Deriving Mayan V1: A look at sentential prosody in Chol

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Introduction

Goals

In this talk we. . .

I. Discuss the prosodic predictions of two different accounts for deriving verb initial (V1) word order:

1. Parameterized specifiers: subjects base-generated to the right (e.g. Aissen 1992; England 1991)
2. Raising: V- or VP-movement to the left of the subject (e.g. Coon 2010; Clemens 2014)

II. Present findings from a study of sentence-level prosody in Chol which provide evidence in favor of a raising analysis

Background

Mayan word order

Basic word order across the Mayan language family is verb initial (**V1**) —see England 1991

- Some languages are rigidly **VSO** (e.g. Q'anjob'al)
- Some are fairly rigidly **VOS** (e.g. Tsotsil)
- Others alternate between **VOS and VSO** (e.g. Chol)

Sentences with two post-verbal arguments are rare in corpora

VOS/VSO alternations in Chol (Coon 2010)

- The grammatical structure associated with the object contributes to determining whether a clause will be VSO or VOS:
  - VOS order is found with NP (determinerless) objects
  - Full DP objects are impossible in VOS constructions

(1) a. Tyi ik'uxu [$_{\text{OBJ}}$ **waj**] [$_{\text{SUBJ}}$ jiñi x'ixik].
ASP eat tortilla DET woman
'The woman ate tortillas.'

b. * Tyi ik'uxu [$_{\text{OBJ}}$ **jiñi waj**] [$_{\text{SUBJ}}$ jiñi x'ixik].
ASP eat DET tortilla DET woman
Intended: 'The woman ate the tortillas.'

VOS/VSO alternations in Chol (Coon 2010)

- The grammatical structure associated with the object contributes to determining whether a clause will be VSO or VOS:
  - Because DP objects are impossible in VOS constructions
  - If the object is a DP, VSO order is obligatory

(2) a. Tyi ik'uxu [SUBJ jiñi x'ixik] [OBJ **jiñi waj**].
ASP eat DET woman DEM tortilla
'The woman ate this tortilla.'

b. * Tyi ik'uxu [OBJ **jiñi waj**] [SUBJ jiñi x'ixik].
ASP eat DET tortilla DET woman
Intended: 'The woman ate the tortillas.'

VOS/VSO alternations in Chol (Coon 2010)

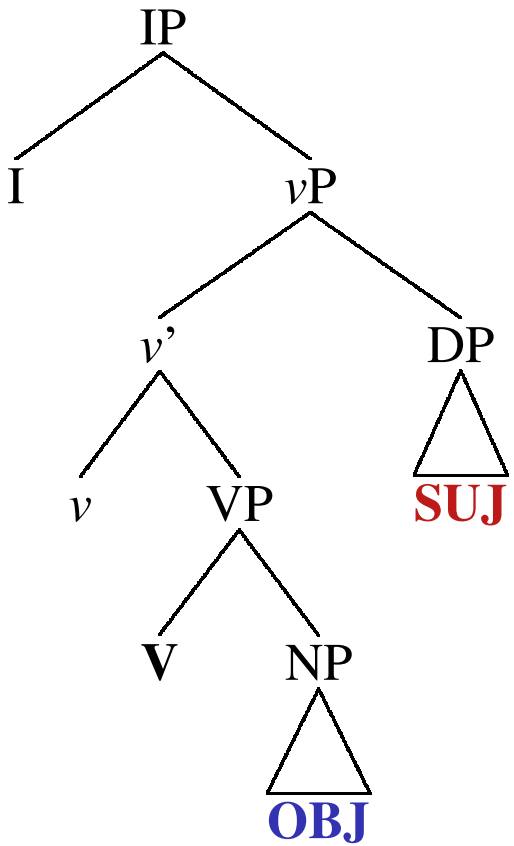
- Bare objects are phrasal (NP not N^0)
  - Although VOS objects may not appear with determiners, demonstratives, or proper names...
  - modifiers *are* possible

(3) Tyi itsäñsä [$_{OBJ}$ **kolem chityam**] [$_{SUBJ}$ jiñi wiñik].
ASP kill big pig DET man
'The man killed a big pig.'

Syntactic analyses

Right-branching specifier — VOS (Aissen 1992)

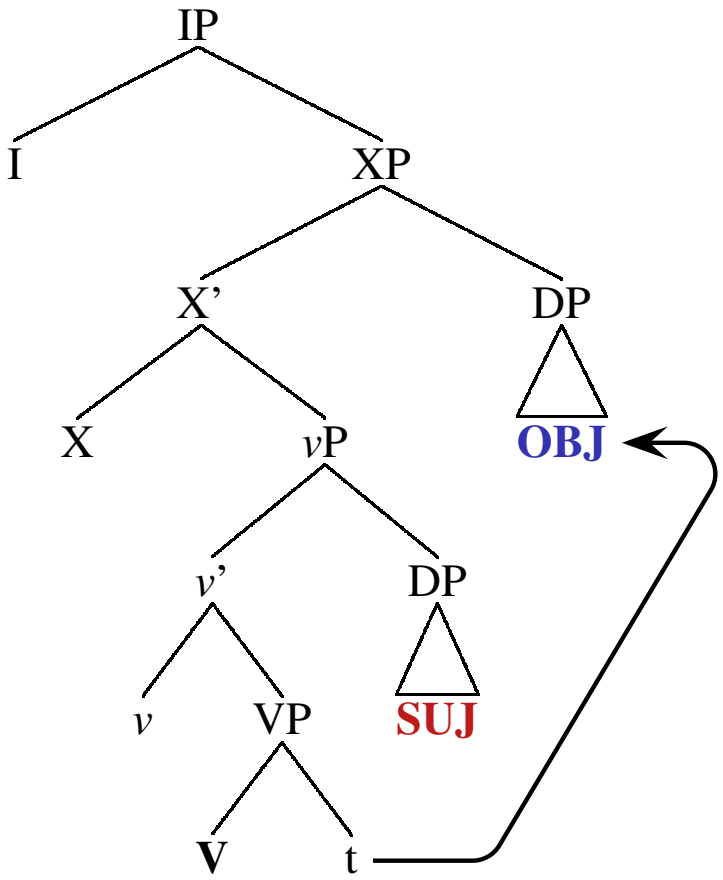
(4)



- Specifiers associated with verbal categories are oriented to the right
- Thus, the subject is generated in a right-branching specifier
- As is, this structure yields a VOS clause

Right-branching specifier — VSO (England 1991)

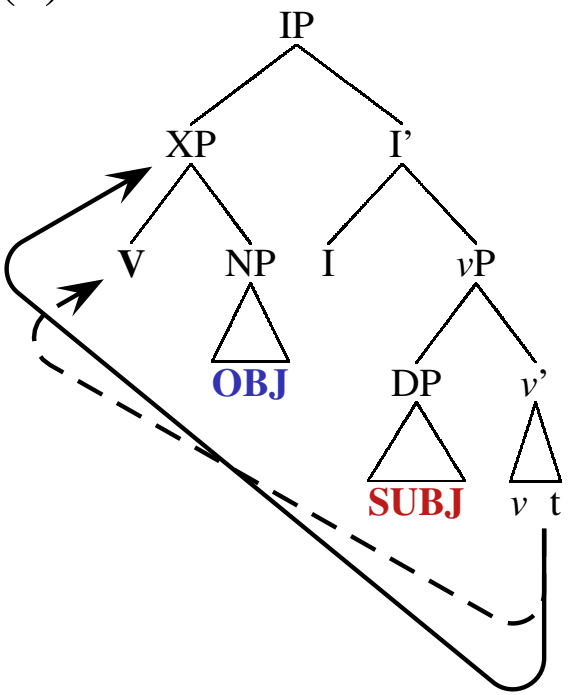
(5)



- The subject is generated in a right-branching specifier
- DP objects are displaced to the right of the subject
- This yields a VSO clause

Raising — VOS (Coon 2010, Clemens 2014)

(6)

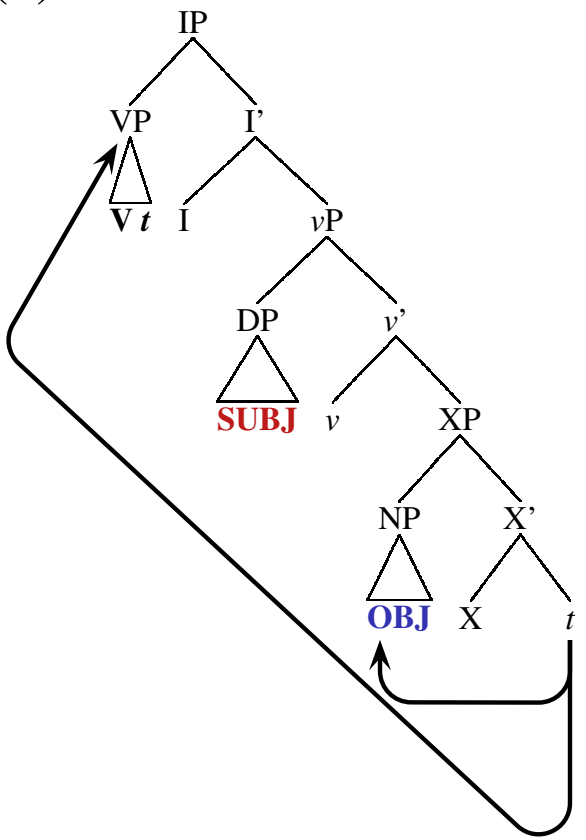


Two possibilities:

1. VP-raising: The phrase containing the verb and the object move above (and to the left of) the subject (Coon 2010)
2. V-raising: The verb moves in the syntax, and the object moves into its verb-adjacent position at PF (Clemens 2014)

Raising — VSO (Coon 2010)

(7)

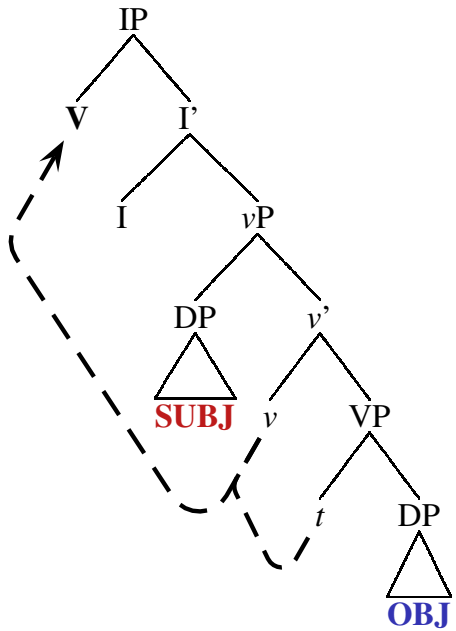


Coon 2010:

- Remnant-raising:
  - DP objects move out of the VP
  - The VP raises after the object moves
  - The result is a VSO clause

Raising — VSO (Clemens 2014)

(8)



Clemens 2014:

- V-raising:
  - The verb undergoes head movement
  - The object stays in situ
  - This yields a VSO clause

Interim Discussion

Four present purposes...

1. The similarities between the raising analyses are more important than the differences:
   - In VOS clauses, the verb and the object are a displaced-constituent
   - In VSO clauses, both the subject and the object remain *v*P-internal
2. In contrast, for right-branching specifier analyses (1992)...
   - In VOS clauses, the verb and the object form an in situ-constituent
   - In VSO clauses, the object is displaced, and the verb and subject stay low

➽ These differences will ultimately allow us to distinguish between right-branching and raising analyses with prosodic information

Syntax–prosody mapping

Match Theory

Match Theory (Selkirk 2011)

MATCH constraints

Match Theory consists of a series of **OT correspondence constraints** (McCarthy and Prince 1995)

- Each level of the syntactic hierarchy corresponds to a designated level of prosodic structure
- Assumes a direct mapping between syntactic and prosodic structure
- Mismatches between syntactic and prosodic structure can be accounted for by ranking other constraints higher than MATCH constraints

Match Theory (Selkirk 2011)

The input (syntactic structure) corresponds to the output (prosodic structure)

Syntactic head (X^0)	$\rightarrow$	Prosodic word (ω)
Syntactic phrase (XP)	$\rightarrow$	Prosodic phrase (φ)
Illocutionary phrase (CP/IP)	$\rightarrow$	Intonational phrase (ι)

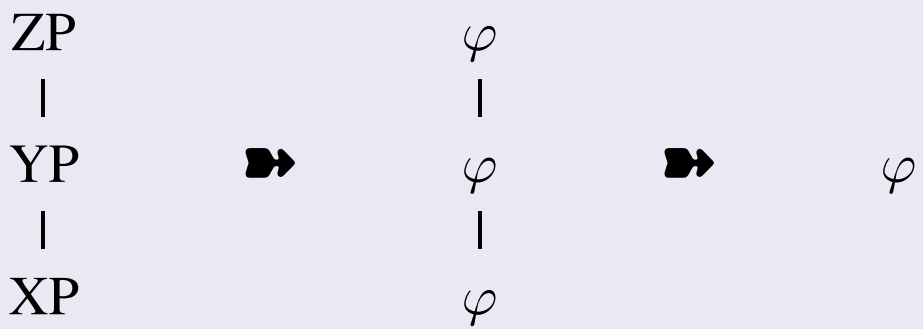
The output corresponds to the input

Prosodic word (ω)	$\rightarrow$	Syntactic head (X^0)
Prosodic phrase (φ)	$\rightarrow$	Syntactic phrase (XP)
Intonational phrase (ι)	$\rightarrow$	Illocutionary phrase (CP/IP)

Additional assumptions (see Elfner 2012)

1. No redundant recursive structure

Prosodic categories which do not correspond to phonological content are not shown:



Additional assumptions (see Elfner 2012)

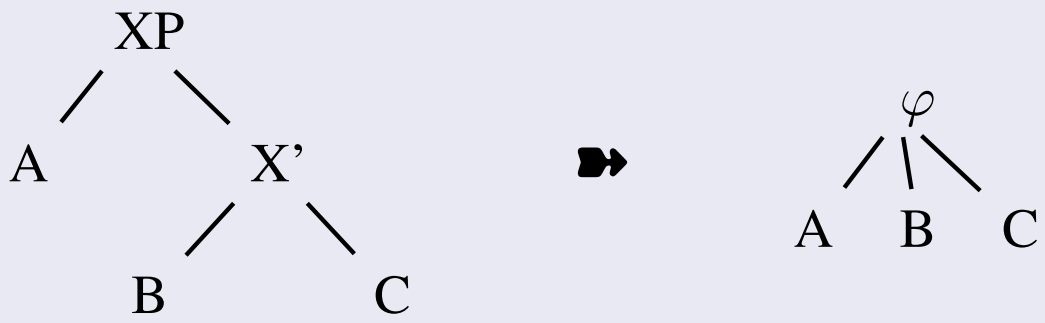
2. No empty categories

Terminal nodes without phonologically overt material are not assigned prosodic structure:

Additional assumptions (see Elfner 2012)

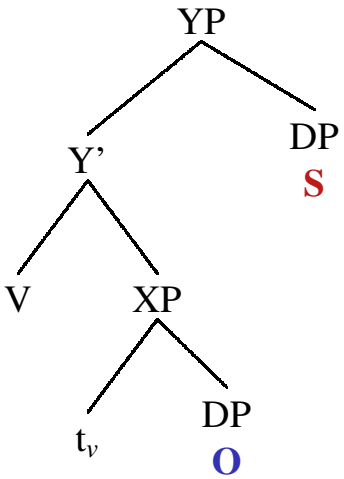
3. What about the bar-level?

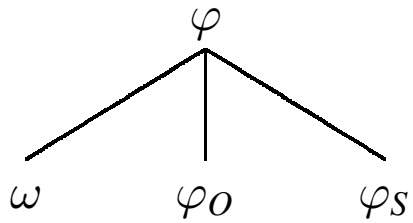
Match Theory is underspecified for bar-level syntax; we will start with a tertiary mapping

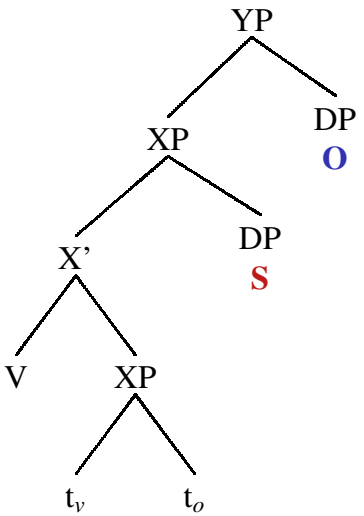


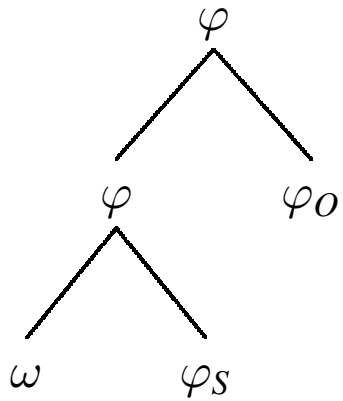
Predictions

Right-branching specifiers: Syntax-prosody mapping

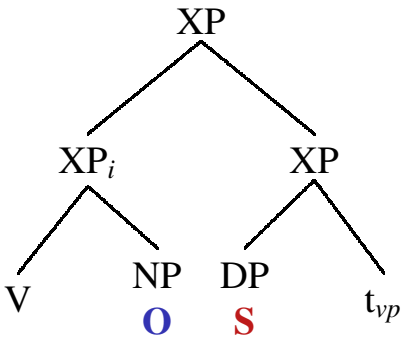


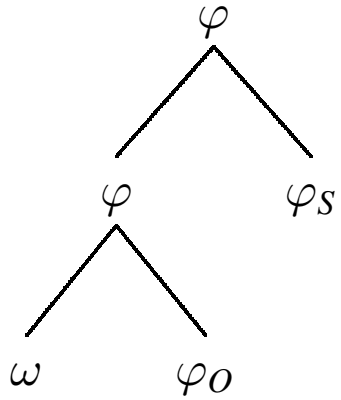


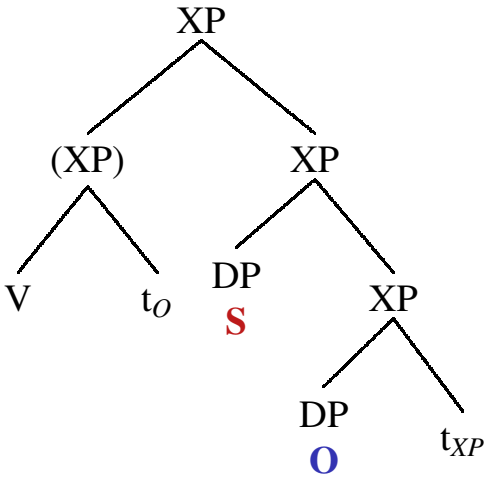


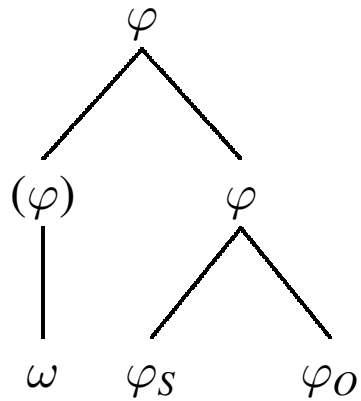


Raising: Syntax-prosody mapping









Summary

Summary of syntax–prosody mapping

Evidence for right-branching:

Relatively large boundary between the subject and the object in VSO:

(V S) (O)

Evidence for Raising:

Large prosodic boundary between the subject and the object in VOS:

(V O) (S)

Warning! In principle we could find (V S) (O) *and* (V O) (S)!
(See Ladd 1988 for an early discussion of relative boundary strength and see Wagner & Watson 2010 for a recent review)

The Experiment

Design

Methodology

Participants

- Data from this study come from **four native-speakers of Chol**:
  - 3 women and 1 man
  - all between 20–40 years old
  - all speakers from the Tilá dialect

Task

- Each speaker was asked to read each of 57 sentences (44 experimental)
- They were instructed to read the sentences naturally
- They were asked to read each sentence 2 times, or until they got a "natural-sounding" version (as determined by the participant)

The Frequency of VOS/VSO

Factors that contribute to the relative scarcity of clauses with two post-verbal arguments include...

1. Core arguments may be **dropped**

(9) a. Tyi **y**-ilä-**Ø**.
ASP 3ERG-see-3ABS
'She saw it.'

b. Tyi **k**-mek'e-**yety**.
ASP 1ERG-hug-2ABS
'I hugged you.'

The Frequency of VOS/VSO

Factors that contribute to the relative scarcity of clauses with two post-verbal arguments include...

2. Two overt arguments are rare

- Vázquez Álvarez and Zavala 2013 found that in a corpus of 2496 naturally-produced Chol utterances, 41 of the 657 transitive sentences had two overt arguments (= **6%**)
- Clauses with two overt *p*ost-verbal arguments must be even less frequently occurring.

The Frequency of VOS/VSO

Factors that contribute to the relative scarcity of clauses with two post-verbal arguments include...

3. There are **preverbal** topic and focus positions

(10) a. [$_{\text{TOP}}$ **Jiñi x'ixik**] tyi ik'uxu **ja'as**.
DET woman ASP eat banana
'The woman ate bananas.'

b. [$_{\text{TOP}}$ **Jiñi x'ixik**] [$_{\text{FOC}}$ **ja'as**] tyi ik'uxu.
DET woman banana ASP eat
'The woman ate *bananas*.'

The Frequency of VOS/VSO

Nonetheless. . .

- Chol speakers accept and produce VOS and VSO sentences
- For our purposes, VOS and VSO sentences are the most informative
- All of our stimuli were normed by a native speaker

Sentences with significant disfluencies, or background noise, were thrown out.

Experimental materials

Sentences

There were two variables:

1. Word order (VOS/VSO)
   - VOS = NP object
   - VSO = DP object
2. Presence/absence of modifiers 4 conditions x 11 items = 44 target sentences

	UNMODIFIED	MODIFIED
VOS	V [$_{NP}$ **O**] [$_{DP}$ **S**] [Adv]	V [$_{NP}$ mod. **O**] [$_{DP}$ mod. **S**] [Adv]
VSO	V [$_{DP}$ **S**] [$_{DP}$ **O**] [Adv]	V [$_{DP}$ mod. **S**] [$_{DP}$ mod. **O**] [Adv]

Experimental materials

- Target sentences are “sonorant-rich”
  (Mayan phoneme inventories do not lend themselves easily to this task)
- They include adverbial material in final position
- Head nouns and modifiers are bi- and trisyllabic
- Because of these constraints, some of the sentences are amusing…

(11) Tyi ibä’ñä chämeñ lukum jiñi jujp’embä ñeñe’ tyi abälel.
ASP fear dead snake DET fat baby PREP night
‘The fat baby feared the dead snake at night.’

(12) Tyi ich’ili k’umbä bu’ul jiñi p’ump’uñ uma’ tyi k’iñijel.
ASP fry soft beans DET poor mute PREP party
‘The poor mute fried soft beans at the party.’

Testing predictions

Recall. . .

- Evidence supporting right-branching
  Large prosodic boundary between the subject and the object in VSO:

  (V S) (O)

- Evidence supporting raising
  Large prosodic boundary between the object and the subject VOS:

  (V O) (S)

Acoustic cues

Cross-linguistic cues to the presence of a prosodic boundary

- Phrase-final lengthening
- The distribution of pauses

In other Mayan languages (see Bennett 2014)...

- Phrase-final H% tones
- Final devoicing
- Final aspiration

Results

Duration

Duration of the immediately post-verbal argument:

- Raising:
  - The object in VOS should be longer than the subject in VSO
  - A large boundary between the object and the subject in VOS
- Right-branching:
  - The subject in VSO should be longer than the object in VOS
  - A large boundary between the subject and the object in VSO

Duration of the verb:

- Raising analyses predict a large boundary between the verb and the subject in VSO
- So, the verb should be longer in VSO than in VOS

Duration

Duration of the immediately post-verbal argument:

	UNMODIFIED	MODIFIED
VOS	**52 ms**	49 ms
VSO	**48 ms**	48 ms

Duration of the verb:

	UNMODIFIED	MODIFIED
VOS	69 ms	68 ms
VSO	70 ms	68 ms

The NP object in unmodified VOS clauses is significantly longer than the DP subject in VSO clauses. **This is consistent with the raising analyses.**

Intonation

The shape of phonological phrases. . .

- Chol sentences contain a series of HL*H% tunes
  - It looks like HL* marks the left edge of a prosodic constituent
  - And H% indicates the right edge of a prosodic constituent
  - The fall associated with the left edge appears to be more abrupt than the rise(or fall) associated with the right edge, which is more gradual.
- L% boundary tones appear utterance-finally, or preceding a pause

Prosodic boundaries

Between arguments

- Boundary tone between the object and the subject in VOS
- Boundary tone between the subject and the object in VSO
  - This is consistent with both accounts
  - Good to see predictions borne out

After the verb

- Boundary tone associated with VSO verbs, but not VOS verbs
  - This is consistent with the raising account
  - However, the explanation could be syntactic *or* eurythmic (e.g., STRONG START (Werle 2009, Selkirk 2011)

Prosodic boundaries

VOS phrasing

HL*		H%	HL*		H%
verb	noun		DET	noun	

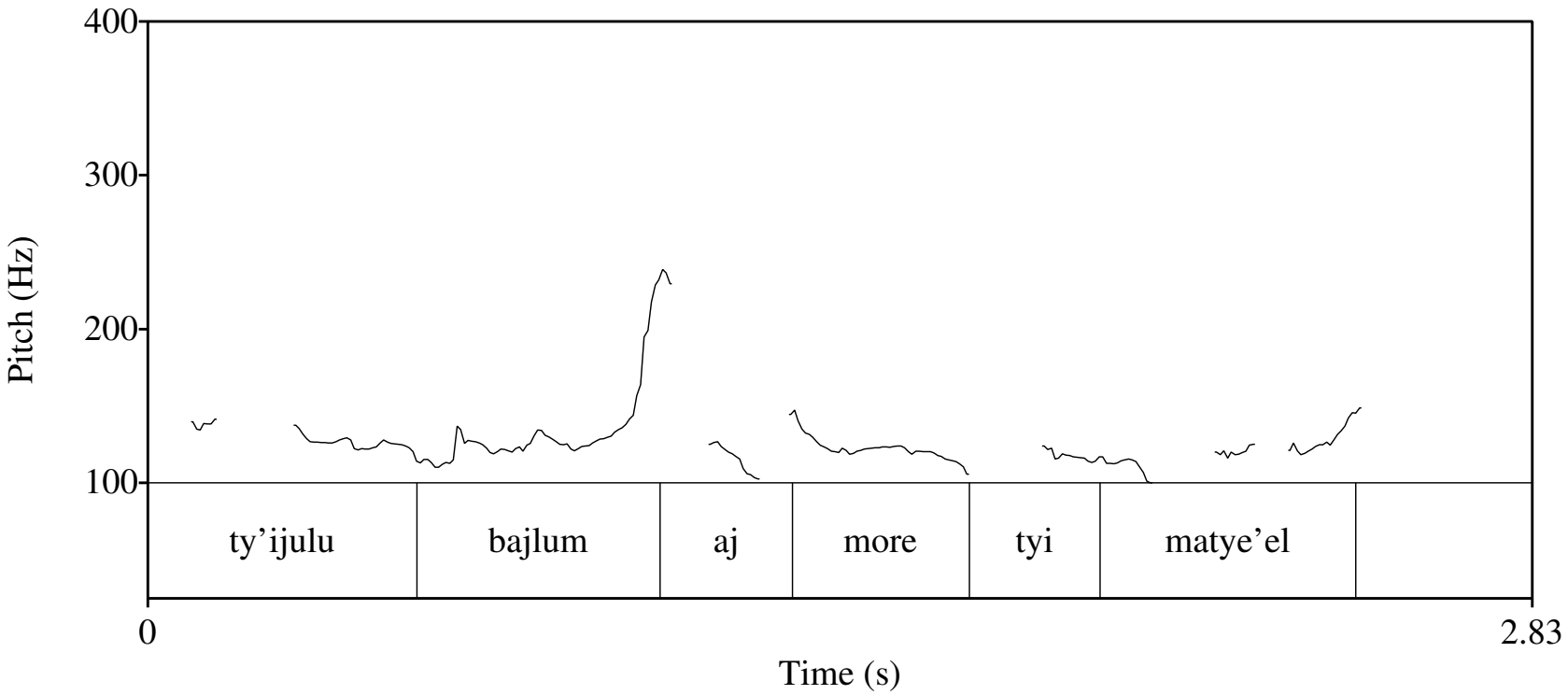
(V O) (S)

VSO phrasing

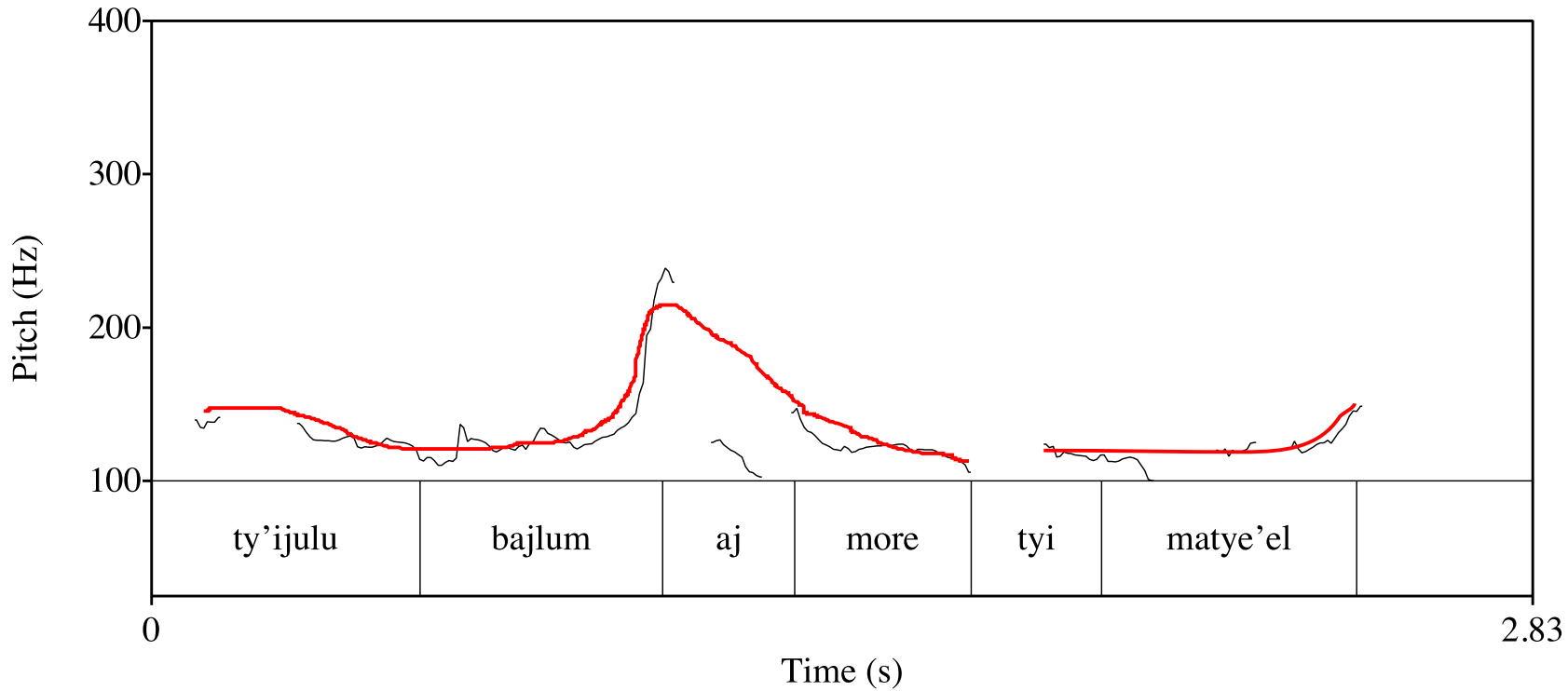
HL*H%	HL*		H%	HL*		H%
verb	DET	noun		DET	noun	

(V) (S) (O)

VOS


400
300
200
100
Pitch (Hz)
ty'ijulu
bajlum
aj
more
tyi
matye'el
0
2.83
Time (s)

VOS


400
300
200
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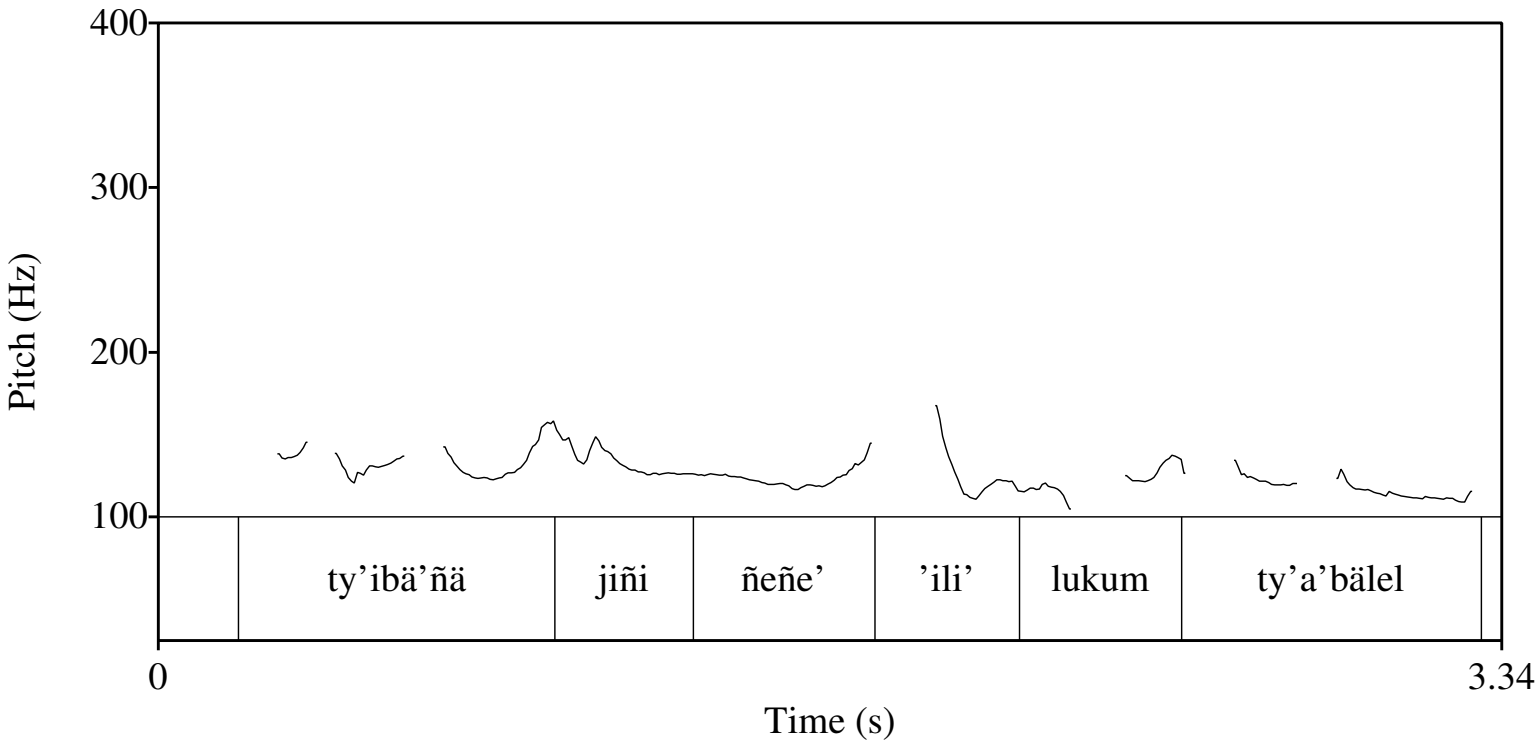
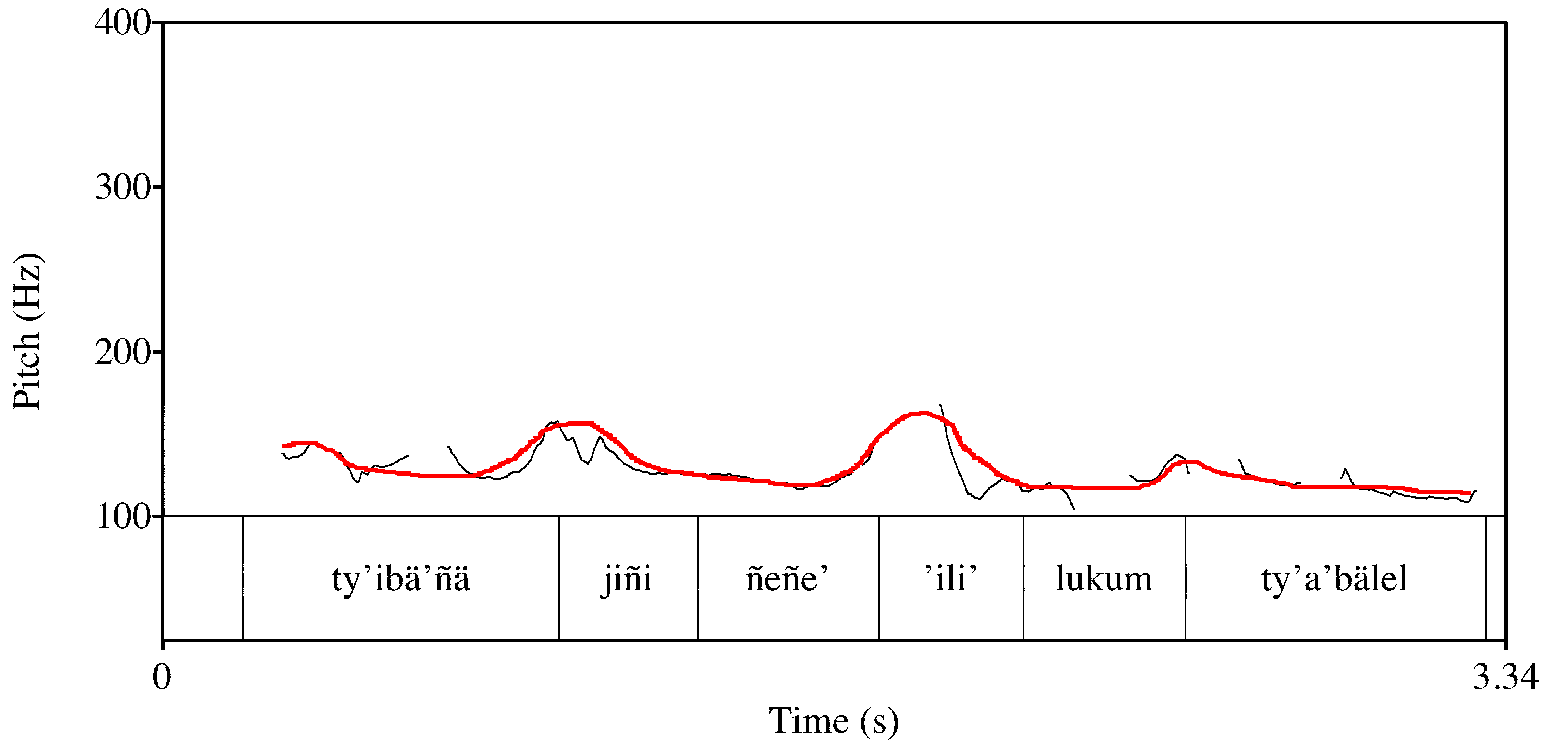
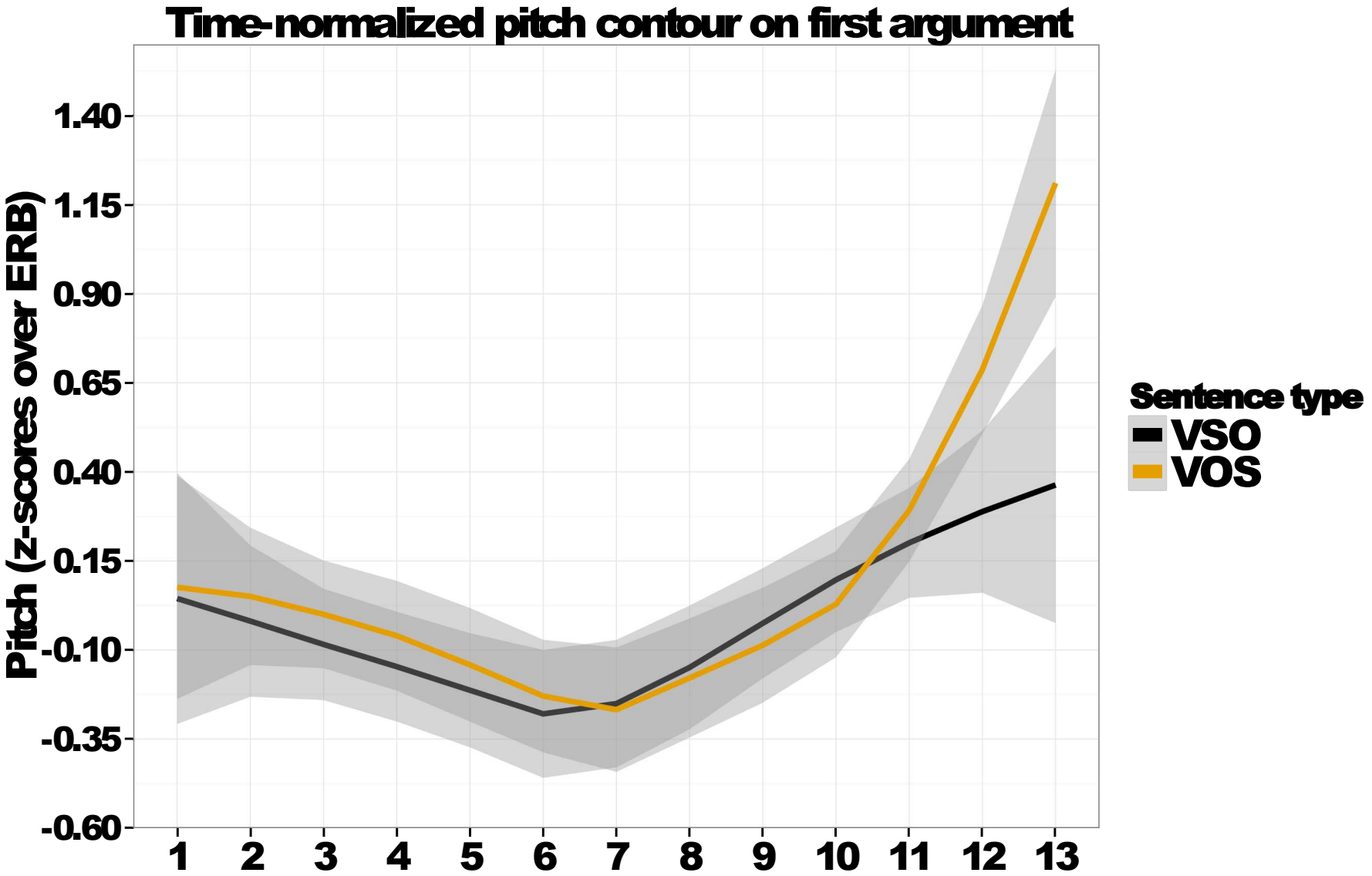
Pitch (Hz)
ty'ijulu
bajlum
aj
more
tyi
matye'el
0
2.83
Time (s)

VSO


400
300
200
100
Pitch (Hz)
ty'ibä'ñä
jiñi
ñeñe'
'ili'
lukum
ty'a'bälel
0
3.34
Time (s)

VSO


400
300
200
100
Pitch (Hz)
ty'ibä'ñä
jiñi
ñeñe'
'ili'
lukum
ty'a'bälel
0
3.34
Time (s)


Time-normalized pitch contour on first argument
Pitch (z-scores over ERB)
1.40
1.15
0.90
0.65
0.40
0.15
-0.10
-0.35
-0.60
1
2
3
4
5
6
7
8
9
10
11
12
13
Sentence type
VSO
VOS

Boundary strength

Between arguments

- The boundary tone that delimits the VOS object and subject is greater than the boundary tone between the VSO subject and object

This is consistent with the raising account.

Discussion

Summary

- We reviewed two types of syntactic approaches to Mayan V1 – right-branching specifiers and raising
- We worked out the prosodic predictions that these two approaches make in the context of Match Theory
- We introduced a prosodic study with the following results:
  - Chol sentences contain a series of HL*H% tunes
  - A H% delimits the edge of the VSO verb, but not the VOS verb
  - The H% between the object and subject in VOS clauses is higher than the H% between the subject and object in VSO clauses
  - The immediate post-verbal argument is longer in VOS clauses than in VSO clauses

Conlusions

- The data from duration suggest that the prosodic boundary between the object and subject in VOS clauses is stronger than the boundary between the subject and object in VSO clauses
- The intonational data converge with the durational data, but we we need to record more speakers to strengthen the intonational argument

- **The prosodic data fits the raising analyses better than the right-branching specifier analyses — investigating prosodic structure can be used as a diagnostic for syntactic structure.**

- **Chol:** Juan Vázquez Álvarez, Matilde Vázquez Vázquez, Virginia Martínez Vázquez, Morelia Vázquez Martínez, María de Jesús Vázquez Martínez
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