaraní is an official language of Paraguay (in addition to Spanish) and one of the most widely spoken American languages. This makes PG politically unique, as otherwise the Americas saw a strong shift towards colonial languages (English, Spanish, Portuguese).

Paraguayan Guaraní is a highly agglutinating language. All syllables are open. The language shows a remarkable degree of nasal spreading, with nasality capable of spreading from nasal vowels in both directions and across word-boundaries. Prefixes express agreement categories and valence changing operations, while suffixes express other inflectional and derivational categories. There is little previous scholarship on Paraguayan Guaraní stress and prosody. Gregores & Suárez (1967) provide the most extensive description of the language's prosodic system, which supports parts of the present analysis. Phonetically, stress correlates most robustly with pitch, duration, and intensity. Generally, pitch is a more reliable correlate of phrase-final stress, whereas duration is a more reliable correlate of stress occurring earlier in a phonological phrase.

Most of the data were collected in a graduate-level field methods course in the Department of Linguistics at UC Berkeley between September 2020 and May 2021 (Linguistics 240A/B) with María (Mary) Gómez

---

\* First of all, my heartfelt thanks go to my Paraguayan Guaraní consultants Mary Gómez and Irma Ovelar, without whose insight, kindness, and patience this project would not have been possible. I would also like to thank Lev Michael, Hannah Sande, Larry Hyman, Zachary O'Hagan, Myriam Lapiere, Scott AnderBois, John Starr, and the audiences at ETT (Emerging Topic in Typology) 2021, AMP 2021, LSA 2022, Zoom Phonology, Phorum (Berkeley Phonetics, Phonology, and Psycholinguistics Forum), and ALDP (Brown University A'ingae Language Documentation Project) for helpful discussions and their invaluable feedback.

(MCG) and Irma Easty Ovelar (IXO) as language consultants. The collection is deposited in the California Language Archive as Gómez et al. (n.d.) and cited throughout the paper with elicitation session identifiers.

### 3 Prosodic structure

In this section, I describe and analyze the prosodic structure of Paraguayan Guaraní's morphologically complex verbs. I argue that the language's predominantly final stress is a result of a uniformly right-headed branching structure. I propose that PG verbal suffixes form two classes: prosodified and non-prosodified. Finally, I propose that all suffixes subcategorize for phonological words and that prosodic well-formedness requires that prosodified suffixes precede the non-prosodified ones.

**3.1 Data** First, consider basic stress facts. Stress predominantly falls on the last syllable. This generalization holds of verbs (1a), nouns (1b), adjectives (1c), numerals (1d), syntactically independent particles (1e), and even some suffixes (1f).<sup>1</sup> Stress is represented with the acute accent.

- |     |                     |       |                    |          |
|-----|---------------------|-------|--------------------|----------|
| (1) | a. <i>guatá</i>     | walk  | d. <i>mbohapý</i> | three    |
|     | b. <i>mbarakajá</i> | cat   | e. <i>va'ekué</i>  | long ago |
|     | c. <i>morotí</i>    | white | f. <i>-riré</i>    | -after   |
- (gug\_mcg\_20200923\_ejg; gug\_20210401\_ixo\_mmd)

Prefixes may not affect stress. Thus, stress is insensitive to the value of agreement (2a), valence (2b), and possession (2c), which are all expressed prefixally. I. e., regardless of the prefix, stress remains final.

- |     |                        |                        |                          |
|-----|------------------------|------------------------|--------------------------|
| (2) | a. <i>a- guatá</i>     | b. <i>mbo- guatá</i>   | c. <i>che- mbarakajá</i> |
|     | A1SG- walk             | CAUS- walk             | B1SG- cat                |
|     | “I walk”               | “make walk”            | “my cat”                 |
|     | (gug_20210401_ixo_mmd) | (gug_20210401_ixo_mmd) | (gug_20210401_ixo_mmd)   |

There are two classes of suffixes. Suffixes of the first class may be stressed. If one of these stressable suffixes attaches, stress shifts onto the last syllable of the suffix (3). When several stressable suffixes attach at once, stress falls on the last syllable of the last stressable suffix (4).<sup>2</sup>

- |     |                        |                        |                          |
|-----|------------------------|------------------------|--------------------------|
| (3) | a. <i>a- guata -sé</i> | b. <i>a- guata -vé</i> | c. <i>a- guata -mo'á</i> |
|     | A1SG- walk -want       | A1SG- walk -more       | A1SG- walk -almost       |
|     | “I want to walk”       | “I walked more”        | “I almost walked”        |
|     | (gug_20210401_ixo_mmd) | (gug_20210401_ixo_mmd) | (gug_20210401_ixo_mmd)   |
- |     |                            |                              |                               |
|-----|----------------------------|------------------------------|-------------------------------|
| (4) | a. <i>a- guata -se -vé</i> | b. <i>a- guata -pa -riré</i> | c. <i>a- guata -pota -ajá</i> |
|     | A1SG- walk -want -more     | A1SG- walk -finish -after    | A1SG- walk -about to -while   |
|     | “I want to walk more”      | “after I walk”               | “when I was ready to walk”    |
|     | (gug_20210401_ixo_mmd)     | (gug_20210301_mcg_mmd)       | (gug_20210329_mcg_mmd)        |

The other class consists of stressless suffixes. When a stressless suffix attaches, stress remains on the last syllable of the verb (5). When several stressless suffixes attach, stress likewise remains on the last syllable of the verb and the stressless suffixes form a stressless string (6).

<sup>1</sup> There are lexically specified exceptions, e. g. (i).

- |     |                |        |                  |       |
|-----|----------------|--------|------------------|-------|
| (i) | a. <i>óga</i>  | house  | c. <i>máramo</i> | never |
|     | b. <i>aitá</i> | sneeze | d. <i>-kuéra</i> | -PL   |
- (gug\_ixo\_20200910\_mmd; gug\_20210401\_ixo\_mmd)

<sup>2</sup> The distinction between the stressable and stressless suffixes may at first appear to track the distinction between suffixes and clitics. However, it does not correlate with any morphosyntactic or semantic differences. Alternatively, all of the morphemes I refer to as suffixes could be referred to as clitics. Neither label is in itself sufficient to explain their ordering properties.

- (5) a. *a- guatá -ta*  
A1SG- walk -FUT  
“I will walk”  
(gug\_20210401\_ixo\_mmd)
- b. *a- guatá -ma*  
A1SG- walk -already  
“I already walked”  
(gug\_20210401\_ixo\_mmd)
- c. *a- guatá -ne*  
A1SG- walk -dare  
“I dare walk”  
(gug\_20210401\_ixo\_mmd)
- (6) a. *a- guatá -ta -ma*  
A1SG- walk -FUT -already  
“I will walk right now”  
(gug\_20210401\_ixo\_mmd)
- b. *a- guatá -ne -ramo*  
A1SG- walk -dare -if  
“if I dare walk”  
(gug\_20210401\_ixo\_mmd)
- c. *e- guatá -ke -na*  
IMP- walk -FCE -REQ  
“please walk”  
(gug\_20210401\_ixo\_mmd)

The stressable suffixes have considerable freedom when it comes to ordering. This is to say, many of them can be reordered without a change in meaning (7-9).

- (7) a. *a- guata -mo'ã -vé*  
A1SG- walk -almost -more  
“I planned to continue walking”
- b. *a- guata -ve -mo'ã*  
A1SG- walk -more -almost  
(gug\_ixo\_20201203\_mmd)
- (8) a. *o- guata -gua'u -sé*  
A3- walk -pretend -want  
“he pretends to want to walk”
- b. *o- guata -se -gua'ú*  
A3- walk -want -pretend  
(gug\_20210330\_ixo\_mmd)
- (9) a. *e- guata -rei -mí*  
IMP- walk -in vain -PLD  
“go walk around a little bit”
- b. *e- guata -mi -rei*  
IMP- walk -PLD -in vain  
(gug\_20210329\_mcg\_mmd)

The different orders do not reflect scopal differences. Indeed, scope does not appear to play any role whatsoever in the interpretation of morphologically complex forms. For suffix permutations as in the examples above, the translations given for both orders are often identical or the two forms are identified as having “the same meaning.” The lack of relevance of semantic scope to linear order can be verified by carefully controlling for scenario. In (10), a scenario is given in which *-gua'u* ‘pretend’ takes scope over *-se* ‘want.’ In (11), the scope reverses. In either scenario, either order of suffixes is possible, further testifying to the fact that semantic scope does not play a role in the ordering of suffixes.

- (10) SCENARIO: You took your friend on a walk. He is not enthusiastic, but he does not want to offend you, so he feigns his excitement.
- a. *o- guata -se -gua'ú*  
A3- walk -want -pretend  
“he pretends to want to walk”
- b. *o- guata -gua'u -sé*  
A3- walk -pretend -want  
(gug\_20210330\_ixo\_mmd)
- (11) SCENARIO: There is a pretending contest. The participants choose the activity they pretend to do, and the more difficult the activity is to pretend, the more highly rewarded it is. It is most difficult to pretend to walk without actually walking, but if you succeed, you will get a lot of points.
- a. *a- guata -se -gua'ú*  
A1SG- walk -want -pretend  
“I want to pretend to walk”
- b. *a- guata -gua'u -sé*  
A1SG- walk -pretend -want  
(gug\_20210330\_ixo\_mmd)

Furthermore, there is some freedom with respect to the reordering of stressless suffixes (12-13).

- (12) a. *a- guatá -ma -nte*  
A1SG- walk -already -only  
“I only walk”
- b. *a- guatá -nte -ma*  
A1SG- walk -only -already  
(gug\_20210406\_mcg\_mmd)
- (13) a. *e- guatá -nte -rire*  
IMP- walk -only -if  
“if I keep walking”
- b. *e- guatá -rire -nte*  
IMP- walk -if -only  
(gug\_20210412\_mcg\_mmd)

Finally, although there is ordering freedom within the domain of stressable suffixes and within the domain of stressless suffixes as well, the stressable suffixes always precede the stressless ones (14-16).

- |      |  |  |
|------|--|--|
| (14) | a. <i>e- guata -mí -na</i><br>IMP- walk -PLD -REQ<br>“please walk”                 | b. * <i>e- guata -na -mí</i><br>IMP- walk -REQ -PLD<br>(gug_20210405_mcg_mmd)        |
| (15) | a. <i>a- guata -pá -ma</i><br>1SG- walk -finish -already<br>“I finished walking”   | b. * <i>a- guata -ma -pá</i><br>1SG- walk -already -finish<br>(gug_20210405_mcg_mmd) |
| (16) | a. <i>a- guata -potá -ne</i><br>1SG- walk -about to -may<br>“I will probably walk” | b. * <i>a- guata -ne -potá</i><br>1SG- walk -may -about to<br>(gug_20210405_mcg_mmd) |

This generalizes such that in morphologically complex forms, the stressable suffixes, such as *-pa* ‘finish,’ *-rei* ‘in vain,’ and *-gua’u* ‘pretend,’ precede unstressable suffixes, such as *-ta* ‘FUT,’ *-ma* ‘already,’ and *-ramo* ‘if.’ Stress falls on the last syllable of the last stressable suffix (17).

- (17) *a- guata -pa -rei -gua’ú -ta -ma -ramo*  
1SG- walk -finish -in vain -pretend -FUT -already -if  
“if I pretend that I will have already finished walking in vain” (gug\_20210401\_ixo\_mmd)

**3.2 Analysis** My analysis of the prosodic structure of the PG verb consists of four parts. First, prosodic constituents are right headed—this captures the preponderance of final stress in the language. Second, there are two prosodic classes of suffixes: (i) separate prosodic words and (ii) non-prosodified suffixes—this captures the difference between suffixes which may carry stress and those which may not. Third, all suffixes subcategorize for prosodic words—this captures the free ordering of Paraguayan Guaraní suffixes. Fourth, prosodic well-formedness ensures that a non-minimal prosodic word immediately dominates only prosodic words—this captures the fact that stressable suffixes precede the stressless ones.

First, prosodic constituents are right-headed. Thus, a verb receives final stress because its rightmost syllable is the prosodic head of the word (18a). I propose that stressable suffixes, such as *-se* ‘want,’ are also prosodified (18b). The two together form a non-minimal prosodic word which is headed, again, by the rightmost constituent (18c).<sup>3</sup> Prosodic constituency is represented with brackets [ ]. Headedness is represented with a small cap H.

- (18)
- |  |  |   |
|--|--|---|
| $\begin{array}{c} \omega \\ / \backslash_H \\ \sigma \ \sigma \ \sigma \\ [a- guata] \\ \text{a. } a- guatá \end{array}$ | $\begin{array}{c} \omega \\  _H \\ \sigma \\ [se] \\ \text{b. } -sé \end{array}$ | $\begin{array}{c} \omega \\ / \backslash_H \\ \omega \ \omega \\ / \backslash_H \  _H \\ \sigma \ \sigma \ \sigma \ \sigma \\ [[a- guata] [se]] \\ \text{c. } a- guata \ -sé \end{array}$ |
|--|--|---|

The stress on *a-guata* ‘1SG-walk’ in (18c) is lost in destressing due to clash with *-se* ‘want.’ However, it may also be preserved in careful pronunciation. Thus, in addition to (19a), (19b) is also possible. Secondary stress is represented with the grave accent.

- |      |   |  |
|------|---|--|
| (19) | a. [ <i>a- guata</i> ] [ <i>ve</i> ]<br><i>a- guata vé</i><br>1SG- walk more<br>“I walk more” | b. [ <i>a- guata</i> ] [ <i>ve</i> ]<br><i>a- guatà vé</i><br>1SG- walk more<br>(gug_20210408_ixo_mmd) |
|------|---|--|

<sup>3</sup> I am assuming that morphologically complex verbs have recursive prosodic structure. For a motivation of recursive prosodic structure, see Ito & Mester (2009, 2012).

The observation that non-final stresses in morphologically complex words are preserved receives support from previous literature. Gregores & Suárez (1967:106) also claim that stems with stressed suffixes retain secondary stress. Nascimento (2008:59) makes the same claim about a related language Guajá.

The mechanism of optional destressing applies across word boundaries in phonological phrases as well. For example, nouns with final stress may (20a) but need not (20b) undergo destressing when followed by a postposition with initial stress. Thus, the destressing seen in (18c) is a general operation which may affect morphologically complex verbs as well as multi-word phonological phrases.

- (20) a. [jagua] [guýpe]  
           jagua guýpe  
           dog under  
           “under a dog”
- b. [jagua] [guýpe]  
           jaguà guýpe  
           dog under
- (gug\_ixo\_20201029\_mmd)

Now I turn to stressless suffixes. I propose that stressless suffixes, such as *-ta* ‘FUT,’ are not prosodified. Non-prosodified suffixes are represented without brackets. They are stray-adjoined and not dominated by any prosodic word node. Instead, they are immediately dominated by a phonological phrase (21).

- (21)
- |  |   |   |
|--|---|---|
| $\begin{array}{c} \omega \\ / \backslash \backslash \text{H} \\ \sigma \ \sigma \ \sigma \\ [a- \text{guata}] \\ \text{a. } a- \text{guatá} \end{array}$ | $\begin{array}{c} \sigma \\ \text{ta} \\ \text{b. } -\text{ta} \end{array}$ | $\begin{array}{c} \varphi \\ / \quad \backslash \\ \omega \quad \quad \quad \sigma \\ / \backslash \backslash \text{H} \quad \quad \quad \backslash \\ \sigma \ \sigma \ \sigma \ \sigma \\ [a- \text{guata}] \ \text{ta} \\ \text{c. } a- \text{guatá} \ -\text{ta} \end{array}$ |
|--|---|---|

In morphologically complex forms with both prosodified and non-prosodified suffixes, primary stress falls on the last syllable of the last prosodified suffix (22).

- (22)
- $$\begin{array}{c} \varphi \\ / \quad \backslash \quad \backslash \quad \backslash \quad \backslash \quad \backslash \\ \omega \quad \quad \quad \omega \quad \quad \quad \omega \quad \quad \quad \omega \quad \quad \quad \sigma \quad \quad \quad \sigma \quad \quad \quad \sigma \\ / \backslash \backslash \text{H} \quad | \text{H} \quad \backslash \backslash \text{H} \quad \backslash \backslash \text{H} \quad \backslash \quad \backslash \quad \backslash \quad \backslash \quad \backslash \quad \backslash \\ \sigma \ \sigma \ \sigma \ \sigma \quad \sigma \sigma \quad \sigma \ \sigma \quad \sigma \quad \sigma \quad \sigma \quad \sigma \\ [[a- \text{guata}] \ [pa] \ [rei] \ [\text{gua}'u]] \ \text{ta} \ \text{ma} \ \text{ramo} \\ a- \text{guata} \ -\text{pa} \ -\text{rei} \ -\text{gua}'ú \ -\text{ta} \ -\text{ma} \ -\text{ramo} \end{array}$$

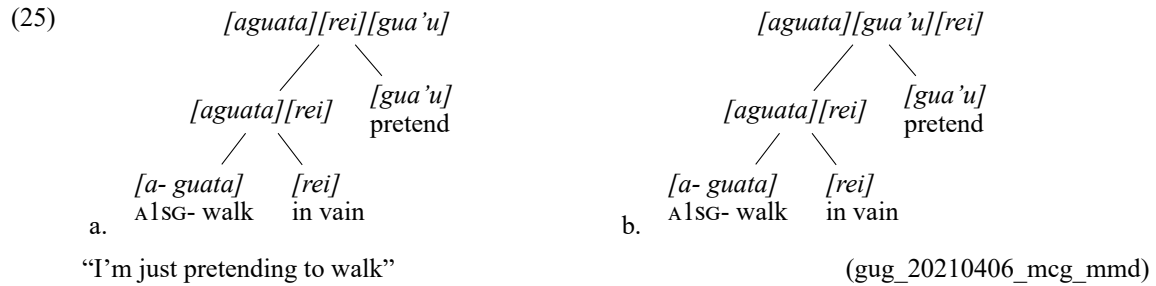
Non-final prosodified suffixes may be realized with secondary stress (23).

- (23) [a- ha] [kuaa] [se] [jevɣ]  
           a- hà kuaà sè jevý  
           A1SG- go know want again  
           “I want to know how to go again”
- (Gregores & Suárez, 1967:106)

Furthermore, I propose that all suffixes subcategorize for a prosodic word to their left. I formulate the subcategorization requirement as a constraint (24) couched within Optimality Theory (McCarthy & Prince, 1986; Prince & Smolensky, 1993).

- (24) SUBCATEGORIZATION, or: SUBCAT  
       Suffixes attach to the right edge of a prosodic word:  
       suffix : [ ]<sub>ω</sub> \_\_\_\_.

This subcategorization requirement derives the free ordering of PG suffixes. Consider a verb with two prosodified suffixes (25). Assume that the verb *[a-guata]* ‘A1SG-walk’ first combines with one suffix *[rei]* ‘in vain.’ The latter suffix *[gua’u]* ‘pretend’ may then, in accordance with its subcategorization frame, attach to *[rei]* ‘in vain’ (25a). It may, however, also infix by attaching to *[a-guata]* ‘A1SG-walk’ (25b). Thus, variable affix order obtains.<sup>4</sup>



This is an adaptation of Bickel et al. (2007)’s analysis of variable prefix ordering in Chintang (Kiranti, iso 639-3: ctn). In Chintang, prefixes are freely ordered. Bickel et al. (2007) shows that they are also independently prosodified. They propose that Chintang prefixes subcategorize for a prosodic word to their right. As a consequence, in the example below, the three prefixes third person non-singular agent *[u]* ‘3NS.A,’ first person non-singular patient *[kha]* ‘1NS.P,’ and negation *[ma]* ‘NEG’ may freely permute without any change in meaning (26).

- (26)
- |   |   |
|---|---|
| <p>a. <i>[u] [kha] [ma] [cop -yokt -e]</i><br/>3NS.A 1NS.P NEG see -NEG -PAST</p> <p>b. <i>[u] [ma] [kha] [cop -yokt -e]</i></p> <p>c. <i>[kha] [u] [ma] [cop -yokt -e]</i></p> | <p>d. <i>[kha] [ma] [u] [cop -yokt -e]</i></p> <p>e. <i>[ma] [u] [kha] [cop -yokt -e]</i></p> <p>f. <i>[ma] [kha] [u] [cop -yokt -e]</i></p> <p>“they didn’t see us” (Bickel et al., 2007:44)</p> |
|---|---|

Turning again to PG, the analysis of (25) is represented below as an Optimality Theoretic tableau. Either suffix order satisfies SUBCATEGORIZATION, which means that both candidates are optimal (27).

(27)	<i>[a-guata], [gua’u], [rei]</i> A1SG-walk pretend in vain	SUBCAT
	i. <i>[aguata][gua’u][rei]</i>	
	ii. <i>[aguata][rei][gua’u]</i>	

“I’m just pretending to walk” (gug\_20210406\_mcg\_mmd)

The analysis extends to free ordering among non-prosodified suffixes. Below, *-ma* ‘already’ and *-nte* ‘only’ both subcategorize for a phonological word. Since there is only one phonological word *[a-guata]* ‘A1SG-walk,’ the subcategorization requirement of one of the suffixes will necessarily be unfulfilled. Since both candidates incur equal number of SUBCATEGORIZATION violations, both are optimal (28).

(28)	<i>[a-guata], ma, nte</i> A1SG-walk already only	SUBCAT
	i. <i>[aguata]mante</i>	*nte
	ii. <i>[aguata]ntema</i>	*ma

“I only walk” (gug\_20210406\_mcg\_mmd)

Thus, by adopting Bickel et al. (2007)’s proposal that affixes are prosodified and subcategorize for phonological words, I capture the variable ordering of prosodified as well as non-prosodified suffixes.

<sup>4</sup> If the attachment of *[gua’u]* ‘pretend’ precedes the attachment of *[rei]* ‘in vain,’ the same reasoning applies; variable affix order results in either case.

Finally, I propose that prosodic well-formedness is responsible for the fact that prosodified suffixes precede the non-prosodified ones. I formalize my proposal with a version of the EXHAUSTIVITY constraint (29), which belongs to the family of Prosodic Domination constraints (Selkirk, 1995).<sup>5</sup>

- (29) EXHAUSTIVITY( $\omega_{\text{nonmin}}$ ,  $\omega$ ), or: EXHAUST  
*No non-minimal prosodic word immediately dominates a syllable.*

I assume that a non-minimal prosodic word dominates the stem and all the prosodified suffixes. The EXHAUSTIVITY constraint ensures that the recursive word immediately dominates only minimal prosodic words by penalizing each non-prosodified suffix within it (30).<sup>6</sup>

(30)	<i>[a- guata], [pa], ta, ma</i> A1SG- walk finish FUT already :	EXHAUST
☞	i. <i>[[aguata][pa]]tama</i>	
	ii. <i>[[aguata]ta[pa]]ma</i>	* <i>ta</i>
	iii. <i>[[aguata]tama[pa]]</i>	* <i>ta, *ma</i>

“I’ve almost finished walking”<sup>7</sup>(gug\_20210405\_mcg\_mmd)

In interim summary, I proposed that in Paraguayan Guarani, the right branch of a prosodic constituent is its head, that suffixes can be classified as prosodified and non-prosodified, that all suffixes subcategorize for prosodic words, and that prosodic well-formedness prevents recursive prosodic words from immediately dominating non-prosodified suffixes. This captured the right-edge orientation of stress in PG, variable realization of secondary stress on non-final prosodic constituents, the variable suffix order, and the linear precedence of prosodified suffixes over the non-prosodified ones.

<sup>5</sup> The SUBCATEGORIZATION constraint is sufficient to ensure the correct order of a prosodified suffix before a non-prosodified one if only one non-prosodified suffix is present (ii).

(ii)	<i>[a- guata], [rei], ta</i> A1SG- walk in vain FUT :	SUBCAT
☞	i. <i>[aguata][rei]ta</i>	
	ii. <i>[aguata]ta[rei]</i>	* <i>[rei]</i>

“I will walk for no reason” (gug\_20210406\_mcg\_mmd)

However, with more than one non-prosodified suffix, SUBCATEGORIZATION alone does not uniquely determine the correct winner (iii). Hence, a recourse to EXHAUSTIVITY is needed.

(iii)	<i>[a- guata], [pa], ta, ma</i> A1SG- walk finish FUT already :	SUBCAT
☞	i. <i>[aguata][pa]tama</i>	* <i>ma</i>
●	ii. <i>[aguata]ta[pa]ma</i>	* <i>[pa]</i>
	iii. <i>[aguata]tama[pa]</i>	* <i>ma, *[pa]</i>

“I’ve almost finished walking” (gug\_20210405\_mcg\_mmd)

<sup>6</sup> Non-prosodified suffixes are not dominated by phonological words, but rather immediately dominated by phonological phrases. I assume that another EXHAUSTIVITY constraint which penalizes phonological phrases immediately dominating stray syllables ranks low, showing no activity in the language (iv).

- (iv) EXHAUSTIVITY( $\varphi$ ,  $\omega$ )  
*No phonological phrase immediately dominates a syllable.*

<sup>7</sup> The tableau does not consider candidates where *-ma* ‘already’ precedes *-ta* ‘FUT,’ which is prohibited on templatic grounds. For further discussion of templatic constraints, see section 4.

## 4 Ordering restrictions

In this section, I describe and analyze other factors responsible for the ordering of PG suffixes. I propose that these restrictions are both scopal (mirroring the order of syntactic operations) and templatic. This contributes to the typology of affix ordering a system where subcategorization requirements and prosodic well-formedness interact with a limited demand on correspondence between linear order and syntactic structure as well as arbitrary morphotactic requirements.

The general order of morphemes within a morphologically complex verb is as follows. Verbal stems come first. All verbal stems are prosodified (31).

- (31) VERBS (V)
- |             |         |
|-------------|---------|
| a. [guata]  | walk    |
| b. [jeroky] | dance   |
| c. [mokõ]   | swallow |
| ...         |         |

Then there are two categories of suffixes with respect to their syntactic position. I will refer to the first category as predicate-level suffixes. Predicate-level suffixes express categories associated with tense, aspect, modality, desiderativity, and other broadly modificational meanings. Some predicate-level suffixes are prosodified while others are not (32).

- (32) PREDICATE-LEVEL SUFFIXES (Pd)<sup>8</sup>
- |           |            |          |                                      |
|-----------|------------|----------|--------------------------------------|
| g. [rei]  | in vain    | l. [ite] | very                                 |
| a. [se]   | want       | m. ta    | FUT (future)                         |
| b. [ve]   | more       | n. ne    | dare (IXO),<br>may (MCG)             |
| c. [pa]   | finish     | o. nte   | only                                 |
| d. [mo'ã] | almost     | p. ma    | already                              |
| e. [pota] | about to   | ...      |                                      |
| f. [ramo] | recently   |          |                                      |
|           | h. [gua'u] |          | pretend                              |
|           | i. [vy]    |          | intend (MCG),<br>somewhat (IXO)      |
|           | j. [guy]   |          | somewhat (IXO),<br>reluctantly (MCG) |
|           | k. [mi]    |          | PLD (pleading<br>imperative)         |

The second category of suffixes are the clause-level suffixes. The clause-level suffixes include complementizer- and force-like morphemes. Again, only some clause-level suffixes are prosodified (33).

- (33) CLAUSE-LEVEL SUFFIXES (C)
- |           |                      |         |                                    |
|-----------|----------------------|---------|------------------------------------|
| e. rire   | if                   | j. ke   | FCE (forceful<br>imperative)       |
| a. [rire] | after                | f. jave | while                              |
| b. [aja]  | while                | g. vo   | while                              |
| c. [ha]   | N (nominal-<br>izer) | h. vove | while                              |
| d. ramo   | if, when             | i. va   | REL (relativ-<br>izer)             |
|           |                      | k. na   | REQ (reques-<br>tative imperative) |
|           |                      | l. py   | URG (urging<br>imperative)         |
|           |                      | ...     |                                    |

In most cases, predicate-level suffixes precede clause-level suffixes. Since predicate-level suffixes take scope over the predicate, while clause-level suffixes take scope over the entire clause, this affix order complies with the general cross-linguistic tendency for word order to reflect semantic scope or order of syntactic operations (cf. the Mirror Principle in Baker 1985).

In particular, predicate-level suffixes precede clause-level suffixes (i) when the predicate-level suffix and the clause-level suffix are both prosodified (34-35), (ii) when the predicate-level suffix is prosodified but the clause level suffix is not (36-37), and (iii) when neither the predicate-level suffix nor the clause level suffix is prosodified (38-39). However, (iv) when the clause-level suffix is prosodified but the predicate-level suffix is not, the order reverses (40-41).

- (34) PROSODIFIED PD SUFFIX + PROSODIFIED C SUFFIX  
 a. *[a- guata] [ve] [rire]*  
 A1SG- walk more<sub>Pd</sub> after<sub>C</sub>  
 “after having walked”  
 b? \**[a- guata] [rire] [ve]*  
 A1SG- walk after<sub>C</sub> more<sub>Pd</sub>  
 (gug\_mcg\_20201124\_mmd)
- (35) a. *[a- guata] [se] [aja]*  
 A1SG- walk want<sub>Pd</sub> while<sub>C</sub>  
 “while I will want to walk”  
 b. \**[a- guata] [aja] [se]*  
 A1SG- walk while<sub>C</sub> want<sub>Pd</sub>  
 (gug\_ixo\_20201203\_mmd)
- (36) PROSODIFIED PD SUFFIX + STRESSLESS C SUFFIX  
 a. *[a- guata] [se] ramo*  
 A1SG- walk want<sub>Pd</sub> if<sub>C</sub>  
 “if I want to walk”  
 b? \**[a- guata] ramo [se]*  
 A1SG- walk if<sub>C</sub> want<sub>Pd</sub>  
 (gug\_mcg\_20201124\_mmd)
- (37) a. *[o- guata] [pa] va*  
 A3- walk finish<sub>Pd</sub> REL<sub>C</sub>  
 “one who finished walking”  
 b. \**[o- guata] va [pa]*  
 A3- walk REL<sub>C</sub> finish<sub>Pd</sub>  
 (gug\_20210412\_mcg\_mmd)
- (38) STRESSLESS PD SUFFIX + STRESSLESS C SUFFIX  
 a. *[a- guata] ta jave*  
 A1SG- walk FUT<sub>Pd</sub> while<sub>C</sub>  
 “when I almost start to walk”  
 b. \**[a- guata] jave ta*  
 A1SG- walk while<sub>C</sub> FUT<sub>Pd</sub>  
 (gug\_20210222\_mcg\_mmd)
- (39) a. *[a- guata] ta rire*  
 A1SG- walk FUT<sub>Pd</sub> if<sub>C</sub>  
 “if I will walk”  
 b. \**[a- guata] rire ta*  
 A1SG- walk if<sub>C</sub> FUT<sub>Pd</sub>  
 (gug\_ixo\_20201203\_mmd)
- (40) STRESSLESS PD SUFFIX + PROSODIFIED C SUFFIX  
 a. \**[a- guata] ta [aja]*  
 A1SG- walk FUT<sub>Pd</sub> while<sub>C</sub>  
 “while I will walk”  
 b. *[a- guata] [aja] ta*  
 A1SG- walk while<sub>C</sub> FUT<sub>Pd</sub>  
 (gug\_20210222\_mcg\_mmd)
- (41) a? \**[a- guata] ta [rire]*  
 A1SG- walk FUT<sub>Pd</sub> after<sub>C</sub>  
 “after I will walk”  
 b. *[a- guata] [rire] ta*  
 A1SG- walk after<sub>C</sub> while<sub>Pd</sub>  
 (gug\_ixo\_20201203\_mmd\_1)

Compare directly (38) with (40). In (38), the non-prosodified *jave* ‘while’ comes after *ta* ‘FUT.’ In (40), a prosodified morpheme with the same meaning *[aja]* ‘while’ comes before *ta* ‘FUT.’ Also compare (39) with (41). In (39), the non-prosodified *rire* ‘if’ comes after *ta* ‘FUT.’ In (41), the segmentally identical but prosodified *[rire]* ‘after’ comes before *ta* ‘FUT.’

The last configuration (iv), where the predicate-level suffix appears after the clause-level suffix, is specifically the one where the expected order of Pd before C would result in a non-prosodified suffix before a prosodified suffix (42). This switch can be understood as avoidance of a dispreferred prosodic structure.

- (42) (i) [Pd] < [C]  
 (ii) [Pd] < C  
 (iii) Pd < C  
 (iv) [C] < Pd

This pattern can be modeled as a consequence of competing demands on the ordering of suffixes. I propose that there is a constraint which favors correspondence between linear order and syntactic scope (43).

- (43) PHONOLOGY ≈ SYNTAX (Ltd.), or: PH ≈ SYN  
*The linear order directly reflects aspects of syntactic derivation:*  
 V < Pd < C.

PHONOLOGY $\approx$ SYNTAX (Ltd.) is violated whenever a clause-level suffix is followed by a predicate-level suffix. However, the constraint is limited only to the relative order among these major categories (hence Ltd.). For example, it does not penalize counterscopal ordering of two predicate-level suffixes.

PHONOLOGY $\approx$ SYNTAX (Ltd.) is outranked by EXHAUSTIVITY, which assigns a violation mark for each non-prosodified suffix followed by a prosodified suffix. This predicts the correct affix order (i) when both the predicate-level suffix and clause-level suffix are prosodified (44), (ii) when predicate-level suffix is prosodified and the clause level suffix is not (45), and (iii) when both the predicate-level and the clause-level suffixes are non-prosodified (46).

(44)	<i>[a- guata], [pa], [rire]</i> A1SG- walk finish <sub>Pd</sub> after <sub>C</sub>	: EXHAUST » PH $\approx$ SYN
☞ i.	<i>[aguata][pa][rire]</i>	
☞ ii.	<i>[aguata][rire][pa]</i>	*C < Pd
“after I finish walking” (gug_20210406_mcg_mmd)		
(45)	<i>[o- guata], [pota], va</i> A3- walk about <sub>toPd</sub> REL <sub>C</sub>	: EXHAUST » PH $\approx$ SYN
☞ i.	<i>[oguata][pota]va</i>	
☞ ii.	<i>[oguata]va[pota]</i>	*va _____
“one who will just begin to walk” (gug_20210408_ixo_mmd)		
(46)	<i>[a- guata], ta, rire</i> A1SG- walk FUT <sub>Pd</sub> if <sub>C</sub>	: EXHAUST » PH $\approx$ SYN
☞ i.	<i>[aguata]tarire</i>	
☞ ii.	<i>[aguata]rireta</i>	*C < Pd
“if I will walk” (gug_ixo_20201203_mmd)		

Finally, the ranking of EXHAUSTIVITY above PHONOLOGY $\approx$ SYNTAX (Ltd.) predicts the correct order when the clause-level suffix is prosodified but the predicate-level suffix is not (47).<sup>9</sup>

(47)	<i>[a- guata], ta, [rire]</i> A1SG- walk FUT <sub>Pd</sub> after <sub>C</sub>	: EXHAUST » PH $\approx$ SYN
☞ i.	<i>[aguata]ta[rire]</i>	*ta
☞ ii.	<i>[aguata][rire]ta</i>	*C < Pd
“after I will walk” (gug_ixo_20201203_mmd)		

Recall that the constraint PHONOLOGY $\approx$ SYNTAX (Ltd.) is sensitive only to relative ordering of suffixes of different categories. Thus, it does not penalize a counterscopal ordering of two predicate-level suffixes. If the two predicate-level suffixes are also prosodified, either order satisfies SUBCATEGORIZATION and EXHAUSTIVITY. Thus, variable suffix order obtains (48).

<sup>9</sup> The nominalizer *[ha]* ‘N’ follows predicate-level suffixes (v). This can be modeled by introducing a morphotactic constraint which enforces Pd < *[ha]* ‘N’ and which is ranked above EXHAUSTIVITY.

(v)	a. <i>[a- guata] ta [ha]</i> A1SG- walk FUT <sub>Pd</sub> Nc	b? * <i>[a- guata] [ha] ta</i> A1SG- walk Nc FUT <sub>Pd</sub>
“that I will walk”		(gug_20210408_ixo_mmd)

---

(48)	<i>[o- guata]</i> , <i>[se]</i> , <i>[gua'u]</i> A3- walk want <sub>Pd</sub> pretend <sub>Pd</sub>	SUBCAT,	EXHAUST »	PH≈SYN
------	---	---------	-----------	--------

---

i.	<i>[oguata][se][gua'u]</i>
ii.	<i>[oguata][gua'u][se]</i>

---

“they pretend that they want to walk” (gug\_20210329\_mcg\_mmd)

Finally, in addition to the limited correspondence between syntactic structure and linear order, there are syntactically and semantically unmotivated restrictions which need to be captured via templatic constraints (49). For example, the suffix *[se]* ‘want’ always precedes *[ve]* ‘more’ (50).

(49) MORPHOTACTICS, or: MORPH

*The linear order obeys precedence relations:*

*[se]* ‘want’ < *[ve]* ‘more,’

*[vy]* ‘intend’ < *[ve]* ‘more,’

*[pota]* ‘about to’ < *[se]* ‘want,’

*ke* ‘FCE’ < *na* ‘REQ,’

...

---

(50)	<i>[a- guata]</i> , <i>[ve]</i> , <i>[se]</i> A1SG- walk more want	MORPH,	PH≈SYN
------	---	--------	--------

---

i.	<i>[aguata][ve][se]</i>	* <i>[ve][se]</i>	————
ii.	<i>[aguata][se][ve]</i>		

---

“I want to keep walking more” (gug\_ixo\_20201112\_mmd)

These morphotactic restrictions seen in PG are not semantic in nature. First, some of them are actually counter-scopal. In both (51) and (52), *[ve]* ‘more’ takes narrow scope; *more* modifies *walking* and *running*, not *wanting* and *intending*. The linear order mismatches scope.

(51)	a. <i>[a- guata]</i> <i>[se]</i> <i>[ve]</i> A1SG- walk want more “I want to keep walking more”	b. * <i>[a- guata]</i> <i>[ve]</i> <i>[se]</i> A1SG- walk more want (gug_ixo_20201112_mmd)
(52)	a. <i>[o- dispara]</i> <i>[vy]</i> <i>[ve]</i> A3- run intend more “he’s trying to intend to run more”	b. * <i>[o- dispara]</i> <i>[ve]</i> <i>[vy]</i> A3- run more intend (gug_20210315_mcg_mmd)

Second, there are morphotactic restrictions among suffixes which do not interact scopally in any obvious manner. For example, there is no clear sense in which the requestative imperative *na* ‘REQ’ takes semantic scope over the forceful imperative *ke* ‘FCE’ (53a). Yet, the reverse order is not possible (53b). Likewise, there is no clear sense in which the urging imperative *py* ‘URG’ should be semantically incompatible with the forceful imperative *ke* ‘FCE.’ And yet, they cannot occur together (54).

(53)	a. <i>[e- guata]</i> <i>ke</i> <i>na</i> IMP- walk FCE REQ “please walk”	b. * <i>[e- guata]</i> <i>na</i> <i>ke</i> IMP- walk REQ FCE (gug_20210318_ixo_mmd)
(54)	a. * <i>[e- guata]</i> <i>ke</i> <i>py</i> IMP- walk FCE URG intended: “walk!”	b. * <i>[e- guata]</i> <i>py</i> <i>ke</i> IMP- walk URG FCE (gug_20210318_ixo_mmd)

In summary, Paraguayan Guaraní suffixes show ordering restrictions of two types: scopal and templatic. Scopal restrictions were captured with the PHONOLOGY≈SYNTAX (Ltd.) constraint, which ensures a limited correspondence between syntactic derivation and linear order. Deviations from the correspondence between syntactic derivation and linear order which are phonological in nature were captured by ranking PHONOLOGY≈SYNTAX (Ltd.) below EXHAUSTIVITY. In addition, there are templatic restrictions on suffix ordering, which need to be stipulated separately. These were captured with MORPHOTACTIC constraints.

## 5 Conclusion

In conclusion, I described and analyzed the prosodic structure of Paraguayan Guaraní verbs. The language's predominantly final stress derives from the universal right-headedness of prosodic constituents. The difference between the two classes of PG suffixes lies in prosodification: Stressable suffixes are independently prosodified phonological words, while stressless suffixes are non-prosodified.

The prosodified suffixes come before the non-prosodified ones, but otherwise their ordering is largely free. I derived the variable ordering by adapting Bickel et al. (2007)'s analysis of affixes as subcategorizing for prosodic words. I captured the linear precedence of prosodified suffixes by leveraging Prosodic Dominance constraints (Selkirk, 1995). I categorized the restrictions on PG affix order as limited correspondence between linear order and syntactic structure and templatic effects.

Thus, I documented a novel agglutinating system with independently prosodified suffixes, whose ordering is part variable, part templatic, and part scopal, emergent from interactions of prosodic hierarchy, phonological subcategorization, templatic restrictions, and syntactic structure. Finally, the highly non-prototypical prosodified and freely-ordered suffixes of Paraguayan Guaraní challenge the notion of a word, contributing to the ongoing research on phonological and syntactic domains as well the nature of the interface of phonology, morphology, and syntax.

## References

- Baker, Mark. 1985. The Mirror Principle and morphosyntactic explanation. *Linguistic Inquiry* 16(3). 373–415.
- Bickel, Balthasar, Goma Banjade, Martin Gaenszle, Elena Lieven, Netra Prasad Paudyal, Ichchha Purna Rai, Manoj Rai, Novel Kishore Rai & Sabine Stoll. 2007. Free prefix ordering in Chintang. *Language* 43–73.
- Estigarribia, Bruno. 2020. *A grammar of Paraguayan Guaraní* Grammars of World and Minority Languages. London: UCL Press.
- Gregores, Emma & Jorge A. Suárez. 1967. *A description of colloquial Guaraní*. The Hague: Walter de Gruyter GmbH & Co KG.
- Gómez, María, Irma Easty Ovelar, Madeline Bossi, Maksymilian Dąbkowski, Emily Drummond, Emily Grabowski, Rebecca Jarvis, Phuong Khuu, Lev Michael & Katherine Russell. n.d. Berkeley Field Methods: Paraguayan Guaraní. 2020–09. California Language Archive, Survey of California and Other Indian Languages. University of California, Berkeley. URL: <http://dx.doi.org/doi:10.7297/X2PR7TNF>.
- Ito, Junko & Armin Mester. 2009. The extended prosodic word. *Phonological Domains: Universals and Deviations* 135–194.
- Ito, Junko & Armin Mester. 2012. Recursive prosodic phrasing in Japanese. In *Prosody Matters: Essays in Honor of Elisabeth Selkirk*, 280–303. Equinox London.
- McCarthy, John J. & Alan Prince. 1986. Prosodic morphology. *Linguistics Department Faculty Publication Series* 13. [https://scholarworks.umass.edu/linguist\\_faculty\\_pubs/13](https://scholarworks.umass.edu/linguist_faculty_pubs/13).
- Nascimento, Ana Paula Lion Mamede. 2008. *Estudo fonético e fonológico da língua Guajá*. Brasília, Brazil: Universidade de Brasília Master's thesis.
- Prince, Alan & Paul Smolensky. 1993. Optimality Theory: Constraint interaction in Generative Grammar. *Rutgers Optimality Archive* <http://roa.rutgers.edu/>. ROA-101.
- Selkirk, Elisabeth. 1995. The prosodic structure of function words. In Jill N. Beckman, Laura Walsh Dickey & Suzanne Urbanczyk (eds.), *Papers in Optimality Theory*, vol. 18, 439–469. Amherst: GLSA.