## The Prosody of the Extended VP

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Two major questions in work on the extended vp:
( $\approx$ voicep/vp phase)

1. What is the hierarchical organization of constituents in the postverbal space?
2. What are the mechanisms that position the verb and its arguments there?

Three longstanding desiderata:

- Constituency tests that provide evidence for functional projections (Larson 1988)
(1) a. They sent [applp books to Mary ].
b. *It was [applP books to Mary ] that they sent.
- Diagnostics to resolve constituency paradoxes, where tests conflict (Pesetsky 1995)
(2) a. John said he gave candy [ ${ }_{\mathrm{FP}}$ to none of the kids [GP in any library ] ].
b. But [ ${ }_{\mathrm{FP}}$ give candy to the kids ] he surely $\operatorname{did} t_{\mathrm{FP}}$ [ ${ }_{\mathrm{GP}}$ in this library here ].
- Tests for the derivation of certain orders (Otsuka 2006, Polinsky \& Potsdam 2021)



The first goal of this talk: address questions 1-2 in Mandar (Austronesian; Indonesia).

- Identify the fine internal constituency of clauses with the order vso.
- Pin down the constituency and the derivational pathway to the order vos.

The second goal: lay the foundations to investigate vp-level syntax through prosody.

- Surface strings are parsed into hierarchical constituent structures in the phonology, which provides domains for phrasal phonology (Selkirk 1986; Nespor \& Vogel 1986)
- When planning factors do not interfere: this structure roughly mirrors the syntax: under the right conditions, every $\mathbf{x P} \rightarrow$ phonological phrase (Selkirk 2009)
- Today's methodology: to leverage introspective judgments on Mandar phonology to document patterns of prosodic constituency, then work backward to the syntax


## Roadmap:

1. Background/prosodic constituency tests
2. Vso: the prosody of the functional spine
3. Vos: the prosody of scrambling and adjunction

## 1 Language Background

Mandar is a language of the South Sulawesi Subfamily
(Pelenkahu et al. 1983)

- Predicate-initial word order in all clause types (finite/nonfinite, matrix/embedded)
- Stable preverbal word order: COMPLEMENTIZER > NEGATION > AUXILIARIES > v

The shape of a Mandar clause:

| (4) | neg | AUX | v | ADJUNCT | SUbJECT | C | PRED | SUBJECT |
| :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- |
| Ndammi | rua | pole | dini | iKaco' | tappana | karambo | boyanna. |  |
|  | not.3ABS | have come | here | name | since.3GEN far | house.3GEN |  |  |

'Kacho' hasn't come here since his house became far away.' Sikki et al. 1987

Mandar clauses always allow the order VSO(X). ( $\mathrm{s}=\mathrm{SUBJ}, \mathrm{O}=\mathrm{OBJ}, \mathrm{x}=$ ADJUNCT $)$

- This is possible when the v is transitive (erg agreement; definite o; Patient Voice)
(5) Na-baca i
3erg-read 3abs
[s iMaria ]
[o itim buku
[ x dionging $]$. that book yesterday
'Maria read that book yesterday.' (vsox; transitive)
$\operatorname{VsO}(\mathbf{x})$ order remains possible when verbal voice and o-definiteness change.
- Vso(x) can occur in other "Austronesian voices," like the antipassive. (Agent Voice)
- Antipassive verbs: prefix may-; indefinite o
(6) Mam-baca i antip-read 3abs
$\left[\begin{array}{ll}\text { i } & \text { iMaria }]\end{array}\right.$
[o $\left.\begin{array}{ll}\text { buku } \\ & \text { book }\end{array}\right]$ [ $\left.\begin{array}{ll}\mathrm{x} & \text { dio }\end{array}\right]$. 'Maria is reading a book there.' (vsox; AnTIPASSIVE)


## Puzzle: free and pragmatically unmarked alternations between VSO and vOS.

- All transitive and antipassive clauses allow alternations between these two orders.
- N.b. Vos $\neq$ right topicalization or HNPS (no comma intonation / weight constraints)
a. Na-baca i
3ERG-read 3ABS
'Maria read that book.'
[o itim buku ] [s iMaria ].
that book NAME
b. Mam-baca i
antip-read 3abs
'Maria is reading a book.'
$\left[\begin{array}{ll}\text { o } & \text { buku } \\ & \text { book }\end{array}\right]$
$\left[\begin{array}{ll}\text { o } & \text { buku } \\ & \text { book }\end{array}\right.$
[s iMaria ]. nAME
(vos; TRANSITIVE)


## 2 The Prosodic Targets

Vision: leverage the prosodic organization of these strings to probe the syntax of vso/vos.

- TARGET: the optimal prosody of prosodically-integrated clauses (intonational phrases)
- Method: solicit introspective judgments on restrictions under broad-focus prosody
- The following generalizations: established over three years with Jupri Talib

The relevant constituents will be built on two lower levels of prosodic structure:

- Prosodic words ( $\omega \mathrm{s}$ ):
- Lexical heads in Mandar $\left(\mathrm{v}^{0}, \mathrm{~N}^{0}, \mathrm{ADJ}^{0}, \mathrm{ADV}^{0}\right)$ will always form their own $\omega \mathrm{s}$
- Diagnostic for the $\omega$ : penultimate stress (low tone, phonological lengthening)
- Phonological phrases ( $\phi s$ ):
- The verb will always form a $\phi$; each argument will also form its own $\phi$
- Diagnostic for the $\phi$ : final high tone (н), plus restrictions on the final foot
(8) máne málli ${ }^{\mathrm{H}}$ i pustakáwam makáppa? ${ }^{\mathrm{H}}$ búya malólo ${ }^{\mathrm{H}}$ mane m-alli i pustakaway makappa? buya malolo just antip-buy 3ABS librarian handsome flower beautiful 'The handsome librarian just bought beautiful flowers.' (vso; ANTIP.)

Constituency Tests: restrictions on four processes diagnose a larger constituent:

| Process | Target |  | Result | Context | Except at |
| :---: | :---: | :---: | :---: | :---: | :---: |
| Coalescence | ai ae, ao au | $\rightarrow$ | $e, o$ |  | Right Edge of $\phi_{[\text {max }]}$ |
| Gliding | $i, u$ | $\rightarrow$ | $j, w$ | V | Right Edge of $\phi_{[\text {max }]}$ |
| Glottal Coda Deletion | P, $\eta$ | $\rightarrow$ | $\varnothing, \varnothing^{N}$ | V__.V | Right Edge of $\phi_{[\text {max }]}$ |
| Voiced Stor Lenition | $b, d, \widehat{d J}, g$ | $\rightarrow$ | $w, I, j, X$ | V__V | Left Edge of $\phi_{\text {[max] }}$ |

Asymmetry: these processes apply between $\mathrm{v}+\mathrm{s}$, but not between $\mathrm{s}+\mathrm{x}$.
a. $\begin{array}{ll}\text { napápja }{ }^{\text {H }} & \text { i } \\ \text { na-papia } & \text { i } \\ \text { 3ERG-make } & \text { 3ABS }\end{array}$ 年
imaría $^{\mathrm{H}}$
imaria
NAME
di lamasaría $\eta^{H}$
di lamasariay
in place
'Maria made it in Lamasariang.'

'That person went looking for it that day.'

## 3 The Rough Constituency of VSO

Strategy: use restrictions on these processes to detect the edges of the maximal $\phi$

- Definition: $\phi_{[\mathrm{max}]}=\phi$ that is not dominated by other $\phi \mathrm{s} \quad$ (Itô \& Mester 2013)


## (11) The Prosody of VSX



These diagnostics show that the VSO string $\rightarrow \phi_{\text {max }} \cdot$

- Transitive verb $\rightarrow$ vso $=\left\{_{\phi[\max ]} \mathrm{V}\right.$ s o $\}$
 'Ripa'i is looking for this book here.'
- Antipassive verb $\rightarrow$ vso $=\left\{_{\phi[\max ]}\right.$ V s o $\}$ (caveat: Page 7)


Claim: the vso string always forms a constituent in the syntax.

Syntactic Evidence: this exact pattern of constituency is also revealed by vp-ellipsis:

- When vp-ellipsis targets a $\mathrm{v}(=$ voicep), it must also suppress the following s and o .
(14) a. Usanga ndangi rua nawaluang iKaco' bulawang gamallo.
'I used to think that Kacho' had never sold false gold.'
b. Mane uissang [cp mua' [auxP rua i...
now I know that has 3abs
[voiceP na-waluang (*do asu) (*do roppong)] di ruambongi]].
3ERG-sold that dog that grass in the past
'Now I know that (*the jerk) has sold (*the junk) in the past.'


## 4 Interim Results

These results lay the groundwork for a finer investigation of the Mandar vp.

- The stable parse of vsox strings (+ facts of ellipsis) $\rightarrow$ vso strings are always xps.
- Proposal: vso order arises via $\mathrm{x}^{0}$-movement of $\mathrm{v}+$ non-movement of s and o .
(15) The Syntax of VSO


Interim Footwork: the v must be forced to form a $\phi$ by constraints in the phonology.

- Null hypothesis: the complex $x^{0}$ created by $x^{0}$-movement $\rightarrow \omega$
- Question: why should the verbal complex be mapped to a $\phi$ ?

Connection: "promotion effects" with external clitics:
(Selkirk 1996)
(16) Coordinator $\rightarrow \phi$ when initial in the $\iota$

'I saw the doctor' $\mathbf{n}$ '/?? ${ }^{\text {n }}$ ' the teacher earlier.'
b. $\left\{_{\iota}\left\{_{\phi}\left\{_{\phi}\right\} \quad\left\{_{\phi}\right\}\right\}\left\{\left\{_{\phi}\right\}\right\}\left\{{ }_{\phi}\left\{_{\phi}\left\{_{\phi} \quad\right\}\left\{_{\phi}\right\}\right\}\right\}\right.$ wita $^{\mathrm{H}} \mathrm{i}$ Ióttor ${ }^{\mathrm{H}}$ di yéna? ${ }^{\mathrm{H}}$, ánna ${ }^{\mathrm{H}}$ yúru ${ }^{\mathrm{H}}$ u-ita i dottor di gena? na guru 1ERG-see 3ABS doctor in earlier and teacher 'I saw the doctor earlier, an'/*n' the teacher.'

Mapping claim: the Mandar v raises as an $\mathrm{x}^{0}$ but maps to a $\phi$ due to a constraint ranking of Eurythmicity (initial $\mathrm{x}^{0}$ in the $\iota \rightarrow \phi$ ) over Faith ( $\mathrm{x}^{0} \mathrm{~s} \leftrightarrows \phi \mathrm{~s}$ ). (Kubozono 1989...)
(17) Deriving the Parse of $v^{0}$
a. StrongStart: Assign one violation (aov) for every intonational phrase ( $\iota$ ) in which the leftmost $\omega$ is not left- \& right-aligned with a $\phi$.
b. Dep- $\phi$ : aov for every output $\phi$ that does not correspond to an input xp.
c.

|  | Strong Start | Dep- $\phi$ |
| :---: | :---: | :---: |
| a. $\left\{_{\iota}\left\{_{\phi} \mathrm{V}\left\{_{\phi} \mathrm{S}\right\}\right\}\right\}$ | *! |  |
|  |  | * |

## 5 Testing for Finer Constituents

Question: what is the internal structure of the vso xp ?

- No syntactic evidence for constituency of internal XPs (e.g. vp in [voicep $\mathrm{V}\left[{ }_{v \mathrm{p}} \mathrm{SO}\right]$ ])
- Strategy: suss out prosodic evidence for these xps with disruptions to weight

The smallest $\phi$ that contains v can host other $\omega \mathrm{s}$ : $\omega$-sized affixes, specific $\mathrm{x}^{0}$-adjuncts.
Phrasing changes in specific ways when we add $\omega$ s to the $\phi_{\mathrm{v}}$ in Vsx clauses:

- $\phi_{\mathrm{v}}=$ TWO $\omega \mathrm{s} \quad+\phi_{\mathrm{s}}=$ ONE $\omega: \quad$ vs $\rightarrow \phi_{[\max ]}$
- $\phi_{\mathrm{v}}=$ Three $\omega \mathrm{s}+\phi_{\mathrm{s}}=$ ONE $\omega: \quad \mathrm{vs} \rightarrow \phi_{[\text {max-v }]} \phi_{[\text {max-s] }]}$

| a. $\left\{_{\phi}\left\{_{\phi}\right.\right.$ |  | $\left\{_{\phi}\right.$ | $\}\}\left\{{ }_{\phi}\right.$ | $\left\{_{\phi}\right.$ |
| :---: | :---: | :---: | :---: | :---: |
| máne natúme ${ }^{\mathrm{H}}$ | i | лo ripáPi ${ }^{\text {H }}$ | dio ${ }^{\text {H }}$ | $\mathbf{o b}^{\text {H }}$ |
| mane na-tumae | i | do ripa?i | dio | 0 |
| just 3erg-propose | 3ABS | that nAME | there | there |

'That Ripa'i just proposed to her there.'
 'That Ripa'i just tried to propose to her there.'

## Descriptive Generalizations:

- Ternarity: the $\phi_{\text {max }}$ can contain three $\omega$ s in Mandar, but it cannot contain four
- Exposure: when a $\phi$ cannot be parsed into its usual $\phi_{\text {max }}$, it becomes a $\phi_{\text {max }}$ itself
- Faith: when a $\phi_{\text {max }}$ is split up, the prosody stays as close to the syntax as it can.
(19) The Default Parse

(20) The Exposure Effect

(21) Impossible: Reparsing

(22)
$\left.\begin{array}{llllllll}\boldsymbol{X}\left\{_{\phi}\right. & & & \left\{_{\phi}\right. & \left\{_{\phi}\right. & \} & \left\{_{\phi}\right. & \}\end{array}\right\}\left\{_{\phi}\right\}$
'That Ripa'i just tried to propose to her there.'


## 6 The Prosody of the Extended VP

Match Theory: there should be a pressure for vp-internal functional xps to form $\phi$.

- There are many reasons why we might not see these $\phi$ s.
- The weight manipulations open up a new path to detect these $\phi$ s:

Split the v from the s d o to expose lower levels of prosodic constituency in the vp.

VSO clauses: try introducing another $\omega$ to the $\phi_{\mathrm{v}}$.

- Example: the antipassive prefix forms an independent $\omega$ before c-initial verbal roots.
- Vso clauses that contain $m a ́ \eta_{\omega}$, or any other $\omega$ in the $\phi_{\mathrm{v}}$ : $\mathrm{V} \rightarrow \phi_{[\max ]}$
 'The mouse is drinking palm wine over there.'

Observation: when the $v \rightarrow \phi_{[\max ]}$, we can see that the $s$ and $o \rightarrow \phi_{[\max ]}$ too.

- Hypothesis: weight effects do not drive the creation of non-xp $\phi s$ (but: Page 11)
- Result: There must be a constituent in the syntax that corresponds to the $\phi_{\text {so }}$.
(24)

The Exposure Effect
(25)

Plausible Target

$\mathrm{v}_{\omega} \quad \mathrm{s}_{\phi} \mathrm{o}_{\phi}$
(26) Syntax

TP

v s o

Deriving the Exposure Effect: Ternarity = the Emergence of the Unmarked (TETU)

- Матсн-xp: aov for every input xp that does not correspond to an output $\phi$
- Minimal Binarity: aov for every $\phi_{[m a x]}$ that contains $<2 \omega \mathrm{~s}$
- Maximal Binarity: aov for every $\phi_{[\max ]}$ that contains $>2 \omega \mathrm{~s}$

|  | МАтCh-xp | Min-Bin | Max-Bin |
| :---: | :---: | :---: | :---: |
| a. $\left\{_{\phi} \mathrm{mán}\right.$-v $\left\{_{\phi}\left\{_{\phi} \mathrm{s}\right\}\left\{_{\phi}\left\{_{\phi} \mathrm{O}\right\}\right.\right.$ |  |  | *! |
|  | * |  |  |
|  | **! |  | * |

## 7 The Prosody of VOS

Final Question: what's the syntax beneath the alternation vso-vos?

- Observation: there's a prosodic asymmetry between strings of these orders.
- Under all circumstances: the final $s$ in the vos string $\rightarrow \phi_{[\text {max }]}$

'The teacher is looking for the mouse.' (Vos; transitive)
Interim Result: the prosody disambiguates the interpretation of v-np-np strings
a. $\left\{_{\phi[\operatorname{Max}]}\right.$ V NP NP $\} \quad \rightarrow$ ONLY VSO
b. $\left\{_{\phi[\max ]} \mathrm{VNP}\right\}\left\{_{\phi[\max ]} \mathrm{NP}\right\} \rightarrow \operatorname{vos}$

Intuition: the final $\mathbf{s}=$ outside the constituent that corresponds to the vso $\phi_{[\max ]}$.
(30)

VOS: Prosody

(31) VOS: Syntax


Supporting Argument One: the final s must also follow right adjuncts to the vp:
a. Na-alli i [s iKaco' ] [o iLouis ] dio.

3ERG-buy 3ABS NAME NAME there
'Kacho' bought Louis (who is a cat) there.' (Before an x: v-NP-NP $\rightarrow$ vso)
b. Na-alli i [o iLouis ] dio [s iKaco' ].

3ERG-buy 3ABS NAME there NAME
'Kacho' bought Louis (who is a cat) there.' (vos: $\rightarrow$ s must follow all xs)
Supporting Argument Two: the final s can survive vp-ellipsis:
a. Usanga di ruambongi ndangi rua maccoro iKaco'.
'I used to think that Kacho' had never stolen anything.'
b. Mane u-issang [cp mua' [perfP rua i...
just now 1ERG-know that have 3ABS
[voiceP mac core _ ] diduambongi do asu ]] o. ANTIP-steal in the past that dog there
'Now I know that the jerk has stolen in the past.'

## 8 Scrambling and Adjunction

Question: how can the disjunctive parse (final $s \rightarrow \phi_{[\mathrm{Max}]}$ ) be derived in Match Theory? - nOTE: there can't be a rigid correspondence between specific xps and maximal $\phi$ s.

- even if the s is outside the voicep: there are still higher xps that should form $\phi$.
(34) VOS: S above Vp

(35) Prediction: XP $\rightarrow \phi$

(36) Target: Disjunction


Connection: scrambled arguments are parsed in the same way as phrasal adjuncts.

- Mandar: vp-level adjuncts always form $\phi_{[\max ]}$ es; ignoring eurhythmic constraints.
- Proposal: adjunction structures are distinguished at the syntax-prosody interface.
- Selkirk 2011: "the higher node produced as a consequence of an adjunction operation... is not visible to syntactic-prosodic correspondence constraints."
- But: vp-adjunction sites are dominated by other nodes that should form $\phi$ s.
(37) Parsing Adjuncts:
a. Repel: aov for every input adjunction structure $\left[\begin{array}{c}\mathrm{XP}\end{array}{ }_{\mathrm{XP}} \mathrm{XP}\right]$ YP ], YP an adjunct, for which the output correspondents of XP and YP are contained in a single $\phi$.
b.

|  | Repel | Match-xp |
| :---: | :---: | :---: |
|  | *! |  |
|  |  | *(*) |

Proposal: the same constraint forces scrambled arguments to form independent $\phi_{[\mathrm{MAX}]}$ es.

- There's a rightward scrambling operation that shifts xps out of the voicep
- Syntactic tests: this process can't involve leftward movement (cf. Mahajan 1997)
- Prosodic disjunction: this process must place its targets in adjunct positions
a. Syntax:


Implications: this result opens up a new line of evidence for two classical positions.

- Landing site: ( $\overline{\mathrm{A}})$-scrambling places targets in adjunct positions (Chomsky 1993)
- Motivation: scrambling cannot be driven by higher heads, (Chomsky et al. 2018) as EPP features are selectional $\rightarrow$ cannot place attracted XPS in adjunct positions


## 9 Conclusion

Foundational claims about Mandar in this talk:

1. Phonological restrictions mark the edges of a large prosodic constituent: the $\phi_{[\max ]}$
2. The introspectively optimal distribution of $\phi_{[\max ]}$ es $\rightarrow$ vso strings always form xps
3. Forcing the $v$ to form a $\phi_{[\max ]}$ reveals a $\phi$ that contains so $\rightarrow$ reveals a headless $v \mathrm{P}$
4. Vos order involves rightward ( $\overline{\mathrm{A}}$-)scrambling, with a stable prosodic effect: $\rightarrow \phi_{[\mathrm{MAX}]}$
5. Scrambled xps $\rightarrow \phi_{[\max ]}$ es because they're in adjunct positions; xp-adjuncts $\rightarrow \phi_{[\text {max }]}$ es

Within the syntax: these results...

- Provide novel evidence for the existence and constituency of headless vp-shells;
- Demonstrate that there must be movement to positions linearized to the right;
- Stake out a new test for the argument-adjunct distinction in derived positions;
- Lay the foundations for a new approach to research on the extended vp.

Within the prosody: these results...

- Provide further evidence that functional XPS can be mapped to prosodic constituents;
- Suggest a new perspective on prosodic responses to weight-based disruption;
- Refine the theory of the prosody of adjunction (Cinque 1993, Truckenbrodt 1999);
- Suggest that syntactic relationships like adjunction-such as selection and projectionmay also be preserved at the interface / phonologized in subtle but consistent ways.

The Road Ahead: the next step here will be to understand the prosody of selection.

- There's a common syntax-prosody mismatch in the vp that has the following shape:
- When the v is too light to form a $\phi_{[\text {[мах] }}$ on its own (when the $\phi_{\mathrm{v}}<2 \omega \mathrm{~s}$ ),
- ...and when the vp contains too many arguments to build a single $\phi_{[\max ]}$,
- ...the v is parsed into a $\phi$ with the linearly closest argument alone.
- Kalivoda 2018 notes this phrasing in 12 languages; it's present in English + Mandar.
a. English ditransitive Sx: $\quad\left[{ }_{v P} \mathrm{~V}\left[{ }_{f p 1} \mathrm{DP}_{\mathrm{DAT}}\left[\mathrm{vv} \mathrm{DP}_{\mathrm{AcC}}\right]\right]\right] \quad$ Larson 1988
b. English ditransitive Pr: $\left\{_{\phi} \mathrm{V} \mathrm{DP}_{\mathrm{DAT}}\right\}\left\{_{\phi} \mathrm{DP}_{\mathrm{AcC}}\right\}$ Hayes 1989; Elfner 2014
- Possible correlate: disjunctive phrasing in Mandar when DPs are not selected by v

| $\left\{_{\phi}\right\}$ |  | $\left\{_{\phi}\right.$ | $\left\{_{\phi}\right.$ |
| :---: | :---: | :---: | :---: |
| malingáo ${ }^{\text {H }}$ | i | do táu ${ }^{\text {H }}$ | $\delta^{\text {H }}$ |
| malingao | i | do tau | o |
| tall | 3ABS | that person | there |

References: see the online version of this handout at: http://tinyurl.com/brodkinLSA

## 10 References

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