

A Cyclic Account of Prefix Integration in Kaqchikel Mayan

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Outline

- 1 Overview
- 2 Data
- 3 Previous analysis: subcategorization frames
- 4 Unified analysis: spell out domains
- 5 Conclusion & Implications



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Overview

- **Recent work:** surface-oriented prosodic subcategorization frames for individual morphemes (Bennett 2018, Bennett et al. 2018, Rolle & Hyman 2019, Tyler 2019). These are powerful!
 - ▶ Interact with other constraints on prosodic structure.
 - ▶ Override prosodic subcategorization frames of other morphemes.
- **General issue:** subcategorization frames are stipulative, non-explanatory, and fail to capture broader grammatical generalizations (e.g., Bonet et al. 2007, Wolf 2008, Bonet & Harbour 2012, Bennett 2017).

Overview

Motivated by: prefixes in Kaqchikel Mayan

- Some prefixes argued to contain idiosyncratic prosodic subcategorization frames (Bennett et al. 2018, Bennett 2018).
- **This talk:** prefix integration follows straightforwardly in a
 - ▶ **cyclic derivational model**, with
 - ▶ **standard assumptions about the syntax-phonology interface**
- **Possibly:** prosodic subcategorization frames are not necessary at all!

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Syntax

- Many types of **prefixes** (highlighted):

- ▶ Verbs: Infl⁰– v^0 – VP

TAM–**ABS**– **ERG**– [ROOT–VOICE–STATUS.SUFFIX]

- ▶ Nouns: Poss'r– NP –infl

ERG– [STEM] –suffixes

(For syntactic analyses, see [Coon 2016](#), [C. et al. 2014](#))

The prosodic word (ω) in Kaqchikel Mayan

Prosodic word (ω) defined by...

- word-final stress
- [ʔ]-epenthesis before initial vowels
- degemination of adjacent fricatives

(Bennett et al. 2018)

- (1) a. /ok/ 'enter' [ʔ-ok^h]_ω *xok* '(s)he entered'
- b. /ok/ 'enter' [ʔok-i-'bəŋ]_ω *okib'äl* 'entryway'
- c. /ʃ-o_χ-χo't-eʔ/ → [ʃ-o_χ-o't-eʔ]_ω *xo_jjote'* 'we climbed'

Default prefix integration

- Most prefixes are parsed into an adjacent prosodic word.
- Prefixes bleed [ʔ]-epenthesis, (2).

(2)	[ʃ-ok ^h] _ω	*[ʃ-ʔok ^h]	<i>x-ok</i>	'(s)he entered'	TAM on verbs
	[ʔaw-ikʔ] _ω	*[ʔaw-ʔikʔ]	<i>aw-ik'</i>	'your month'	ERG on nouns
	[ʃ-aw-I _o] _ω	*[ʃ-aw-ʔI _o]	<i>x-aw-il</i>	'you found it'	ERG on verbs
	[ʃ-in-oŋ] _ω	*[ʃ-in-ʔoŋ]	<i>x-in-oq'</i>	'I cried'	ABS on verbs

- Fricative sequences across the prefix-stem boundary degeminate (3).

(3)	[ʃ-o _x -o't-eʔ] _ω	*[ʃ-o _x -x _x o't-eʔ]	<i>x-oj-jot-e'</i>	'we climbed'	ABS on verbs
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Exceptional prefixes

- Two types of nominal prefixes lie outside the minimal prosodic word but are not themselves minimal words.
 - ▶ prosodic word adjuncts
 - ▶ i.e. [PRE- [____]_ω]_ω
- ① A set of non-inflectional prefixes
- ② ABS prefixes in non-verbal predication

Non-inflectional prefixes

- A set of bound but non-inflectional prefixes:

/aχ-/ *aj* AGT

/ij-/ *ix* FEM

/atʃ-/ *ach* COM

/jaχ-/ *yaj* 'related by marriage'

- Non-inflectional prefixes do not bleed [ʔ]-epenthesis, (4)

(4) [ʔaχ-['ʔikʔ]_ω]_ω *aj-ik'* 'domestic worker' (AGT-month)

- Fricatives across the prefix-stem boundary do not degeminate (5)

(5) [ʔaχ-[χu'kuʔ]_ω]_ω *aj-juku'* 'boatman' (AGT-boat)

Non-verbal absolutive markers

- ABS agrees with the subject of a non-verbal predicate.
- Non-verbal ABS do not bleed [ʔ]-epenthesis, (6).

(6) [ʔin- [ʔu'laʔ]_ω]_ω *in ula'* 'I am a foreigner'
[ʔin- [ʔaχ- ['ʔikʔ]_ω]_ω]_ω *in ajik'* 'I am a domestic worker'

- Fricatives across the absolutive-stem boundary do not degeminate (7).

(7) [ʔoχ- [χo't-ɔl]_ω]_ω *öj jot-öl* 'We are elevated.'

Summary: two types of prefix integration

	Default				Exceptional	
Type	TAM	ERG	ERG	ABS	non-infl.	ABS
Attaches to...	verbs	nouns	verbs	verbs	nouns	non-verbs
Phonology	[PRE- ____] _ω				[PRE- [____] _ω] _ω	

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Puzzle: No morphological conditioning

	Default				Exceptional	
Type	TAM	ERG	ERG	ABS	non-infl.	ABS
Attaches to...	verbs	nouns	verbs	verbs	nouns	non-verbs

- No other morphological properties condition prosodic structure
 - ▶ not affix vs. clitic ([Bennett 2018](#), [Bennett et al. 2018](#))
 - ▶ not inflection vs. derivation ([Bennett 2018](#))

Puzzle: No morphological conditioning

	Default				Exceptional	
Type	TAM	ERG	ERG	ABS	non-infl.	ABS
Attaches to...	verbs	nouns	verbs	verbs	nouns	non-verbs

- No other morphological properties condition prosodic structure
 - ▶ not affix vs. clitic (Bennett 2018, Bennett et al. 2018)
 - ▶ not inflection vs. derivation (Bennett 2018)
- **ABS** integrates in two ways (Bennett et al. 2018).

Puzzle: No morphophonological conditioning

① Not level ordering (e.g. Kiparsky 1982):

- ▶ What if default prefixes are Level 1 and exceptional prefixes are Level 2?
- ▶ No: Level 1 prefixes can go outside Level 2 prefixes.

(8) [r-aχ- [ʔe'j-aχ]_ω]_ω *[ru- [ʔaχ- [ʔe'j-aχ]_ω]_ω]_ω *rajeyaj* 'his/her dentist'

Puzzle: No morphophonological conditioning

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(8) [r-aχ- [ʔeʲj-aχ]_ω]_ω * [ru- [ʔaχ- [ʔeʲj-aχ]_ω]_ω]_ω *rajeyaj* 'his/her dentist'

② Not transderivational faithfulness (e.g. Benua 2000):

- ▶ Could inner ω arise due to faithfulness with independent unprefixing words?
- ▶ No: bound roots can be parsed into inner prosodic words.

(9) [ʔatʃ- [ʔaliʔ]_ω]_ω *achali* 'co-parents-in-law'

*[-(ʔ)aliʔ]_ω *-*ali* 'daughter-in-law'

Previous solution: prosodic subcategorization frames

- 'Exceptionality' treated as an idiosyncratic lexical property.
- Prosodic subcategorization frames in the lexical entries.

NON-INFL. PREFIXES

AGT: [_ω aχ- [_ω]]

COM: [_ω atʃ- [_ω]]

FEM: [_ω iʃ- [_ω]]

REL: [_ω jaχ- [_ω]]

ABSOLUTE PREFIXES

ABS.1SG: [_ω in- [_ω]]

ABS.2SG: [_ω at- [_ω]]

ABS.1PL: [_ω oχ- [_ω]]

ABS.2PL: [_ω iʃ- [_ω]]

ABS.3PL: [_ω e- [_ω]]

Previous solution: prosodic smothering

- To explain the dual behavior of ABS, TAM prefixes (verbs only) also have a subcategorization frame [Bennett et al. \(2018\)](#)

- ▶ CPL: $[\omega_{\text{-MIN}} \text{ } j\text{-} [\dots]]$

- ▶ INCPL: $[\omega_{\text{-MIN}} \text{ } j\text{-} [\dots]]$

- This “smothers” the ABS prefix in verbs, forcing it into the minimal word.

(10) **in=** $[\omega_{\text{-MIN}} \text{ } n\ddot{i}m \text{ }]$

1SG.ABS large

‘I’m large.’

(11) $[\omega_{\text{-MIN}} \text{ } x\text{-} \text{ } i\text{-} \text{ } w\ddot{a}r \text{ }]$

CPL **1SG.ABS** sleep

‘I slept.’

Previous solution: subcategorization as constraints

- Subcategorization frames construed as a SUBCAT constraint.
- Interacts with prosodic structure (ALIGN; McCarthy & Prince 1994)

	SUBCAT(ASP)	AL-R(ω , LEX)	AL-L(LEX, ω)
$[_{\text{AspP}} \text{ x- } [_{\text{VP}} \text{ in- } \text{wär}]]$			
a.  $[_{\omega\text{-MIN}} \text{ x- in- } \text{wär}]$			*
b. $\{\phi \text{ x- in} = [_{\omega\text{-MIN}} \text{wär}]\}$	*! W		L
c. $[_{\omega\text{-NONMIN}} \text{ x- in} = [_{\omega\text{-MIN}} \text{wär}]]$	*! W		L
d. $[_{\omega\text{-MIN}} \text{ x- in}] [_{\omega\text{-MIN}} \text{wär}]$		*! W	L

(See another implementation in Rolle & Hyman 2019.)

Previous solution: summary

- Prosodic integration does not follow morpho(phono)logical classes.
- Construed as a lexical property (subcategorization frames).
- ...but this is redundant
 - ▶ *every* ABS prefix has a frame
 - ▶ *every* non-inflectional prefix has a frame
 - ▶ *every* TAM prefix has a frame
- ...and the frames are powerful! (surface-oriented, optimizing)
- Is there some other relevant generalization?

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Unified analysis: spell-out domains

- We argue that both constructions with “exceptional” prefixes involve structures commonly associated with a spell out domain
- ‘Exceptional prefixes’ then have a natural explanation under traditional assumptions about syntax-phonology interface (Embick & Marantz 2008, Embick 2010, Marvin 2002, Newell 2008, Arad 2005, Marantz 2007, Chomsky 2001)

Unified analysis: spell-out domains

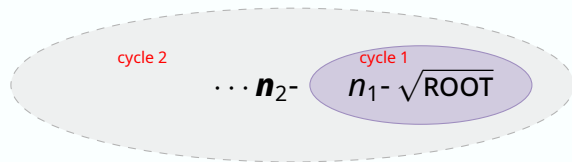


Figure 1: Non-inflectional prefixes

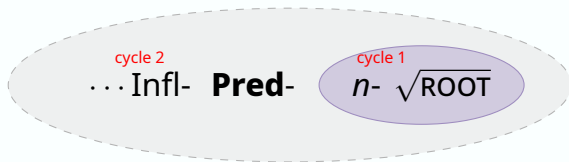
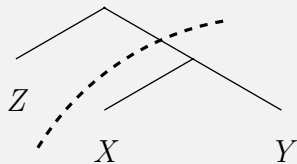


Figure 2: Non-verbal predication

Unified analysis: spell-out domains

Assumptions ...

- Cyclic translation from syntax to prosody
- Spell out proceeds from root outward (Bobaljik 2000, Wolf 2008, Myler 2017, Kiparsky 1982)



narrow syntax



linearize & expone



regular phonology

$X \smallfrown Y$

$/\textcolor{red}{?}X\text{-}Y/$

Unified analysis: spell-out domains

- Each phonological cycle:
 - ▶ Parse into a prosodic word
 - ▶ Syllabification + stress assignment
 - ▶ [ʔ]-epenthesis
 - ▶ Degemination
- The phonological yield of each spell-out domain is included in later phonological cycles
- Faithfulness preserves epenthesis and degemination from previous cycles (Kiparsky 1982)

Unified analysis: spell-out domains

- The two relevant points of spell out for Kaqchikel Mayan
 - ① Stacked categorizing heads
 - ② Pred^0 in nonverbal predication

Non-inflectional prefixes: stacked categorizing heads

- The non-inflectional prefixes are n^0 heads
- They select for nP and project to nP
- Non-nominal stems must first be nominalized. Compare (12) with (13)

(12) ?aχ-'ʔikʔ

AGT-month_N

'domestic worker'

(13) r-aχ-[toʔ-ɔ̌]_N

ERG.3SG-AGT-[help_V-NMLZ]_N

'his/her helper'

Non-inflectional prefixes: stacked categorizing heads

- n^0 prefixes combine directly with verbs in some examples in [Bennett et al. \(2018\)](#) and [Bennett \(2018\)](#)
- These likely contain a null categorizer, (14).
- Other dialects use an overt categorizing suffix in the same words, (15).

(14) $aj=[t'is-\emptyset]_N$

AGT=[sew-NMLZ]_N

'tailor'

(e.g. [Bennett 2018](#))

(15) $aj=[t'is-\text{ɔl}]_N$

AGT=[sew-NMLZ]_N

'tailor'

([Patal Majzul 2007](#) p. 75)

Non-inflectional prefixes: stacked categorizing heads

- Categorizing heads are cyclic (see [Embick 2015](#) and the citations therein)
- In configurations like $n_2 - [n_1 - \sqrt{\text{ROOT}}]$, n_2 and $[n_1 - \sqrt{\text{ROOT}}]$ are included in cycles
 - ▶ Thus n_2 morphonologically appears as more “detached” to $[n_1 - \sqrt{\text{ROOT}}]$

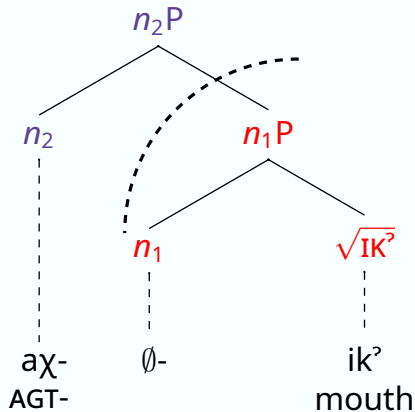
Non-inflectional prefixes: stacked categorizing heads

(16) ?aχ-**ʔ**ikʔ (17)

AGT-month

'domestic

worker'



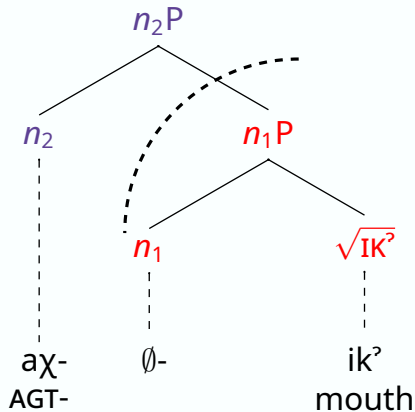
Non-inflectional prefixes: stacked categorizing heads

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AGT-month

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worker'



Cycle 1: [**ʔ**ikʔ]_w

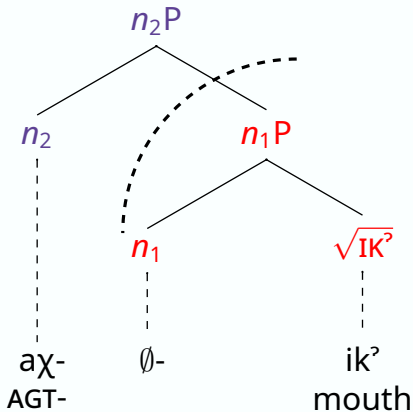
Non-inflectional prefixes: stacked categorizing heads

(16) $\text{ʔa}\chi\text{-ʔik}^?$ (17)

AGT-month

'domestic

worker'



Cycle 2: $[\text{ʔa}\chi[\text{ʔik}^?]]_\omega$

↑
Cycle 1: $[\text{ʔik}^?]_\omega$

Non-verbal predication: Null Pred⁰

- Non-verbal predicates contain a null Pred⁰
 - ▶ This is crosslinguistically true: non-verbal predication is supported by an additional element (e.g. Bowers 1993, Baker 2008 a.o.)
- Pred⁰ sends its complement to spell-out (den Dikken 2006, Ko 2014, Citko 2014)
- Infl⁰ is thus included in a different spell out domain from the complement to Pred⁰

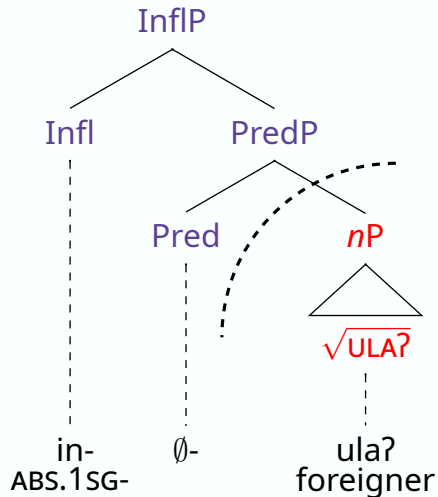
Non-verbal predication: Null Pred⁰

(18) ?in-ʔu'la?

1SG.ABS-foreigner

'I am a foreigner.'

(19)



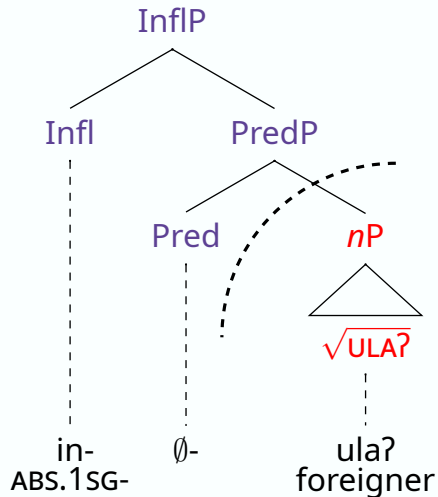
Non-verbal predication: Null Pred⁰

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Cycle 1: [ʔu'la?]_ω

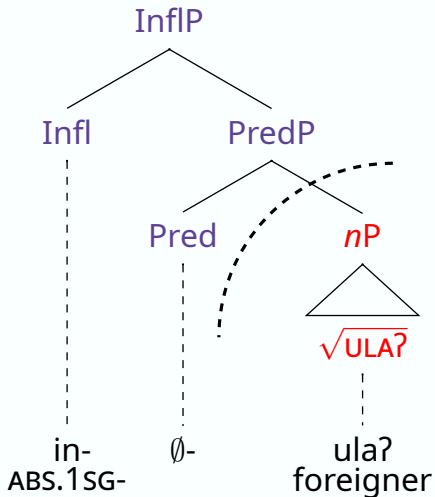
Non-verbal predication: Null Pred⁰

(18) ?in-ʔu'la?

1SG.ABS-foreigner

'I am a foreigner.'

(19)



Cycle 2: [ʔin ʔu'la?]_ω

Cycle 1: [ʔu'la?]_ω

Unified analysis: spell-out domains

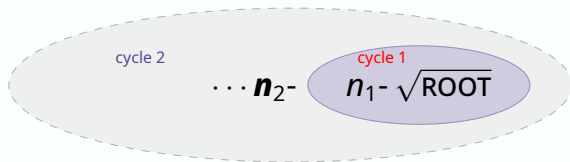


Figure 3: Non-inflectional prefixes

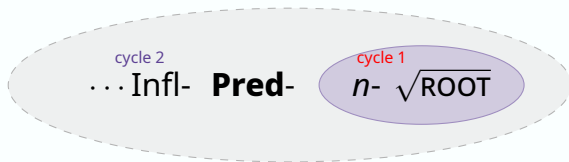


Figure 4: Non-verbal predication

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Conclusion & Implications

- Subcategorization frames traditionally hold only while linearizing or exponing morphemes, or while building prosodic structure (e.g., Yu 2007, Paster 2006, Bye 2007, Kalin & Rolle 2024, Inkelas 1990, Zec 2005)

Conclusion & Implications

- Subcategorization frames traditionally hold only while linearizing or exposing morphemes, or while building prosodic structure (e.g., Yu 2007, Paster 2006, Bye 2007, Kalin & Rolle 2024, Inkelas 1990, Zec 2005)
- The surface-oriented prosodic subcategorization frames in Bennett (Bennett 2018) and Bennett et al. (Bennett et al. 2018) are more powerful, as their effects “linger” through the phonological cycle.

Conclusion & Implications

Take home message

- Our reanalysis of Kaqchikel Mayan suggests that surface-oriented sub-categorization frames should be abandoned in favor of broader grammatical generalizations

Merci!

Florence Zhang-Yukun

Romany Finn Amber

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William Palmer

Natalie Weber

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