The Prosody of Paths

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The goal of this talk is to articulate and defend an output-oriented phonological analysis of a restriction that is traditionally situated in the syntax: Path Containment (Pesetsky 1982).

By studying the optimal application of processes in the phrasal phonology of Mandar (AN), I will argue that the prosody must be leveraged in a transparent and surface-oriented way **to reflect the paths of certain types of syntactic movements.**

Our results will ultimately fit into the interface paradigm of Match Theory (Selkirk 2009), but they will seem at first blush to demand a deep rethinking of syntax-prosody mapping. So to start from the preliminaries:

- **Prosodic Structure:** (Nespor & Vogel 1986, Itô & Mester 1992, 2007)
  - Phonological strings are parsed into hierarchical constituent structures, built from abstract constituents along the prosodic hierarchy ($\sigma >$ FT $> \omega > \phi > \iota$).
  - Prosodic structure is built in a parallel/global phonological evaluation, where it is subjected to ranked and violable output-oriented phonological constraints.
- **Syntax-Prosody Mapping:** (Selkirk 1984, 2009, Truckenbrodt 1999)
  - When phonological strings are produced with broad-focus/regular speech rate, we can identify a "default/optimal" pattern of prosodic phrasing by studying introspective judgments about the distribution of phonological processes.
  - This optimal pattern of phrasing is partially shaped by interface constraints that force the preservation of specific kinds of syntactic information.

My first goal today will be to argue for a new kind of interface constraint: WRAP(CHAIN). Our ultimate target here: to connect this constraint with independent output restrictions to explain a ban on crossing paths of movement in Mandar—which looks a bit like this:

(1) a. [$_{\text{OUTER}}$ WHAT SUBJECT] do you know [$_{\text{INNER}}$ WHO] to talk to ___$_{\text{I}}$ about ___$_{\text{O}}$?

b. [$_{\text{INNER}}$ WHO] do you know [$_{\text{OUTER}}$ WHAT SUBJECT] to talk to ___$_{\text{I}}$ about ___$_{\text{O}}$?

Map:

1. Background
2. WRAP(CHAIN)
3. Path Containment

1. Background

Mandar is a language of the South Sulawesi subfamily, spoken by roughly 500,000 people in Central Indonesia. The basic word order is VSO; the verb shows alternations in *voice*; pivots trigger absolutive agreement. Brodkin (to appear A) shows that VSO strings → XPs.

(2) [$_{voiceP}$ **Mam**-baca **a'** yau buku]
AV-read 1ABS 1SG book
'I'm reading a book.'

The focus of this talk is the way that Mandar clauses are parsed into prosodic structures. This investigation begins from the building blocks of suprametrical prosody:

- Prosodic word (ω): regular penultimate stress in Mandar.
- Phonological phrase (ϕ): final H-tone in Mandar.

A complex DP:

(3) [$_{DP/\phi}$ búku t͡ʃennirrára mándar^{H}]
book love spell mandar
'A book of Mandar love spells'

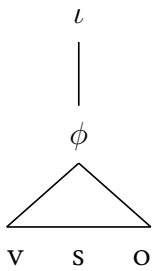
In VSO clauses, these diagnostics reveal the following parse:
the V forms a ω and a minimal ϕ, so does the S, and so does the O.

(4) {$_{\phi}$ V$_{\omega}$ } {$_{\phi}$ S$_{\omega}$ } {$_{\phi}$ O$_{\omega}$ } {$_{\phi}$ X$_{\omega}$ }
nawát͡ʃa^{H} i imína^{H} wúku^{H} diɣéna?^{H}
PV.read 3ABS NAME book earlier
'Mina read the book earlier.'

What we're really interested in is a higher level of clause-internal prosodic constituency. Match Theory sets us up with some basic expectations: if all XPs → ϕs and some CPs → ιs,

(5) *Mandar Syntax*

(6) *Plausible Prosody*



Clause-Internal Prosodic Organization

To detect higher structure, we'll rely on a classical methodology (Nespor & Vogel 1986):

- Prosodic constituents define the domains of application for segmental processes.
- Introspective judgments about these processes → reveal higher-level constituency.

Between the v + o in vox strings: (Brodkin to appear A,B):

1. Coalescence: /ai ae, ao au/ → [e, o]

(7) {$_\pi$ v o } {$_\pi$ x }

n**éte**^{H}	i	kand**áo**^{H}	di waŋg**áe**^{H}
na-itai	i	kandao	di baŋgae
pv-seek	3abs	scythe	in place

'She's looking for the scythe in Banggae.'

2. Glottal Deletion: intervocalic /ŋ ʔ/ → [Ø]

(8) {$_\pi$ v o } {$_\pi$ x }

nakár**os**^{H}	i	iripá**ʔi**^{H}	di rewatá**ʔa**^{H}
na-karaʔus	i	iripaʔi	di rebataʔa
pv-scratch	3abs	name	in place

'She scratched Ripa'i in Rebata'a.'

3. Voiced Stop Lenition: intervocalic /b d d͡ʒ g/ → [w ɹ j ɣ]

(9) {$_\pi$ v o } {$_\pi$ x } {$_\pi$ x }

nasáka^{H}	i	**w**aláo^{H}	**d**o	állo^{H}	ó^{H}
na-saka	i	balao	do	allo	o
pv-catch	3abs	mouse	that	day	prt

'They caught the mouse on that day.'

Between the v, s, + o in vsox strings:

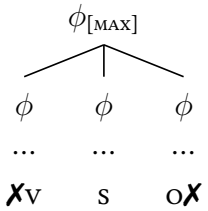
(10) {$_{\phi[\text{max}]}$ v s o } {$_{\phi[\text{max}]}$ x }

n**éte**^{H}	i	irípe^{H}	**w**aláo^{H}	díoŋ^{H}
na-itai	i	iripaʔi	balao	dioŋ
pv-seek	3abs	name	mouse	there

'Ripa'i is looking for the mouse there.'

These processes = blocked at edges of the $\phi_{[\text{max}]}$ (Itô & Mester 2007, Brodkin to appear A)

(11)



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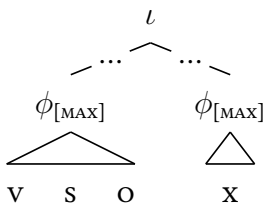


2. Wh-Movement

Mandar has a process of WH-movement that raises WH-words into the left periphery.

- DP WH-movement only targets the pivot; affects voice + triggers loss of ABS AGR;
- DP WH-words always form ϕs and are usually monosyllabic (Brodkin to appear B).

When WH-movement targets the O:

(13) $\{_{\phi[\text{MAX}]}$ WH_O V S t_O $\}$ $\{_{\phi[\text{MAX}]}$ X $\}$

né	na$^\text{H}$túm**e**$^\text{H}$	iripá**ʔi**$^\text{H}$	___	díoŋ$^\text{H}$
nai	na-tumae	ripaʔi	t_{nai}	dioŋ
who	PV-propose	NAME	t_{who}	there

'Who did Ripa'i propose to ___ there?'

WH-movement affects the distribution of $\phi_{[\text{MAX}]}$s when it crosses longer strings.

- When the *voice*P contains four ωs, it is typically split up into two maximal ϕs (14). (Brodkin to appear A: the maximum number of ωs in the Mandar $\phi_{[\text{MAX}]}$ is three.)
- When WH-movement targets the last word of a VSOD string: the parse changes (15).

(14) $\{_{\phi[\text{MAX}]}$ V S $\}$ $\{_{\phi[\text{MAX}]}$ O D $\}$ $\{_{\phi[\text{MAX}]}$ X $\}$

natappás**a**$^\text{H}$	ĩ	iripá**ʔi**$^\text{H}$	**b**áju$^\text{H}$	**ɣ**úru$^\text{H}$	dío$^\text{H}$
na-tappasaŋ	i	iripaʔi	bad͡ʒu	guru	dio
LV-wash for	3ABS	NAME	shirt	teacher	there

'Ripa'i washed a shirt for the teacher there.'

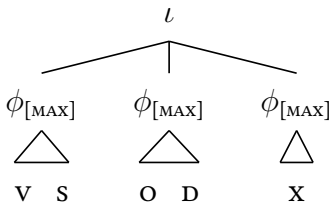
(15) $\{_{\phi[\text{MAX}]}$ WH_D V S O t_D $\}$ $\{_{\phi[\text{MAX}]}$ X $\}$

né	na$^\text{H}$tappás**a**$^\text{H}$	ĩríp**e**$^\text{H}$	**w**áju$^\text{H}$	___	dío$^\text{H}$
nai	na-tappasaŋ	iripaʔi	bad͡ʒu	t_{nai}	dio
who	LV-wash for	NAME	shirt	t_{who}	there

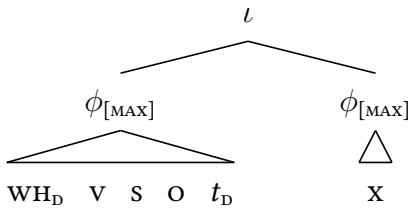
'Who did Ripa'i wash a shirt for ___ there?'

Summary:

(16) a. *Without WhM*



b. *WhM of the D*



A Change in Prosody

WH-movement always triggers the same pattern of prosodic restructuring in Mandar:

The path from a WH-word to its trace is parsed into a single ϕ.

This is distinct from the phonology of contrastive focus in the language (Appendix A).

WH-movement in embedded clauses:

(17) {ϕ[MAX] } {ϕ[MAX] } {ϕ[MAX] }

néssa^{H}	ĩ	iripá**ʔi**^{H}	mwaʔ	nalatt͡ʃári^{H}	ĩ	**ɣ**úru^{H}	**d͡ʒ**ála^{H}	waláo^{H}
na-issaŋ	i	iripaʔi	muaʔ	na-latt͡ʃari	i	guru	d͡ʒala	balao
PV-know	3ABS	NAME	C	LV-throw at	3ABS	teacher	net	mouse

'Ripa'i knows that the teacher threw a net at the mouse.'

(18) {ϕ[MAX] } {ϕ[MAX] }

néssa^{H}	ĩ	iripá**ʔi**^{H}	n**é**	na^{H}latt͡ʃári^{H}	**ɣ**úru^{H}	**j**ála^{H}	___
na-issaŋ	i	iripaʔi	nai	na-latt͡ʃari	guru	d͡ʒala	t_{nai}
PV-know	3ABS	NAME	who	LV-throw at	teacher	net	t_{who}

'Ripa'i knows who the teacher threw a net at ___.'

WH-movement from embedded clauses:

(19) {ϕ[MAX] } {ϕ[MAX] } {ϕ[MAX] }

nahára**a**^{H}	i	iripá**ʔi**^{H}	**g**umóra^{H}	i	ɣúru^{H}	**d**jó	ɹi^{H}	káttiŋ^{H}
na-haraʔ	i	iripaʔi	gumora	i	guru	dio	di	kattiŋ	
PV-hope	3ABS	NAME	scream	3ABS	teacher	there	in	cafeteria	

'Ripa'i hopes that the teacher will scream in the cafeteria.'

(20) {ϕ[MAX] } {ϕ[MAX] }

n**é**	na^{H}hára**a**^{H}	iripe^{H}	**ɣ**umóra^{H}	___	**d**jó	ɹi^{H}	káttiŋ^{H}
nai	na-haraʔ	ripaʔi	gumora	t_{nai}	dio	di	kattiŋ
who	PV-hope	NAME	scream	t_{who}	there	in	cafeteria

'Who does Ripa'i hope ___ will scream in the cafeteria?'

WH-movement of adjuncts:

(21) {ϕ[MAX] }

píra^{H}	ĩ	natappása^{H}	ĩrípe^{H}	**w**áju^{H}	**ɣ**úru^{H}	___
piraŋ	i	na-tappasaŋ	iripaʔi	bad͡ʒu	guru	$t_{piraŋ}$
when	3ABS	LV-wash for	NAME	shirt	teacher	t_{when}

'When did Ripa'i wash a shirt for the teacher ___?'

The Wrapping Effect

We can summarize the basic pattern along the following lines:

(22) a. In Mandar, the path of WH-movement must be parsed into a ϕ.

b. This requirement outranks the active weight constraints in Mandar (yielding ϕs that exceed the regular limit of three ωs).

c. This requirement has no effect on material outside the path of movement (material before the WH-word + material after the trace).

What is the pressure behind this effect?

- NOT MARKEDNESS: WH-chains and traces = absent from output representations.
- NOT MATCH: triggers mismatches between syntactic + prosodic constituency.

(23) $\{_{\phi[\text{MAX}]}$ $\}\{_{\phi[\text{MAX}]}$ $\}\{_{\phi[\text{MAX}]}$ $\}\{_{\phi[\text{MAX}]}$ $\}$

nahára^{H}	ĩ	iripá**ʔi**^{H}	mállja^{H}	ĩ	irámaŋ^{H}	ánde^{H}	ɹónor^{H}	di farréser^{H}
na-haraʔ	i	iripaʔi	maŋ-allian	i	iramaŋ	ande	donor	di farreser
PV-hope	3ABS	NAME	AV-buy for	3ABS	NAME	food	donor	at fundraiser

'Ripa'i hopes that Ramang is buying food for donors at the fundraiser.'

(24) $\{_{\phi[\text{MAX}]}$ $\}$ $\{_{\phi[\text{MAX}]}$ $\}$ $\{_{\phi[\text{MAX}]}$ $\}$

né	na^{H}hára^{H}	ĩrípe^{H}	mallía**ŋ**^{H}	___	ánde^{H}	ɹónor^{H}	di farréser^{H}
nai	na-haraʔ	iripaʔi	maŋ-allian	t_{nai}	ande	donor	di farreser
who	PV-hope	NAME	AV-buy for	t_{who}	food	donor	at fundraiser

'Who does Ripa'i hope ___ is buying food for donors at the fundraiser?'

Proposal: our effects boil down to a third category of 'interface constraints' that leverage output constituency to preserve specific information from the syntax.

(25) WRAP(WH-CHAIN,ϕ)
Let S be an input syntactic representation and P its corresponding output representation. For every WH-chain that crosses a set of elements C in S, the output correspondents of the WH-word and all elements in C must form a ϕ in P. AOV if not.

WRAP(CHAIN) is of a kind with the interface constraints that regulate:

- ADJUNCTION (Truckenbrodt 1999, Selkirk 2011, fn 38, Brodkin to appear A)
- C-COMMAND (Kalivoda 2018: systematic syntax-prosody mismatch in ditransitives)
- The WH-C^{0} relationships in Japanese (Ishihara 2002, Smith 2005; Richards 2010)

3. Path Containment

Our results raise a number of important questions on the "P" side of things:

- PHONOLOGY: how does WRAP(CHAIN) interact with output constraints (BINARITY)? Increasing the weight of fronted WH-phrases affects our patterns in complex ways.
- PRODUCTION: the surface prosody of natural speech can deviate from the optimal prosody that emerges from introspective judgments. What of WRAP(CHAIN) then?

But our results also open up the path toward a separate theoretical goal:

- If certain syntactic relationships are reinstantiated in output prosodic constituency,
- Then how many "restrictions on syntax" can be reduced to output-oriented effects?

Our final goal: to leverage WRAP(CHAIN) to build a completely output-oriented account of one restriction on syntactic displacement: a ban on crossing paths.

The issue:

(26) a. WH V QUANTIFIER S O ___ ___$_D$?

b. WH V QUANTIFIER ___$_S$ O ___ D?

Mandar has five adnominal quantifiers that follow their associated DPs in non-finite clauses: *nasang* "all," *le'ba'* "exactly," *tappa'* "only," *to'o* "too," and *tia* "even."

(27) Mau napelambi sola-u nasang digena',
Though PV-visit friend-1GEN all earlier
'Though all my friends visited [−FIN] earlier,'

These quantifiers have no special influence on prosodic phrasing when they're adnominal. Adding a quantifier after a DP has the same effect as adding any other ω in that position.

(28) {$_{\phi[\text{MAX}]}$ } {$_{\phi[\text{MAX}]}$ } {$_{\phi[\text{MAX}]}$ }
mo néte^{H} iripá**ʔi**^{H} **g**úru **násaŋ**^{H} állo sáttu^{H},
mau na-itai iripaʔi guru nasaŋ allo sattu
though PV-seek NAME teacher all day saturday
'Though Ripa'i looked for [−FIN] all the teachers on saturday,'

(29) {$_{\phi[\text{MAX}]}$ } {$_{\phi[\text{MAX}]}$ } {$_{\phi[\text{MAX}]}$ }
mo néte^{H} iripá**ʔi**^{H} **g**úru maliŋ**gáo**^{H} állo sáttu^{H},
mau na-itai iripaʔi guru maliŋgao allo sattu
though PV-seek NAME teacher tall day saturday
'Though Ripa'i looked for [−FIN] the tall teachers on saturday,'

The Ban on Crossing Paths

In finite clauses, these quantifiers raise out of their associated nominals to adjoin to the v (forming minimal ϕs with the v).
When *nasang* "all" raises out of the s:

(30) {ϕ[MAX] ⋮ } {ϕ[MAX] } {ϕ[MAX] }

nálljan	**nása**^{H}	ĩ	**ɣ**úru^{H}	___	**b**úku^{H}	**ɹ**óttor^{H}	diɣéna?^{H}
na-allian	nasan	i	guru	t_{nasang}	buku	dottor	digena?
LV-buy for all		3ABS	teacher	t_{all}	book	doctor	earlier

'All the teachers bought [+FIN] books for the doctor earlier.'

Quantifier Movement also triggers the Wrapping Effect
(though the wrapping ϕs are slightly misaligned).
When *nasang* "all" raises out of the D:

(31) {ϕ[MAX] ⋮ } {ϕ[MAX] }

nálljan	**nása**^{H}	ĩ	**ɣ**úru^{H}	**w**úku^{H}	**ɹ**óttor^{H}	___	diɣéna?^{H}
na-allian	nasan	i	guru	buku	dottor	t_{nasang}	digena?
LV-buy for all		3ABS	teacher	book	doctor	t_{all}	earlier

'The teacher bought [+FIN] books for all the doctors earlier.'

Quantifier Movement can occur within the path of WH-movement:

(32) {ϕ[MAX] ⋮ ⋮ } {ϕ[MAX] }

né	na^{H}tappásal	**léʔba**^{H}	iríp**e**^{H}	sand͡ʒúta^{H}	___	___	tón	djóloʔ^{H}
nai	na-tappasan	leʔbaʔ	iripaʔi	sand͡ʒuta	$t_{leʔbaʔ}$	t_{nai}	taun	diloloʔ
who	LV-wash for	exactly	NAME	a million	$t_{exactly}$	t_{who}	year	last

'Who did Ripa'i launder [+FIN] exactly $1,000,000 for ___ last year?'

But Quantifier Movement cannot cross the path of WH-movement:

(33) ⋮ ⋮ ✗ ⋮

nai	na-mat-tappasal	**le'ba'**	___	sanjuta	___	iripa'i	manini?
who	will-AV-wash for exactly		t_{who}	a million	$t_{exactly}$	NAME	later

INTENDED: 'Who will launder [+FIN] exactly $1,000,000 for Ripa'i later?'

Questions:

(34) a. Why are nested paths ok?

b. Why are crossing paths banned?

c. How does the language rescue "crossing-path" derivations?

Path Containment in the Prosody

Part 1: on the view that these paths must always be wrapped by ϕs in the surface prosody, the nested-path condition should receive the following parse:

(35) $\{_{\phi[\text{WH}]}$ $\{_{\phi[\text{QM}]}$ $\}_{\phi[\text{QM}]}$ $\}_{\phi[\text{WH}]}$ $\{_{\phi}$ $\}$

Ne	nanatappasal	le'ba'	iRipa'i	sanjuta	___	___	manini?
who	will launder for	exactly	NAME	a million	$t_{exactly}$	t_{who}	later?

'Who will Ripa'i launder exactly $1,000,000 for later?'

There's no explicit segmental evidence for the recursive deployment of the ϕ here (yet). But there are other cases where it seems like WRAP(CHAIN) is satisfied by non-maximal ϕs: for instance, when WH-movement crosses exactly one word.

(36) $\{_{\phi[\text{MAX}]}$ $\{_{\phi[\text{WH}]}$ $\}$ $\}$ $\{_{\phi[\text{MAX}]}$ $\}$

né	na^H málli^H	___	ɹúpa^H	maníni^H
nai	na-maŋ-alli	t_{nai}	dupa	manini
who	will-AV-buy	t_{who}	incense	later

'Who will buy incense later?'

Result: nested paths should be alright if:

(37) a. WRAP(CHAIN) always forces the construction of a ϕ, and
b. The ϕ can recurse (Itô & Mester 2007, 2009, Elfner 2012, 2015; Elordieta 2015)

Part 2: we then predict the following parse for the crossing-path condition:

(38) $\{_{\phi[\text{WH}]}$ $\{_{\phi[\text{QM}]}$ $\}_{\phi[\text{WH}]}$ $\}_{\phi[\text{QM}]}$ $\{_{\phi}$ $\}$ $\{_{\phi}$ $\}$

*Ne	namattappasal	le'ba'	___	sanjuta	___	iRipa'i	manini?
who	will launder for	exactly	t_{who}	a million	$t_{exactly}$	NAME	later?

INTENDED: 'Who will launder exactly $1,000,000 for Ripa'i later?'

This is a case where prosodic constituents intersect, violating a principle of constituency.

(39) *The Proper Bracketing Condition* (Principle II of Nespor & Vogel 1986)
"A unit of a given level of the hierarchy is exhaustively contained in the superordinate unit of which it is a part."

Result: we can rule out crossing paths with reference to output prosodic structure alone. There's no need to posit a system that rules out crossing paths of movement in the syntax (Appendix B: the correlation between wrapping effects + crossing constraints in Mandar)

4. Conclusions

Stepping back from the specifics, we arrive at three central conclusions.

First, we might extend a phonological analysis to path containment effects elsewhere:

(40) a. {$_{\phi WH1}$ WHAT SUBJECT do you know {$_{\phi WH2}$ WHO to talk to __ }$_{WH2}$ about __ }$_{WH1}$?

b. {$_{\phi WH1}$ WHO do you know {$_{\phi WH2}$ WHAT SUBJECT to talk to __ }$_{WH1}$ about __ }$_{WH2}$?

This would be a great coup for Minimalism—allowing for the elimination of linear order, PATHS, the PATH MODULE, and an irreducibly representational constraint from the syntax.

We may also already have the foundations of a case in English:

(41) a. {$_{\phi}$ I need **a/*to** visit Sulawesi }.

b. {$_{\phi}$ Who do you need *t* } {$_{\phi}$ **to/*a** visit Sulawesi }?

Second, we might try to derive other restrictions on movement from output prosody. A phonological island effect:

(42) a. Wait, wait, tell me one more time…

b. {$_{\iota}$ }
What would you get sick [sɪk] if you ate *t*?

c. {$_{\iota}$ } {$_{\iota}$ }
*What would you get sick [sɪk’] if you ate *t*?

Third, we should take seriously the possibility that many more types of movement—and perhaps many more syntactic relationships—are systematically reflected in output prosody.

- This conclusion fits together with the emerging recognition that prosodic phrasing is mobilized to reflect other syntactic relationships: adjunction, Japanese WH-C.
- This theoretical step, in turn, opens up a new world of research at the S-P interface:
  - on the identity of the relevant syntactic relationships,
  - on the cross-linguistic shape of their phonologization,
  - on their interaction with output-oriented pressures, and
  - on their manifestation in “production prosody.”

Covert Movement

We can now turn to our last question: "how are crossing derivations really handled?" Answer: whenever Quantifier Movement would cross the path of WHM, it "fails to occur."

(43) {ϕ[MAX] ✗ } {ϕ[MAX] } {ϕ[MAX] }

né	na^{H}mattappásas	___	___	sand͡ʒúta^{H}	**léʔba**^{H}	iripáʔi^{H}	manínі^{H}
nai	na-maŋ-tappasaŋ		t_{nai}	sand͡ʒuta	leʔbaʔ	iripaʔi	manini
who	will-AV-wash for		t_{who}	a million	exactly	NAME	later

'Who will launder [+FIN] exactly $1,000,000 for Ripa'i later?'

At first blush, this looks like a crisis of modularity: Quantifier Movement must operate in the syntax, but syntactic operations should not interact with phonological constraints.

- Prosodic phrasing, especially, should be unavailable to the syntax (no cyclicity).
- So if Quantifier Movement really "fails to occur" in the context of crossing paths, we'd have to prohibit crossing in the syntax, with no reference to output prosody.

Key Observation: there's evidence that movement really does occur.
In the non-finite clauses that lack Quantifier Movement, quantifiers scope beneath NEG.

(44)

Mau	**ndang**	napelambi	sola-u	**nasang**,
Though	NEG	PV-visit	friend-1GEN	all

'Though all my friends didn't visit [−FIN],' → ✓NOT > ALL, ✗ALL > NOT

In finite clauses, Quantifier Movement opens up a second scopal possibility:

(45)

Ndang	i	napelambi **nasas**		sola-u	___,
NEG	3ABS	PV-visit	all	friend-1GEN	t_{all}

'All my friends didn't visit [+FIN].' → ✓NOT > ALL, ✓ALL > NOT

The high-scope reading persists when Quantifier Movement is "blocked" by WH-movement:

(46)

Nai	na-sanga	**ndang**	map-pelambi	___	___	sola-na	**nasang**?
who	PV-think	NEG	AV-visit		t_{who}	friend-3GEN	all

'Who do they think didn't visit [+FIN] all of their friends?' → ✓ALL > NOT

Analysis: Quantifier Movement occurs in the syntax even when it crosses paths w/ WHM. Movement creates copies, and phonology chooses which copies to realize (Bošković 2001). Pronouncing the lower copy of QM → an output-optimizing strategy to avoid crossing ϕs.

(47) Who do they think **NEG** visited ~~all~~ ~~who~~ their friends **all**?

Result: output-oriented analysis of suspended movement—and the ban on Crossing Paths.

Appendix A: The Phonology of Focus

No work has been done on the phonetic manifestation of any kind of focus in Mandar. But our segmental diagnostics for the $\phi_{[\text{MAX}]}$ reveal some phonological generalizations:

1. Information focus ("whether or not an item has been mentioned in the discourse") has no effect on patterns of prosodic constituency. For a given phonological string, the broad-focus parse will be identical whether every constituent is new or given. (**N.b.**: Féry & Ishihara 2011 claim that information focus has only phonetic effects and does not affect prosodic constituency in German and Japanese, too.)
2. Contrastive focus ("identificational focus, narrow focus") has a phonology:
   - Contrastive foci must always be right-aligned in a $\phi_{[\text{MAX}]}$
     (usually accomplished by changing the distribution of ϕs, not by moving foci).
   - Contrastive foci must be right-aligned in the first $\phi_{[\text{MAX}]}$ in the ι
     (earlier $\phi_{[\text{MAX}]}$ boundaries are deleted, except in cases of 2nd-occurrence focus).
   - In the space after a contrastive focus, the usual pattern of phrasing emerges.

Examples:

(48) {ϕ[MAX] } {ϕ[MAX] } {ϕ[MAX] }

néssa^{H}	ĩ	iripá**ʔi**^{H}	mwaʔ	nalatt͡ʃári^{H}	i	**ɣ**úru^{H}	**d͡ʒ**ála^{H}	waláo^{H}
na-issaŋ	i	iripaʔi	muaʔ	na-latt͡ʃari	i	guru	d͡ʒala	balao
PV-know	3ABS	NAME	C	LV-throw at	3ABS	teacher	net	mouse

'Ripa'i knows that the teacher threw a net at the mouse.'

(49) {ϕ[MAX] } {ϕ[MAX] } {ϕ[MAX] } {ϕ[MAX] }

naíssaŋ^{H}	i	iripáʔi^{H}	mwaʔ	nalatt͡ʃári^{H}	i	ɣúru^{H}	d͡ʒála^{H}	waláo^{H}
na-issaŋ	i	iripaʔi	muaʔ	na-latt͡ʃari	i	guru	d͡ʒala	balao
PV-know	3ABS	NAME	C	LV-throw at	3ABS	teacher	net	mouse

'Ripa'i KNOWS that the teacher threw a net at the mouse'.

(50) {ϕ[MAX] } {ϕ[MAX] }

néssa^{H}	ĩ	irípe^{H}	mwaʔ	nalatt͡ʃári^{H}	i	ɣúru^{H}	**jála**^{H}	**baláo**^{H}
na-issaŋ	i	iripaʔi	muaʔ	na-latt͡ʃari	i	guru	d͡ʒala	balao
PV-know	3ABS	NAME	C	LV-throw at	3ABS	teacher	net	mouse

'Ripa'i knows that the teacher threw A NET at THE MOUSE.'

Appendix B: Toward a Typology of Movements

The real case for our analysis emerges from two further generalizations about movement. **First**: the remaining movements are parameterized for wrapping in Mandar.

1. Amount movement: the prenominal quantifiers *mai'di* 'a lot of' and *sicco'* 'a little of' move in finite clauses, affecting the voice morphology (!) and triggering wrapping:

(51) {$_{\phi[\text{MAX}]}$ } {$_{\phi[\text{MAX}]}$ } {$_{\phi[\text{MAX}]}$ }

mo	mánde^{H}	wal**áo**^{H}	mé?di	**w**áta?^{H}	diɣena?^{H},
mau	maŋ-ande	balao	mai?di	bata?	digena?
though	AV-eat	mouse	a lot of	corn	earlier

'Though the mouse ate [−FIN] a lot of corn earlier,'

(52) {$_{\phi[\text{MAX}]}$ } {$_{\phi[\text{MAX}]}$ }

mé?di	nánde^{H}	**w**álo^{H}	___	**w**áta?^{H}	diɣena?^{H}
mai?di	na-ande	balao	$t_{mai?di}$	bata?	digena?
a lot of	PV-eat	mouse	$t_{a\ lot\ of}$	corn	earlier

'The mouse ate [+FIN] a lot of corn earlier,'

2. Scrambling: definite arguments can scramble to the right, yielding orders like VOS. Brodkin (to appear A) shows that (i) this is movement + (ii) scrambled DPs → $\phi_{[\text{MAX}]}$s.

(53) {$_{\phi[\text{MAX}]}$ } {$_{\phi[\text{MAX}]}$ }

nasáka^{H}	i	___	wal**áo**^{H}	iripá?i^{H}
na-saka	i	$t_{iripa?i}$	balao	iripa?i
PV-catch	3ABS	t_{NAME}	mouse	NAME

'Ripa'i caught the mouse,'

3. Topicalization: referential XPs can be topicalized to the left. Brodkin (submitted) shows that (i) this is movement + (ii) topicalized XPs → ιs. (Test: nasal assimilation)

(54) {$_{\iota}$ } {$_{\iota}$ }

itim	búla**ŋ**,^{H}	póle^{H}	i	irámas**s**^{H}	sola	wenéna^{H} ___
itiŋ	bulaŋ	pole	i	iramaŋ	sola	baine-na
that	month	come	3ABS	NAME	with	wife-3GEN

'That month, Ramang came with his wife.'

4. Pivot Raising: under specific prosodic circumstances, pivots must shift to a position that falls between auxiliaries and the verb. No wrapping effect.

(55) {$_{\phi[\text{MAX}]}$ } {$_{\phi[\text{MAX}]}$ }

púra^{H}	i	iripa**?i**^{H}	mánde	állo^{H}	___
pura	i	iripa?i	maŋ-ande	allo	
finished	3ABS	NAME	AV-eat	midday	

'Ripa'i is finished having lunch.'

5. Pronoun Raising: unstressed pronouns move through a series of positions in finite clauses, ultimately ending up in 2P. No wrapping effect.

(56) {$_{\phi[\text{MAX}]}$ ⇣ } {$_{\phi[\text{MAX}]}$ }

púra^{H}	ma	jáu^{H}	mánde^{H}	___	jépaʔ^{H}
pura	maʔ	iau	maŋ-ande	t_{iau}	d͡ʒepaʔ
finished	PFV.1ABS	1SG	AV-eat	t_{1SG}	tortilla

'I'm done eating tortillas.'

6. Preposition Raising: unstressed stranded prepositions move left in the *voice*P. No wrapping effect.

(57) {$_{\phi[\text{MAX}]}$ } {$_{\phi[\text{MAX}]}$ }

nalátt͡ʃar^{H}	i	iripáʔi^{H}	báta ʔ^{H}	lo	ri	jáli^{H}
na-latt͡ʃar	i	iripaʔi	bataʔ	lao	di	iali
PV-throw	3ABS	NAME	corn	toward	to	NAME

'Ripa'i threw the corn at Ali.'

(58) {$_{\phi[\text{MAX}]}$ ⇣ } {$_{\phi[\text{MAX}]}$ }

nalátt͡ʃar^{H}	i	lao	irípe^{H}	wáta ʔ^{H}	___
na-latt͡ʃar	i	lao	iripaʔi	bataʔ	t_{lao}
PV-throw	3ABS	toward	NAME	corn	t_{toward}

'Ripa'i threw the corn at him.'

Second: the correlation is perfect between wrapping effects and crossing constraints.

- The movements that force wrapping → unable to cross paths with each other. (WH-movement, Focus-Fronting, Amount Movement, Quantifier Movement)
- The movements that don't force wrapping → can cross each other/everything else (Scrambling, Topicalization, Pivot Raising, Pronoun Raising, Preposition Raising)

(59)

Movement	Wrapped by ϕ?	Crossing Constraint?
WH-Movement	✓	✓
Quantifier Movement	✓	✓
Amount Movement	✓	✓
Scrambling	✗	✗
Topicalization	✗	✗
Pivot Raising	✗	✗
Pronoun Raising	✗	✗
Preposition Raising	✗	✗

References: find them online at: https://tinyurl.com/brodkinafla31