Align-driven clitic movement in Chamorro

Richard Bibbs
LSA 2021

Background

- Many languages have prosodically dependent morphemes that get special treatment by the grammar as to where they are positioned
- **Second-position elements** (2P-clitics): those which occur as far left in a sentence as possible without beginning the sentence (Anderson 2005)
- Placement of second position elements (and non second-position weak elements) among several languages has been shown to be prosodically motivated (Bennett et al., 2016; Chung, 2003; Harizanov, 2014)
- Weak pronouns in **Chamorro** [Austronesian, Mariana Islands] resemble typical second-position elements, but with notable differences regulated by prosody (Chung 2003)

Roadmap

1. Background and introduction of weak pronouns in Chamorro
2. OT account of Chamorro weak pronoun movement

   1. Defining GEN – Inputs and Outputs

   2. Align vs Match system

   3. Results - Align succeeds by itself; Match isn't helpful

   4. Discussion + Conclusion

   ❖ Built-in analysis available at spot.sites.ucsc.edu

Weak pronouns in Chamorro

- Chamorro has a flexible VSO word order (Chung 1998, 2003)
- Weak pronouns are prosodically deficient:
  - **Unstressed**
  - **Enclitics**
  - *Mostle monosyllables*
- Weak pronouns can also be treated as *free clitics*; they do not affect word-level prosody, such as stress placement (Chung, 2003)

	Weak	Independent
1.Sg	**yu'**	guahu
2.Sg	**hao**	hagu
3.Sg.Anim	**gui'**	guiya
1.incl.pl	**hit**	hita
1.excl.pl	**ham**	hami
2.Pl	**hamyu**	hamyu
3.Pl.Anim	**siha**	siha

Differences between weak pronouns and full DPs

Full DPs, and independent pronouns, occur in positions where weak pronouns can't, and vice-versa

Kao patgon-ña **hao** adyu na maʼestra?
Q   child-AGR you that L   teacher
`Are you the child of that teacher?'

*Kao patgon-ña **si Dolores** adyu na maʼestra?
 Q   child-AGR   Dolores that L   teacher
(`Is Dolores the child of that teacher?')

Differences between weak pronouns and full DPs

While subjects are always generated to the right in the syntax, weak pronouns move to second-position (where full DPs do not)

Malagu' **gui'** nuebu na kareta *t*.
AGR.want she new L car
`She wants a new car.'

Malagu' nuebu na kareta *i lahi-nmami*.
AGR.want new L car the son-AGR
`Our son wants a new car.'

Brief evidence against a syntactic analysis

- Partial DPs and other non-syntactic constituents may precede the weak pronoun

Ma'estro-nña **gui'** si Carmen. teacher-AGR he Carmen `He is Carmen's teacher.	*****[Ma'estro-nña si Carmen] **gui'**. teacher-AGR Carmen he `He is Carmen's teacher.

- Weak pronoun placement is flexible

Maś ya-hu **hao** na taotao. most wh[obj].like-agr you L person `You're the person I like most.'	[Maś ya-hu na taotao] **hao**. most wh[obj].like-agr L person you `You're the person I like most.'

Prosodic analysis – Chung 2003

- Prosodic phrasings are determined by an alignment constraint

  Align the left edge of a syntactic XP with the left edge of a prosodic phrase

- Weak pronouns **subcategorize** for prosodic position: *weak pronouns adjoin to the right of the left-most phi-phrase within an intonational phrase*

$$[_\iota \; [_\phi \; [_\phi \;] \; \rule{1cm}{0.5pt} \;] \;]$$

- Assumes strict layering is only violated by clitic adjunction

Prosodic analysis – OT approach

- Prosodic subcategorization is beneficial in capturing the empirical facts, but is not very explanatory for weak pronoun movement
- Other forms of weak pronoun movement have been accounted for without the use of subcategorization

Irish weak pronoun postposing (Bennett et al. 2016):
- Motivated through the interaction of prosodic well-formedness constraints and Match
- StrongStart the primary driver of postposing

Prosodic analysis – OT approach

Proposal:

Account for Chamorro weak pronoun movement using a similar OT approach as Irish

The SPOT interface

The interface is particularly useful for exploring the typologies of systems with prosodic movement.

Number of parses with clitic movement (parse all syllables and words into phis)

- Movement massively increases the candidate set size →
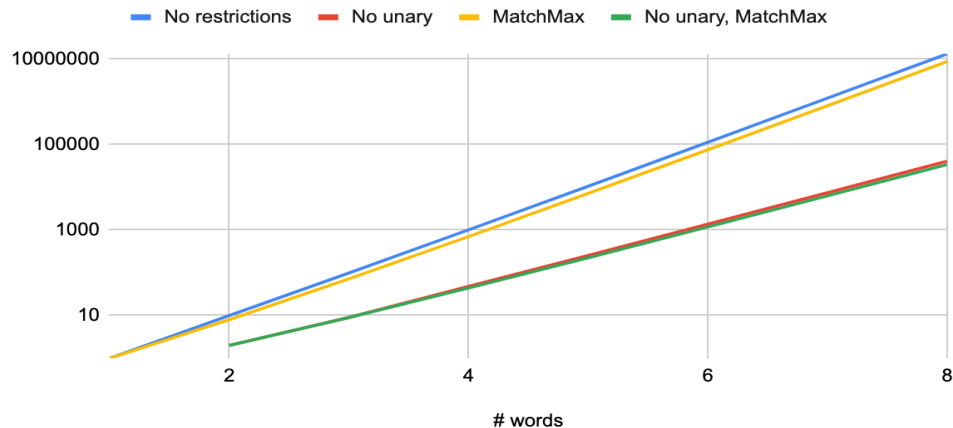
- SPOT provides a computational method which can more easily handle candidate sets of this size compared to more traditional methods

GEN - Inputs

- For this analysis we will only consider relatively simple structures
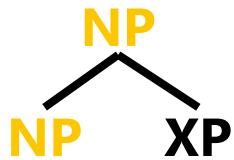- Here is a sampling of the structures we care about:

Syntax	Structure	Weak pronoun position
[[$_{VP}$ V [NP]] [wp]]	Head+complement	second
[[$_{DP}$ [NP] [DP]] [wp]]	DP possessive	second
[[$_{NP}$ [AP] [NP]] [wp]]	Prenominal AP modifier	second *or* third
[[$_{NP}$ [NP] [PP]] [wp]]	Postnominal PP modifier	second

GEN - Inputs

- For this analysis we will only consider relatively simple structures
- Here is a sampling of the structures we care about:

Syntax	Structure	Weak pronoun position
[[$_{VP}$ V [NP]] [wp]]	Head+complement	second
[[$_{DP}$ [NP] [DP]] [wp]]	DP possessive	second
[[$_{NP}$ [AP] [NP]] [wp]]	Prenominal AP modifier	second *or* third
[[$_{NP}$ [NP] [PP]] [wp]]	Postnominal PP modifier	second

Identical syntaxes! How do we account for the position variability?

13

GEN - Inputs

Solution: assume variability in the visibility of projections visible in syntax-prosody mapping (Truckenbrodt 1999; Chung 2003; Bellik & Kalivoda 2016)
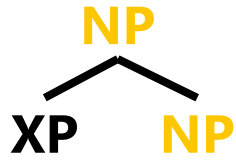
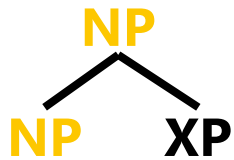**Prenominal (high & low)**

Postnominal (high & low)

Prenominal (low only)

Postnominal (low only)

[[[a] [b]] [clitic]]

[[[a] [b]] [clitic]]

:Input: [[a] [b] [clitic]]

[[a] [b] [clitic]]

{((a clitic) (b))}

:Prosody:

{(a clitic) (b)}

14

GEN - Inputs

Solution: assume variability in the visibility of projections visible in syntax-prosody mapping (Truckenbrodt 1999; Chung 2003; Bellik & Kalivoda 2016)
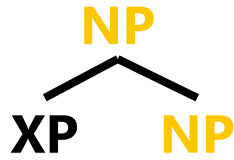
Prenominal (high & low)
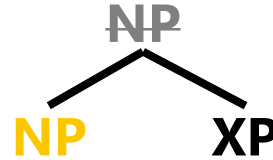
```
      NP
     /  \
   NP    XP
```

[[[a] [b]] [clitic]]

Postnominal (high & low)

```
      NP
     /  \
   XP    NP
```

[[[a] [b]] [clitic]]

:Input:

Prenominal (low only)

```
     ~~NP~~
     /  \
   NP    XP
```

[[a] [b] [clitic]]

Postnominal (low only)

```
     ~~NP~~
     /  \
   XP    NP
```

[[a] [b] [clitic]]
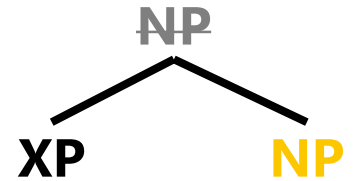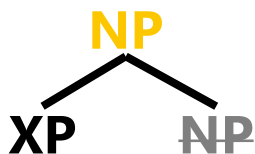
{((a clitic) (b))}   :Prosody: {(a clitic) (b)}

Both in second-position, still undifferentiable!

15

GEN - Inputs

Solution: assume variability in the visibility of projections visible in syntax-prosody mapping (Truckenbrodt 1999; Chung 2003; Bellik & Kalivoda 2016)
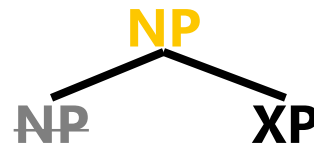

Prenominal (high only)

NP
XP **NP**

[[[a] b] [clitic]]

{((a b) clitic)}

:Input:

:Prosody:

Postnominal (high only)
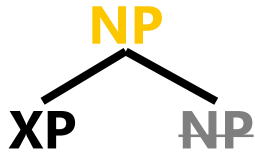
NP
NP **XP**

[[a [b]] [clitic]]

{((a clitic) (b))}

GEN - Inputs

Solution: assume variability in the visibility of projections visible in syntax-prosody mapping

**Prenominal
(high only)**

NP

XP   **NP**

[[[a] b] [clitic]]   :Input: [[a [b]] [clitic]]

{((a b) clitic)}   :Prosody: {((a clitic) (b))}

**Postnominal
(high only)**

NP

NP   **XP**
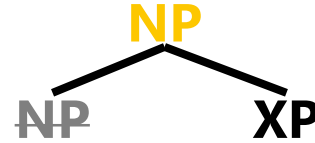
Optional third-position for prenominal correctly differentiated!

GEN - Inputs

Assuming that visibility can be either only high, or high + low, we get 4 unique inputs:

GEN - Inputs

Assuming that visibility can be either only high, or high + low, we get 4 unique inputs:

Structure	Visibility	Input	WP position
Predicate alone		**[[a] [wp]]**	**second**
Predicate with complement		**[[a [b]] [wp]]**	**second**
Postnominal modifier	**Only High**		
Prenominal modifier	**High + Low**	**[[[a] [b]] [wp]]**	**second**
Postnominal modifier	**High + Low**		
Prenominal modifier	**Only High**	**[[[a] b] [wp]]**	**third**

GEN - Inputs

Assuming that visibility can be either only high, or high + low, we get 4 unique inputs:

Structure	Visibility	Input	WP position
Predicate alone		**[[a] [wp]]**	**second**
Predicate with complement		**[[a [b]] [wp]]**	**second**
Postnominal modifier	**Only High**		
Prenominal modifier	**High + Low**	**[[[a] [b]] [wp]]**	**second**
Postnominal modifier	**High + Low**		
Prenominal modifier	**Only High**	**[[[a] b] [wp]]**	**third**

These inputs are all:
- Binary branching
- Rooted in an XP
- One or two X^0 terminals
- XP clitics adjoined on the right edge

20

GEN - Inputs

Assuming that visibility can be either only high, or high + low, we get 4 unique inputs:

Structure	Visibility	Input	WP position
Predicate alone		**[[a] [wp]]**	**second**
Predicate with complement		**[[a [b]] [wp]]**	**second**
Postnominal modifier	**Only High**		
Prenominal modifier	**High + Low**	**[[[a] [b]] [wp]]**	**second**
Postnominal modifier	**High + Low**		
Prenominal modifier	**Only High**	**[[[a] b] [wp]]**	**third**

These inputs are all:
- Binary branching
- Rooted in an XP
- One or two X^0 terminals
- XP clitics adjoined on the right edge

Easily generable in SPOT using either manual or automatic input generation!

GEN – Outputs: options within SPOT

- ***Headedness (at the phi level)*** - all phis must be headed by a prosodic word
- ***Exhaustivity (at the iota level)*** - all daughters of an intonational phrase must be either a phi or an iota
- ***Recursivity:*** - recursivity is permitted in the system
- **Allow clitic movement** - allows items with the 'clitic' category to move

GEN: Output parameters

☐ No prosodic recursion (Non-Recursivity)　　　ⓘ

☑ Enforce headedness　　　ⓘ

☑ No level-skipping (Exhaustivity)　　　ⓘ
　　☑ ɩ's children are ≥φs　☐ φ's children are ≥ωs

☐ All intermediate nodes are branching　　　ⓘ

☐ Restrict maximum number of branches　　　ⓘ

☑ Allow movement　　　ⓘ
　　◉ Move only clitics
　　○ Reorder all terminals

CON – Two systems

Two systems are tested, differing only in mapping constraints:

| S.Align	S.Match
Binarity Mininum	Binarity Mininum
EqualSisters	EqualSisters
StrongStart	StrongStart
NoShift	NoShift
Align-L/R	Match

CON – Two systems

- Markedness constraints are identical to those used in analysis of Irish weak pronoun postposing (Bennett et al. 2016)
- Irish weak pronoun postposing is motivated primarily by StrongStart, within a Match system

- **Can Chamorro weak pronoun movement also be handled within a similar Match system to Irish?**
- **If not, can weak pronoun placement instead be handled within an Align system?**

Results

16 languages in the **Align** system typology, but **only one is compatible with Chamorro**

Language.5
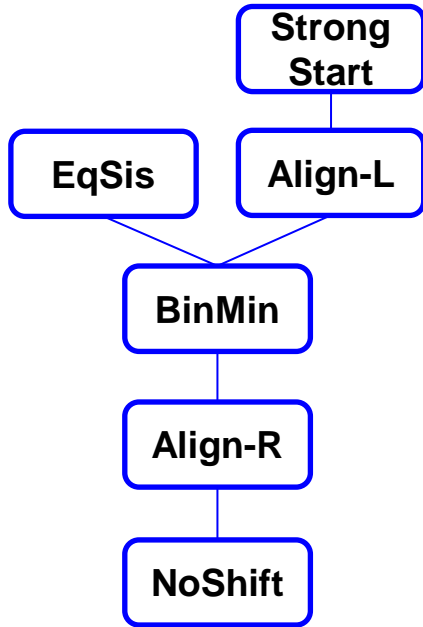
	Input	Winner	Loser	Eq Sis	SS	Al-L	Bin Min	Al-R	NS
1	[[a [b]] [wp]]	((a wp) (b))	(a (b wp))	W			L	W	L
2	[[a] [wp]]	(a wp)	(wp (a))		W	L	W	W	W
3	[[a [b]] [wp]]	((a wp) (b))	((a b) wp)			W	L		L
4	[[a] [wp]]	(a wp)	((a) wp)				W	L	
5	[[a [b]] [wp]]	((a wp) (b))	((a) (b wp))					W	L

Results – Match system

Results – Match system

Match system quickly proves inadequate for Chamorro weak pronoun placement

Results – Match system

Match system quickly proves inadequate for Chamorro weak pronoun placement

		EqSis	StrStrt	MatchXP	BinMin	NoShift
🙁	((a wp) (b))	*		**	*	*
	((a) (b wp))	*		***W	*	L
💥	((a b) wp)	*		**	L	L

Results – Align system

Results – Align system

Align-R >> NoShift – moving the weak pronoun improves prosodic boundary alignment

		EqSis	StrStrt	Align-L	BinMin	**Align-R**	**NoShift**
	((a wp) (b))	*		*	*		*
	((a) (b wp))	*		*	*	**W	L

Results – Align system

Align-L >> NoShift – better boundary alignment favored over keeping weak pronoun in-situ

		EqSis	StrStrt	**Align-L**	BinMin	Align-R	**NoShift**
☞	((a wp) (b))	*		*	*		*
	((a) (b wp))	*		**W	L		L
	((a (b)) wp)	**W		*	*		L

31

Results – Align system

StrongStart >> Align-L – prevents the weak pronoun from being a proclitic

		EqSis	**StrStrt**	**Align-L**	BinMin	Align-R	NoShift
	TP XP DP a clitic						
☞	(a wp)	*		*		*	
	(wp (a))	*	*W	L	*W	**W	*W

Results – Align system

EqSis >> BinMin – moving the WP to second position preferred over preserving binarity

		EqSis	StrStrt	Align-L	**BinMin**	Align-R	NoShift
	TP / XP DP / a XP clitic / b						
☞	((a wp) (b))	*		*	*		*
	(a (b wp))	**W		*	L	**W	L

Discussion

The Align system reveals Align constraints and prosodic well-formedness can motivate weak pronoun movement

Align and prosodic well-formedness motivate improvement of prosodic boundaries

Weak pronouns are phonologically weak, but also instantiate their own syntactic constituent

The syntactic boundaries of the weak pronoun DP also help drive the alignment of prosodic boundaries for the weak pronoun itself

Conclusion

- Prosodic movement of weak pronouns in Chamorro is motivated through the interaction of Align and prosodic well-formedness constraints

- This prosodic movement is ill-captured in a Match theoretic system

- SPOT makes the analysis of clitic movement in a prosodic system manageable and easy, allowing quick and systematic production of inputs/outputs and evaluation of outputs

Thank you!

This research was supported by the National Science Foundation, Award #1749368

Thanks to the entire SPOT team

Discussion

The Match system fails to motivate leftward prosodic movement of weak pronouns

Can the Match system be saved or augmented?

Discussion – Match augmentation?

Match + "Strong End"

- "Strong End" effect: pressure for the ends of phrases to end in a strong element
- If weak pronouns move away from being phrase final, one might suspect this effect

"StrongEnd" constraint: Align(phi,R,w,R) (Selkirk 1996; Ito & Mester 2019)

Could a StrongEnd constraint motivate leftward movement in the Match system?

Discussion – Match augmentation?

Match + "Strong End"

- "Strong End" effect: pressure for the ends of phrases to end in a strong element
- If weak pronouns move away from being phrase final, one might suspect this effect

"StrongEnd" constraint: Align(phi,R,w,R) (Selkirk 1996; Ito & Mester 2019)

Could a StrongEnd constraint motivate leftward movement in the Match system?

Not really…

Discussion – Match augmentation?

Match + "Strong End"

		EqSis	**StrEnd**	MatchXP	BinMin	NoShift
🙁	((a wp) (b))	*	*	**	*	*
💥	((a b) wp))	*	*	**	L	L

The diagram in the second column shows a tree:
TP branching to XP and DP; XP branches to a and XP (with b below); DP dominates clitic.

Using StrongEnd does not resolve the harmonic bounding

Discussion – Match augmentation?

Match + "Strong End"

- One could specify the StrongEnd constraint to the maximal phi
- However, this is suspicious, as it would be the only reference to maximal phis required by the grammar
- Even with this specification, problems still exist:

    - Weak pronouns often found clause finally!

Maś ya-hu   **hao** na taotao.
most wh[obj].like-agr you L   person
`You're the person I like most.'

[Maś ya-hu   na taotao] **hao**.
most wh[obj].like-agr L   person you
`You're the person I like most.'

Results – Align system

BinMin >> Align-R – causes unary phi phrases to collapse

		EqSis	StrStrt	Align-L	**BinMin**	**Align-R**	NoShift
	TP ⟨XP DP / a clitic⟩						
☞	(a wp)	*		*		*	
	((a) wp)	*		*	*W	L	

42