Paraguayan Guaraní and the typology of free affix order

Maksymilian Dąbkowski*

Abstract. Cross-linguistically, affix order is commonly determined by semantic scope (Rice 2006) or a morphological template. Less frequently, affix order is free, which means that suffixes can be reordered without a concomitant change in scope. To address the question of what gives rise to and constrains free affix order (FAO), I present a case study of Paraguayan Guaraní (or PG, Tupí-Guaraní, Paraguay, ISO 639-3: gug). I argue that FAO in PG should be analyzed as driven by prosodic factors. The prosodic analysis has previously been proposed only for Chintang (Bickel et al. 2007). Two major analyses of FAO see the phenomenon as driven by either *morphology* (e. g. Ryan 2010) or *prosody* (Bickel et al. 2007). The morphological analysis proposes that FAO is a consequence of free variation within the morphological template. The prosodic analysis models FAO with prosodic subcategorization for phonologically prominent positions. I argue that the two analyses make different predictions as to the preconditions for and the extent of FAO. I show that both the morphological and the prosodic profile of FAO are attested. I propose that FAO in PG is an instance of the latter. Thus, I demonstrate that FAO is not a unified phenomenon, but rather should be typologized as driven by either morphological or prosodic factors.

Keywords. Paraguayan Guaraní; suffix; free affix order; FAO; variable affix order; morphotactics; template; morphological FAO; subcategorization; infixation; stress; prosody; prosodic FAO; Mirror Principle; scope; Optimality Theory; learning; typology

1. Introduction. Cross-linguistically, the order of affixes often reflects semantic scope, as proposed by Rice (2006), the order of syntactic operations (Baker 1985), or principles of cognitive relevance (Bybee 1985). For example, in Quechua (Peru, ISO 639-5: qwe), the relative order of the causative suffix *-chi* 'CAUS' and the reciprocal suffix *-na* 'RCPR' reflects differences in meaning. If *-na* 'RCPR' attaches after *-chi* 'CAUS,' the reciprocal take high scope (1a). If *-na* 'RCPR' comes before *-chi* 'CAUS,' the causative take high scope (1b). The relevant suffixes are underlined.

(1) Quechua (Peru, ISO 639-5: qwe) (Muysken 1986)

a. *riku -chi -na -n -ku*
see -CAUS -RCPR -3 -PL
RCPR(CAUS): "they make each other see (something)"

b. *riku -na -chi -n -ku*
see -RCPR -CAUS -3 -PL
CAUS(RCPR): "they make (them) see each other"

* First and foremost, I would like to thank my consultants Mary Gómez and Irma Ovelar. Without their patience, kindness, and insight, this project would not have been possible. I would also like to thank Lev Michael, Hannah Sande, Larry Hyman, Zachary O'Hagan, Myriam Lapierre, 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 illuminating discussions and helpful feedback. Author: Maksymilian Dąbkowski, University of California, Berkeley (maksymilian.michal.dabkowski@gmail.com).

Another common ordering is templatic, which means that the order of affixes is invariant regardless of scope. For example, in Mapuche (Araucanian, Chile, ISO 639-3: arn), *-faluw* 'pretend' always comes before negation *-la* 'NEG,' irrespective of whether this ordering mirrors semantics scope (2a) or counters it (2b). Other cases of templatic ordering include, for example, the CARP template in Bantu (Africa, ISO 639-5: bnt) in Hyman (2003)'s work.

(2) Mapuche (Araucanian, Chile, ISO 639-3: arn) (Smeets 1989; 348)
pe -w -faluw -la -e -y -u
see -REFL -pretend -NEG -IND.OBJ -IND -AGR
a. NEG(pretend): "I did not pretend to see you."
b. pretend(NEG): "I pretended not to see you."

Finally, in some languages the order of at least some suffixes is free without any corresponding change in meaning. For example, in Fuuta Tooro Pulaar (Fula, Senegal, ISO 639-3: fuc) the applicative *-ir* 'APPL' and the causative *-in* 'CAUS' can appear in either order with either scope. This is to say, the causative can scope over the applicative (3) and the applicative can scope over the causative (4) regardless of the order of two suffixes.

(3) Fuuta Tooro Pulaar (Fula, Senegal, ISO 639-3: fuc) (Paster 2006; 182)
a. *o irt -ir -in -ii kam supu o kuddu*
3SG stir -APPL -CAUS -PAST 1SG soup DET spoon
b. *o irt -in -ir -ii kam supu o kuddu*
3SG stir -CAUS -APPL -PAST 1SG soup DET spoon
CAUS(APPL): "he made me stir the soup with a spoon" (I used a spoon)

(4) a. *o irt -in -ir -ii kam supu o la6i*
3SG stir -CAUS -APPL -PAST 1SG soup DET knife
b. *o irt -ir -in -ii kam supu o la6i*
3SG stir -APPL -CAUS -PAST 1SG soup DET knife
APPL(CAUS): "he made me stir the soup with a knife" (he used a knife)

I refer to the phenomenon above as free affix order (abbreviated FAO). By FAO, I specifically mean those cases where the order of affixes can be permuted freely, without affecting the scope. In other words, cases where reordering suffixes changes the meaning are *not* instances of free affix order. Among the scopal (1), templatic (2), and free (3-4) affix orders, the last one is by far least common (Caballero 2010). Given its rarity, a natural question is: What gives rise to free affix order and what constrains it?

To address this question, I present a case study of Paraguayan Guaraní (henceforth PG, Paraguay, ISO 639-3: gug), a heavily agglutinating language of the Tupí-Guaraní family. The case study of PG is significant because it is the only known language other than Chintang (Kiranti, Nepal, ISO 639-3: ctn, Bickel et al. 2007), where—I will argue—FAO is driven by prosodic mechanisms.

There are two major analysis of FAO proposed in previous literature. I refer to these two analyses as *morphological* (exemplified by, e. g., Ryan 2010; Caballero 2010; Paster 2006) and *prosodic* (exemplified by Bickel et al. 2007). The morphological analysis proposes that FAO is

a consequence of free variation within the morphological template of a language. The prosodic analysis, on the other hand, models FAO with prosodic subcategorization for phonologically prominent positions.

I argue that the two analyses make different predictions as to the extent of free affix ordering within a language as well as the preconditions necessary for FAO to arise. I show that both profiles are attested: while most languages have morphological FAO, some languages have prosodic FAO. In previous literature, the prosodic analysis has only been applied to Chintang (Bickel et al. 2007). In this talk, I propose that FAO in Paraguayan Guaraní is also of the prosodic type.

In doing so, I demonstrate that FAO is not a unified phenomenon. Instead, I propose that it should be typologized as either morphological or prosodic and situate the free affix ordering in Paraguayan Guaraní in that preliminary typology as being of the latter type.

The rest of the paper is structured as follows. In section 2, I give the language background. In section 3, I describe the prosodic and morphological structure of the PG verb. In section 4, I review the morphological analysis of FAO. In section 5, I review the prosodic analysis and demonstrate that FAO in PG should be analyzed as being of the latter type.

2. Language background. Paraguayan Guaraní (Paraguay, ISO 639-3: gug) is Tupian language (Tupí–Guaraní branch). It is one of two two official languages of Paraguay (along with Spanish). The syllable structure is (C)V, with more complex onsets allowed in borrowings. Paraguayan Guaraní morphology is highly agglutinating. Agreement, possession, and valence are expressed with prefixes, while various inflectional, derivational, and modificational categories are expressed suffixally. Paraguayan Guaraní stress and prosody are considerably understudied. However, see Gregores & Suárez (1967) for a detailed description of the PG stress and prosody, including morphologically complex forms, which corroborates aspects of the analysis presented in this paper.

All the PG data were collected in an Advanced Field Methods (Linguistics 240A/B) course offered by the Linguistics Department at the University of California, Berkeley in Fall 2020 and Spring 2021. The language consultants were María (Mary) Gómez (MCG) and Irma Easty Ovelar (IXO). Most of the data were collected by the author. The data have been deposited in the California Language Archive as Gómez et al. (n.d.) and are cited here with item-level identifiers.

3. PG verb structure. First, I describe and analyze the stress patterns of Paraguayan Guaraní verbs, including suffixed, morphologically complex forms. I demonstrate that PG has a class of stressed (independently prosodified) suffixes. I show that many of the stressed suffixes may be freely reordered. Some of the data and the analysis presented in this section were previously published in Dąbkowski (in press).

3.1. DATA. Most commonly, morphologically simple roots have final stress, regardless of lexical class (5).[1] The most robust phonetic correlates of stress are pitch, duration, and intensity. Stress is marked with the acute accent.

(5) a. *mbarakajá* cat (gug_mcg_20200923_ejg)

[1] Some words and functional morphemes are have exceptional stress, e. g. (i).

(i) a. *óga* house (gug_ixo_20200910_mmd)
b. *atĩ́a* sneeze (gug_20210401_ixo_mmd)
c. *máramo* never (gug_20210401_ixo_mmd)
d. *-kuéra* -PL (gug_20210401_ixo_mmd)

b. *morotĩ́* white (gug_20210401_ixo_mmd)
c. *guatá* walk (gug_20210401_ixo_mmd)

Prefixes express categories such as agreement (6a), valence (6b), and possession (6c). They may not affect stress. Thus, regardless of the prefix, stress remains final.

(6) a. *a- guatá*
A1SG- walk
"I walk"

b. *mbo- guatá*
CAUS- walk
"make walk"

c. *che- mbarakajá*
B1SG- cat
"my cat"
(gug_20210401_ixo_mmd)

Suffixes express various inflectional categories. Many of the language's suffixes are stressed. I this paper, I focus specifically on the predicate-level stressed suffixes, which include at least (7).

(7) a. *-sé* want
b. *-vé* more
c. *-pá* finish
d. *-mo'ã́* almost
e. *-potá* about to
f. *-ramó* recently
g. *-reí* in vain
h. *-gua'ú* pretend
i. *-vý* intend
j. *-guý* somewhat, reluctantly
k. *-ité* very
l. *-mí* PLD (pleading imperative)
m. *-'í* DMN (diminutive)

If there is one stressed suffix attached to a verbal stem, the last syllable of that suffix receives primary stress. The last syllable of the stem may retain secondary stress. Secondary stress is marked with the grave accent (8).

(8) a. *a- guatà -sé*
A1SG- walk -want
"I want to walk" (gug_20210401_ixo_mmd)

b. *a- guatà -vé*
A1SG- walk -more
"I walked more" (gug_20210401_ixo_mmd)

c. *a- guatà -mo'ã́*
A1SG- walk -almost
"I almost walked" (gug_20210401_ixo_mmd)

If there is more than one stressed suffix, the primary stress is assigned to the last syllable of the last stressed suffix. The stress of the preceding suffixes and the verbal stem is preserved as secondary (9).[2]

(9) a. *a- guatà -sè -vé*
A1SG- walk -want -more
"I want to walk more" (gug_20210401_ixo_mmd)

[2] This stress pattern, with secondary stresses closely followed by the primary stress has previously been observed in Paraguayan Guaraní by Gregores & Suárez (1967; 106), and in the related language Guajá by Nascimento (2008; 59).

b. *a-* *guatà* *-pà* *-ramó*
A1SG- walk -finish -recently
"I just finished walking" (gug_20210429_ixo_mmd)

c. *o-* *guatà* *-potà* *-sé*
A3- walk -about to -want
"he wanted to start to walk" (gug_20210318_ixo_mmd)

Now, there is almost complete freedom with respect to ordering among the stressed suffixes (10-14).[3] Importantly, the different orders do not reflect scopal differences.

(10) a. *a-* *guatà* *-mo'ǎ́* *-vé*
A1SG- walk -almost -more
"I planned to continue walking"

b. *a-* *guatà* *-vè* *-mo'ǎ́*
A1SG- walk -more -almost
(gug_ixo_20201203_mmd)

(11) a. *o-* *guatà* *-gua'ù* *-sé*
A3- walk -pretend -want
"he pretends to want to walk"

b. *o-* *guatà* *-sè* *-gua'ú*
A3- walk -want -pretend
(gug_20210330_ixo_mmd)

(12) a. *a-* *guatà* *-potà* *-mo'ǎ́*
A1SG- walk -about to -almost
"I pretend that I'm about to walk"

b. *a-* *guatà* *-mo'ǎ̀* *-potá*
A1SG- walk -almost -about to
(gug_20210429_ixo_mmd)

(13) a. *a-* *guatà* *-pà* *-ramó*
A1SG- walk -finish -recently
"I just finished walking"

b. *a-* *guatà* *-ramò* *-pá*
A1SG- walk -recently -finish
(gug_20210503_mcg_mmd)

(14) a. *e-* *guatà* *-reì* *-mí*
IMP- walk -in vain -PLD
"go walk around a little bit"

b. *e-* *guatà* *-mì* *-reí*
IMP- walk -PLD -in vain
(gug_20210329_mcg_mmd)

To verify that the different suffix orders do not correspond to scopal differences, one can control for the scenario. In (15), *-sé* 'want' scope over *-gua'ú* 'pretend.' In (16), *-gua'ú* 'pretend' scopes over *-sé* 'want.' Nevertheless, in either scenario, either suffix order can be used as a translation of the target sentence.

(15) 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-* *guatà* *-sè* *-gua'ú*
A1SG- walk -want -pretend
want(pretend): "I want to pretend to walk"

b. *a-* *guatà* *-gua'ù* *-sé*
A1SG- walk -pretend -want
(gug_20210330_ixo_mmd)

[3] Some exceptions include (ii).

(ii) *-sé* 'want' ≺ *vé* 'more,'
-vý 'intend' ≺ *vé* 'more,'
-potá 'about to' ≺ *sé* 'want,' . . .

(16) 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- guatà -sè -gua'ú*
A3- walk -want -pretend
pretend(want): "he pretends to want to walk"

b. *o- guatà -gua'ù -sé*
A3- walk -pretend -want
(gug_20210330_ixo_mmd)

3.2. ANALYSIS. In this section, I extend the argument presented in Dąbkowski (in press) that the stressed suffixes in PG are separate phonological words. This is a precondition for analyzing the Paraguayan Guaraní free affix order as prosodically driven.

First, I propose that prosodic constituents are right-headed in Paraguayan Guaraní—this captures the preponderance of final stress in the language. Thus, a verb receives final stress because its rightmost syllable is the prosodic head of the word (17a).

Second, I propose that the stressed suffixes, such as *-sé* 'want,' are independently prosodified phonological words (17b). The verb and the stressed suffix(es) form a non-minimal prosodic word. (Following Ito & Mester (2009, 2012), I assume that prosodic structure may be recursive.) The recursive word is headed by the head of the rightmost minimal word (17c). Prosodic constituents are given in brackets *[ ]*. The head of a constituent is shown with a small cap H.

(17)

a. ω (H)
σ σ σ
[a- gua ta]
a- guatá

b. ω (H)
σ
[se]
-sé

c. ω (H)
ω (H) ω (H)
σ σ σ σ
[[a- gua ta] [se]]
a- guatà -sé

Additional evidence in favor of the analysis is adduced by the process of regressive nasal spreading. Specifically, analyzing the suffixes as separate phonological words explains why nasality does not spread from a prosodified nasal suffix onto the verbal stem.

Normally in PG, nasality spreads from stressed nasal vowels leftward, including prefixes (18a). Nasality spreads from stressed nasal vowels within prosodified suffixes, but it does not spread from nasal suffixes onto verb stems (18b). The domain of nasal spreading is shown with wavy underline.

(18) a. *[o- je- kytĩ]*
õ- ñẽ- kỹtḯ
A3- AGD- cut
"he cut himself"

b. *[a- vy'a] [mo'ã]*
a- vy'à -mõ'ã́
A1SG- rejoice almost
"I was almost happy"
(gug_20210401_ixo_mmd)

Under the current analysis, the boundaries of regressive nasalization correspond to the boundaries of the minimal phonological word. Prefixes do not form a separate phonological word, so nasality can spread onto prefixes. Suffixes, on the other hand, are prosodified separately, so nasality can spread within the suffix but not outside of it.

In interim summary, I showed that in Paraguayan Guaraní verbal stems and stressed suffixes alike are independently prosodified phonological words. The rightmost branch of a prosodic

constituent is its head. The verbal stem and its suffixes form a recursive prosodic word. Thus, in a suffixed verb, the rightmost syllable of the rightmost stressed suffix carries the primary stress.

4. Morphological FAO. As we just saw, PG shows free affix order, which means that the order of affixes can be permuted with changing the meaning. FAO is rather uncommon cross-linguistically (Caballero 2010). Most of the the previous accounts model FAO as free variation within the morphological template of a verb (e. g., Ryan 2010; Caballero 2010; Paster 2006).

First, recall the Quechua data, where the order of suffixes corresponds to their relative semantics scope (19).

(19) Quechua (Peru, ISO 639-5: qwe) (Muysken 1986)

a. *riku -chi -na -n -ku*
see -CAUS -RCPR -3 -PL
RCPR(CAUS): "they make each other see (something)"

b. *riku -na -chi -n -ku*
see -RCPR -CAUS -3 -PL
CAUS(RCPR): "they make (them) see each other"

This kind of reordering is often attributed to a requirement that the order of affixes reflect semantic scope (e. g. Rice 2006). In Optimality Theory, this can be formalized as (20).[4]

(20) SCOPE
Morphological constituency reflects scope.

Mapuche presents us with a different situation where the order of the two suffixes *-la* 'NEG' and *-faluw* 'pretend' is fixed regardless of the scope (21).

(21) Mapuche (Araucanian, Chile, ISO 639-3: arn) (Smeets 1989; 348)
pe -w -faluw -la -e -y -u
see -REFL -pretend -NEG -IND.OBJ -IND -AGR

a. NEG(pretend): "I did not pretend to see you."
b. pretend(NEG): "I pretended not to see you."

In the morphological model, fixed affix order can be captured with morphotactic constraints, which enforce pair-wise suffix order (e. g. Paster 2006). The form of the morphotactic constraints is schematized in (22). Specifically, in Mapuche, the constraint *FALUW-LA* outranks SCOPE (23).

(22) X-Y
Assign a violation mark when affix y precedes affix x.

(23) Mapuche constraint ranking
FALUW-LA » SCOPE

[4] Another implementation of this constraint can be found in Zukoff (to appear)'s work on the Mirror Alignment Principle.

As a consequence, the negative *-la* 'NEG' always ends up surfacing to the right of *-faluw* 'pretend,' regardless of the input scope (24-25).

(24)	*(pe -w -faluw) -la* see -REFL -pretend -NEG :	*FALUW-LA »*	SCOPE
☞	i. *pe-w-faluw-la*		
	ii. *pe-w-la-faluw*	*!	*

NEG(pretend): "I did not pretend to see you."

(25)	*(pe -w -la) -faluw* see -REFL -NEG pretend :	*FALUW-LA »*	SCOPE
☞	i. *pe-w-faluw-la*		*
	ii. *pe-w-la-faluw*	*!	

pretend(NEG): "I pretended not to see you."

Finally, in Fuuta Tooro Pulaar, the applicative *-ir* 'APPL' and the causative *-in* 'CAUS' can appear in either order with either scope (26-27).

(26) Fuuta Tooro Pulaar (Fula, Senegal, ISO 639-3: fuc) (Paster 2006; 182)

a. *o irt -ir -in -ii kam supu o kuddu*
3SG stir -APPL -CAUS -PAST 1SG soup DET spoon

b. *o irt -in -ir -ii kam supu o kuddu*
3SG stir -CAUS -APPL -PAST 1SG soup DET spoon
CAUS(APPL): "he made me stir the soup with a spoon" (I used a spoon)

(27) a. *o irt -in -ir -ii kam supu o laɓi*
3SG stir -CAUS -APPL -PAST 1SG soup DET knife

b. *o irt -ir -in -ii kam supu o laɓi*
3SG stir -APPL -CAUS -PAST 1SG soup DET knife
APPL(CAUS): "he made me stir the soup with a knife" (he used a knife)

Thus, Fuuta Tooro Pulaar shows free affix order. In the morphological model, free affix order is modeled with freely ranked morphotactic constraints (~). In Pulaar, the freely ranked constraints are *IR-IN* and *IN-IR*. Both morphotactic constraints are ranked above Scope (28).

(28) Fuuta Tooro Pulaar constraint ranking
IR-IN ~ *IN-IR* » SCOPE

The free ranking of the morphotactic constraints means that when the output is evaluated either ranking can be used. Thus, both orders are possible for both scopes. Either suffix order is possible when the causative *-in* 'CAUS' takes scope over the applicative *-ir* 'APPL' (29-30).

(29)	*(irt -ir) -in* stir -APPL -CAUS :	*IR-IN »*	*IN-IR »*	SCOPE
☞ i.	*irt-ir-in*		*	
ii.	*irt-in-ir*	*!		*

CAUS(APPL): "he made me stir the soup with a spoon" (I used a spoon)

(30)	*(irt -ir) -in* stir -APPL -CAUS :	*IN-IR »*	*IR-IN »*	SCOPE
i.	*irt-ir-in*	*!		
☞ ii.	*irt-in-ir*		*	*

CAUS(APPL): "he made me stir the soup with a spoon" (I used a spoon)

Likewise, either suffix order is possible when the applicative *-ir* 'APPL' take scope over the causative *-in* 'CAUS' (31-32).

(31)	*(irt -in) -ir* stir -CAUS -APPL :	*IN-IR »*	*IR-IN »*	SCOPE
i.	*irt-ir-in*	*!		*
☞ ii.	*irt-in-ir*		*	

APPL(CAUS): "he made me stir the soup with a knife" (he used a knife)

(32)	*(irt -in) -ir* stir -CAUS -APPL :	*IR-IN »*	*IN-IR »*	SCOPE
☞ i.	*irt-ir-in*		*	*
ii.	*irt-in-ir*	*!		

APPL(CAUS): "he made me stir the soup with a knife" (he used a knife)

Now, assuming that the learner is predisposed to learn the order of suffixes which corresponds to semantic scope, and that they will not posit constraints for which they do not have evidence, scopal affix order has the simplest grammar (1 constraint), templatic affix order is more complex (2 constraints), and FAO is the most complex (3 constraints). This is schematized in Table 1.

ORDER	GRAMMAR	COMPLEXITY	FREQUENCY
SCOPAL	SCOPE	low	high
TEMPLATIC	X-Y » SCOPE	higher	lower
FREE	X-Y ~ Y-X » SCOPE	highest	lowest

Table 1. Affix ordering in morphology (ORDER and GRAMMAR columns based on Ryan 2010).

Furthermore, assuming that higher complexity correlates inversely with frequency, the morphological model predicts that FAO should be the least common of the three orderings. The prediction of the morphological model is generally borne out. Cross-linguistically, FAO is rare. In languages with FAO, it is often restricted to only a couple of morphemes. E. g., in Chichewa (Bantu, Malawi, ISO 693-3: nya), FAO obtains only in two instances: (1) the reciprocal *-an* 'REC' and the causative *-its* 'CAUS' can be freely ordered to express a causativized reciprocal (Hyman 2003; 251), and (2) the applicative *-il* 'APP' and the passive *-idw* 'PASS' can be freely ordered when the applicative introduces a locative expression (Hyman 2003; 253). In Choguita Rarámuri (or CR, Uto-Aztecan, Mexico, ISO 639-3: tar), only three suffixes (the causative *-ti* 'CAUS,' the associated motion *-si* 'MOT,' and the desiderative *-nale* 'DESID') can be freely ordered (Caballero 2010; 190). In Fuuta Tooro Pulaar, only two suffixes (the causative *-(i)n* 'CAUS' and the applicative *-(i)r* 'APPL') can be freely ordered (Paster 2006; 183). These observations are summarized in Table 2.

LANGUAGE	FREELY ORDERED AFFIXES	
Chichewa	*-an* 'REC' ~ *-its* 'CAUS' (when CAUS scopes over REC)	
	-il 'APPL' ~ *-idw* 'PASS' (when APPL introduces a locative)	(Hyman 2003; 251)
CR	*-ti* 'CAUS' ~ *-si* 'MOT'	
	-si 'MOT' ~ *-nale* 'DES'	
	-ti 'CAUS' ~ *-nale* 'DES'	(Caballero 2010; 190)
Pulaar	*-(i)n* 'CAUS' ~ *-(i)r* 'APPL'	(Paster 2006; 183)

Table 2. Exhaustive list of freely ordered affixes in three languages.

In summary, the morphological model analyses FAO with freely ranked morphosyntactic constraints. This model associates FAO with the most complex grammar, predicting that it is difficult to learn and therefore rare.

5. Prosodic FAO. Now, I turn to prosodic model, in which the phenomenon of FAO is analyzed as subcategorization for prosodically prominent positions. The prosodic model has been proposed by Bickel et al. (2007) to account for free affix order in Chintang (Kiranti, Nepal, ISO 639-3: ctn). Chintang is remarkable in that, unlike in most other languages, all of Chintang prefixes participate in free ordering. Thus, for example, give any three prefixes, all 3! = 6 orders are possible (33).

(33) Chintang (Kiranti, Nepal, ISO 639-3: ctn) (Bickel et al. 2007; 44)

a. *u-* *kha-* *ma-* *cop -yokt -e*
   3NS.A- 1NS.P- NEG- see -NEG -PAST
b. *u- ma- kha- cop -yokt -e*
c. *kha- u- ma- cop -yokt -e*
d. *kha- ma- u- cop -yokt -e*
e. *ma- u- kha- cop -yokt -e*
f. *ma- kha- u- cop -yokt -e*

"they didn't see us"

Importantly, Bickel et al. (2007) show that the Chintang prefixes are independently prosodified: they have an onset requirement (underlyingly vowel-initial prefixes are realized with an initial glottal stop) and they can serve as hosts for Chintang endoclitics (pp. 56–58). These properties distinguish prefixes from suffixes, which do not have initial glottal stops and do not host endoclitics.

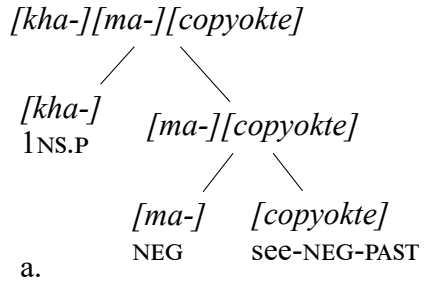
Bickel et al. (2007) use this property of Chintang to propose an analysis where the Chintang FAO is a consequence of subcategorization. In their account, Chintang prefixes subcategorize for a prosodically prominent position, i. e. the phonological word to their right (34).

(34) SUBCATEGORIZATION IN CHINTANG
Prefixes attach to the left edge of a prosodic word:
prefix : __ [ ]$_{\omega}$.

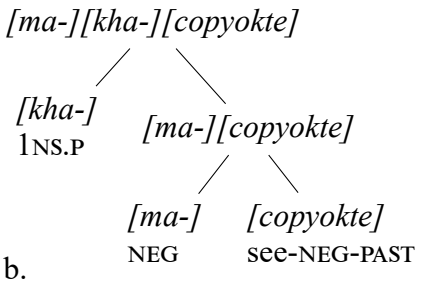
Following Yu (2007), Bickel et al. (2007) assume that only edges and prosodically prominent positions can be subcategorized for. Thus, the fact that prefixes in Chintang are independently prosodified is a necessary prerequisite for this account. It also explains why Chintang's rampant freely ordered affixation is not the cross-linguistic norm—in most languages, affixes are not prosodic words separate from the stems.

The free ordering of Chintang prefixes follows from the subcategorization requirement above. For example, assume that the verb *[copyokte]* 'see-NEG-PAST' first combines with the prefix *[ma-]* 'NEG,' and then with *[kha-]* '1NS.P.' The later prefix *[kha-]* '1NS.P' may, in accordance with its subcategorization frame, attach to the left of the first prefix (35a). However, it may, again in accordance with the subcategorization frame, also attach to the left of the verbal stem (35b). This infixation, and concomitant free affix order, are enabled by the fact that both the earlier prefix and the stem are independently prosodified. (If *[kha-]* '1NS.P' attaches before *[ma-]* 'NEG,' the derivation is analogous. Either underlying order of operations gives rise to surface free affix order.)

(35) a.



b.



Now, note that Bickel et al. (2007)'s treatment of FAO differs from the analyses in the previous section. Bickel et al. (2007) do not use ranked templatic constraints to derive the free affix order in Chintang. Instead, they propose that Chintang FAO takes place in phonology (due to prosodic subcategorization), not in morphology.

It would be possible to model Chintang FAO morphologically. This would require proposing freely ranked constraints which specify order for each pair of prefixes (36). The squiggly arrow (↭) connects different prefix orders with constraint rankings which generate them.

(36) a. *[u-] [kha-] [ma-] [cop -yokt -e]*
3NS.A- 1NS.P- NEG- see -NEG -PAST
↭ *U-KHA » KHA-U, KHA-MA » MA-KHA*

b. *[u] [ma] [kha] [cop -yokt -e]*
   ↭ *U-MA » MA-U, MA-KHA » KHA-MA*

c. *[kha] [u] [ma] [cop -yokt -e]*
   ↭ *KHA-U » U-KHA, U-MA » MA-U*

d. *[kha] [ma] [u] [cop -yokt -e]*
   ↭ *KHA-MA » MA-KHA, MA-U » U-MA*

e. *[ma] [u] [kha] [cop -yokt -e]*
   ↭ *MA-U » U-MA, U-KHA » KHA-U*

f. *[ma] [kha] [u] [cop -yokt -e]*
   ↭ *MA-KHA » KHA-MA, KHA-U » U-KHA*

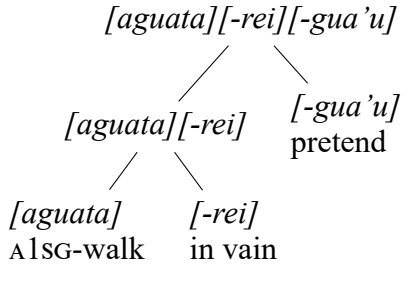
While this yields the correct outputs, it requires stipulating morphotactic constraints for each pair of affixes and misses the central generalization: free ordering of prefixes in Chintang is the norm, not the exception. The subcategorization account captures this generalization by allowing prefixes to freely "infix." The morphological account, on the other hand, would essentially equate to listing each possible ordering of prefixes one by one.

I propose to port Bickel et al. (2007)'s account to Paraguayan Guaraní freely ordered suffixes. In PG, like in Chintang, affixes are independently prosodified. Likewise, in both languages, free ordering is the norm, not the exception. This can be captured by saying that all stressed suffixes in PG subcategorize for phonological words to their left (37).

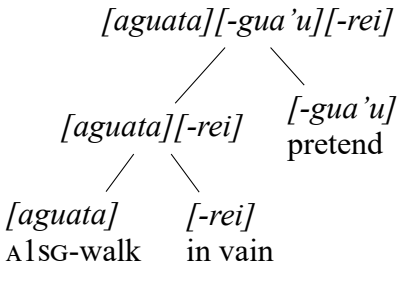
(37) Subcategorization in Paraguayan Guaraní
Suffixes attach to the right edge of a prosodic word:
suffix : [ ]$_{\omega}$ __.

This subcategorization frame derives the free ordering of PG suffixes in a way parallel to Chintang. The outer suffix can attach after the inner suffix (38a), but it can also attach directly to the stem (38b).

(38) a.



b.



One can adapt Bickel et al. (2007)'s account to PG because PG affixes are, as I argued earlier, independently prosodified. Doing so captures the fact that almost any two affixes can be freely ordered without having to list all the different permutations as freely ranked morphotactic constraints. In short, I propose that free affix order in PG has the same source as in Chintang. In both languages, FAO is driven by prosody. This sets these two language aside from other cases of FAO described in previous literature, which are driven by morphology (Table 3).

MORPHOLOGICAL FAO	PROSODIC FAO
Chichewa	Paraguayan Guaraní
Choguita Rarámuri	Chintang
Fuuta Tooro Pulaar	
...	

Table 3. Languages by type of free affix order.

6. Conclusions. To conclude, I proposed that free affix order is not a unified phenomenon. Rather, it falls in one of two typologically distinct categories: morphological FAO and prosodic FAO. Table 4 summarizes the differences between the two systems.

FAO TYPE:	MORPHOLOGICAL	PROSODIC
AFFIXES NEED BE ω?	no	yes
% OF FREELY ORDERED AFFIXES	low	~100%

Table 4. Morphological and prosodic FAO compared.

Most previously described systems are of the morphological type (e. g. Caballero 2010; Ryan 2010; Paster 2006). In the morphological FAO, free ordering is a matter of free variation within the morphological template. Assuming that the order of each pair of affixes needs to be learned separately, ordering affixes freely in morphology involves learning a complex grammar. This correctly predicts that morphological FAO is rare. However, morphological FAO does not have any prosodic perquisites, which means it might arise regardless of whether the affixes are independent prosodic words or not.

The other type of FAO is conditioned by prosody, not morphology. This system characterizes Chintang and Paraguayan Guaraní. In systems with prosodic FAO, the free ordering is a consequence of the fact that affixes subcategorize for prosodically prominent positions, which allows any affix to freely infix. Thus, in systems with prosodic FAO, free ordering is rampant (not restricted to particular affixes). However, for prosodic FAO to arise, affixes need to be independently prosodified. Thus, prosodic FAO is cross-linguistically rare; so far only two languages have been shown to be fall in this category.[5]

[5] A third potential candidate for a language with prosodic FAO is Hill Mari (Uralic, Russia, ISO 639-3: mrj). In Mari, suffixes exponing plurality and possession (as well as case) are generally freely ordered (iii). Luutonen (1997) observes that "[i]n Mari, the plural morphemes *šamôč*, *βlak*, and *βlä* have many characteristics that make them resemble words rather than affixes" (p. 24). Specifically, the plural markers do not vowel-harmonize with the stem and resist resyllabification. This suggests that Mari nominal stems and plural markers are also independently prosodified, both serving as bases for infixation.

(iii) Hill Mari (Uralic, Russia, ISO 639-3: mrj) (Luutonen 1997; 32)

a. *[olma] [-βlä] -em*
apple -PL -my
"my apples"

b. *[olma] -em [-βlä]*
apple -my -PL
"my apples"

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.

Bybee, Joan L. 1985. *Morphology: A study of the relation between meaning and form*. John Benjamins Publishing.

Caballero, Gabriela. 2010. Scope, phonology and morphology in an agglutinating language: Choguita Rarámuri (Tarahumara) variable suffix ordering. *Morphology* 20(1). 165–204.

Dąbkowski, Maksymilian. in press. Prosody drives Paraguayan Guaraní suffix order. In Peter Jurgec, Liisa Duncan, Emily Elfner, Yoonjung Kang, Alexei Kochetov, Brittney K. O'Neill, Avery Ozburn, Keren Rice, Nathan Sanders, Jessamyn Schertz, Nate Shaftoe & Lisa Sullivan (eds.), *Supplemental Proceedings of the 2021 Annual Meeting on Phonology*, Washington, DC: Linguistic Society of America.

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. http://dx.doi.org/doi:10.7297/X2PR7TNF. 2020–09. California Language Archive, Survey of California and Other Indian Languages. University of California, Berkeley.

Hyman, Larry M. 2003. Suffix ordering in Bantu: A morphocentric approach. In *Yearbook of Morphology 2002*, 245–281. Springer.

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.

Luutonen, Jorma. 1997. *The variation of morpheme order in Mari declension* (Suomalais-Ugrilaisen Seuran Toimituksia (Mémoires de la Société Finno-Ougrienne) 226). Helsinki: Suomalais-Ugrilainen Seura (Finno-Ugrian Society).

Muysken, Pieter. 1986. Approaches to affix order. *Linguistics* 24. 629–43.

Nascimento, Ana Paula Lion Mamede. 2008. *Estudo fonético e fonológico da língua Guajá*. Brasília, Brazil: Universidade de Brasília Master's thesis.

Paster, Mary. 2006. Pulaar verbal extensions and phonologically driven affix order. In *Yearbook of Morphology 2005*, 155–199. Springer.

Rice, Keren. 2006. *Morpheme order and semantic scope: Word formation in the Athapaskan verb*. Cambridge: Cambridge University Press.

Ryan, Kevin M. 2010. Variable affix order: Grammar and learning. *Language* 86(4). 758–791.

Smeets, Ineke. 1989. *A Mapuche grammar*. Leiden: University of Leiden dissertation.

Yu, Alan C. L. 2007. *A Natural History of Infixation* Oxford Studies in Theoretical Linguistics. Oxford University Press.

Zukoff, Sam. to appear. The Mirror Alignment Principle: Morpheme ordering at the morphosyntax-phonology interface. *Natural Language & Linguistic Theory* .