Cooperation at the morpho-phonology interface: An argument for phonological adjacency and against phase-based locality

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Doubly morphologically conditioned phonological alternations (=DMP)

A phonological process that only applies if at least two morphological or lexical context features are present.

DMP example 1: Full vowel harmony (=FVH) in Guébie

(Sande, 2020, 466+467)

(1) a. Undergoer root+triggering enclitic: FVH

bala$^{3.3}$🔒=🔑ɔ$^{2.32}$	b ɔ lɔ$^{2.32}$	'hit him"
jɪla$^{3.2}$🔒=🔑ɔ^{2}	j ɔ lɔ$^{3.2}$	'ask him'

b. Non-undergoer root+triggering enclitic: No FVH

sijo$^{2.3}$=🔑ɔ$^{2.32}$	sijɔ$^{2.32}$	'wipe him'
tɛlɪ$^{3.3}$=🔑ɔ^{2}	tɛlɔ$^{3.2}$	'carve him'

c. Undergoer root+non-triggering enclitic/suffix: No FVH

bala$^{3.3}$🔒=e^{3}	bale$^{3.3}$	'hit me'
jɪla$^{3.2}$🔒-ɔ^{2}	jɪlɔ$^{3.2}$	'be asked'

- only a lexically arbitrary class of **undergoing** roots🔒 shows FVH **triggered** by only specific suffixes/enclitics🔑

→ A 'trigger-target-DMP'

DMP example 2: H-tone overwriting in Mian (Fedden, 2011, 82,285)

(2) a. Triggering root+triggering suffix: H on subject marker

dolɑ̃$_{Ø_-}$-b$_{Ø_-}$-i=be	dolɑ̃b í be	'I poured'
pour-nhd.pst-1sg.sbj=decl		
singɑ̃$_{Ø_-}$-b$_{Ø_-}$-i=be	singab í be	'I wrote'
write-nhd.pst-1sg.sbj=decl		

b. Triggering root+non-triggering suffix: No H

dolɑ̃$_{Ø_-}$-b-i=be	dolɑ̃bibe	'I am pouring'
pour-impfv-1sg.sbj=decl		
singɑ̃$_{Ø_-}$-b-i=be	singabibe	'I am writing'
write-impfv-1sg.sbj=decl		

c. Non-triggering root+triggering suffix: No H

gwi-b$_{Ø_-}$-i=be	gwibibe	'I poisoned'
poison-nhd.pst-1sg.sbj=decl		
ge-b$_{Ø_-}$-i=be	gebibe	'I said'
say-nhd.pst-1sg.sbj=decl		

- a H-tone is realized on a subject marker only if the **triggering non-hodiernal past suffix** /-b/ follows certain **triggering roots**

→ A '2-trigger-DMP'

Main Claim

1. Doubly morphologically conditioned phonological processes (=DMP) are constrained by **phonological adjacency**.

2. The typology of DMP does **not provide an argument for phase-domains** within the phonology, contra the claim in Sande (2020)).

3. DMP is best analysed by a **representational account** that predicts morpheme-specific phonology from Generalized Nonlinear Affixation with Gradient Activity.

Plan

1. Competing restrictions on DMP's

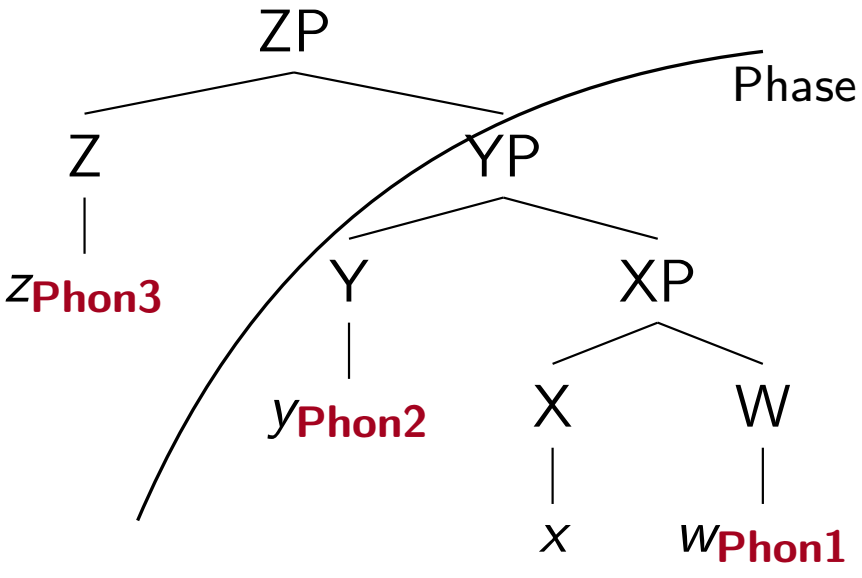
1.1. Cophonology by Phase

DMP and morpheme-specific grammars: Cophonology by Phase Theory (=CbP)

(Sande and Jenks, 2018; Sande, 2019; Sande et al., 2020; Sande, 2020)

- vocabulary entries can contain **constraint-weight readjustments** and hence change the base grammar
- phonological evaluation applies within every **syntactic phase**

(3)



- /y x w/ = Phon1+2 adjust the base grammar
- /z [yxw]/ = only Phon3 adjusts the base grammar

→ DMP=multiple morphemes in a phase adjust the grammar and thus enable a process

CbP: Toy account for Guébie DMP

(4) Guébie base grammar: Ident-V=10, VHarm!=5 → no FVH

(5) Lexical items

No grammar adjustment				Grammar adjustment			
a.	*v*	↔	$\mathcal{F}$: ø, $\mathcal{R}$: ø	b.	*v*🔒	↔	$\mathcal{F}$: ø, $\mathcal{R}$: Id-V^{-3}
c.	1.sg.acc	↔	$\mathcal{F}$: e, $\mathcal{R}$: ø	d.	3.sg.h.acc🔑	↔	$\mathcal{F}$: ɔ, $\mathcal{R}$: VHarm!$^{+3}$

- FVH predicted only if **both grammar adjustments** apply (7)

➙ Obj enclitics and v selected by 🔒-roots within the same phase

(6) Grammar adjusted once: No FVH yet

/bala🔒=e/	Id-V **7**	VHarm! 5	$\mathcal{H}$
☞ a. bale		-1	-5
b. bele	-1		-7

(7) Doubly adjusted Grammar: FVH

/bala🔒-🔑ɔ/	Id-V **7**	VHarm! **8**	$\mathcal{H}$
a. balɔ		-1	-8
☞ b. bɔlɔ	-1		-7

DMP restriction within CbP

CbP: Cooperation if phase-membership

- DMP is predicted iff the two cooperating morphemes are introduced within the same phase
- blocking of DMP is predicted iff the two cooperating morphemes are introduced in different phases

1.2. Generalized Nonlinear Affixation + Gradience

DMP and Representations: GNA with Gradient Symbolic Representations (=GNAG)

- Morpheme representations can be 'defective' and contain **floating and/or underspecified phonological elements** (e.g. Lieber, 1987; Stonham, 1994; Trommer, 2011; Bermúdez-Otero, 2012; Bye and Svenonius, 2012; Zimmermann, 2017)

- Gradient Symbolic Representations: All phonological elements have a certain **activity** that can gradiently differ (e.g. Smolensky and Goldrick, 2016; Rosen, 2016, 2019; Zimmermann, 2019, 2021; Walker, 2020)

  → different activities=different behaviour in the phonology due to **gradient constraint violations**

→ DMP is the **cooperation of (floating/underspecified) phonological elements with a special activity**:

  – cooperation via coalescence
  – cooperation via association

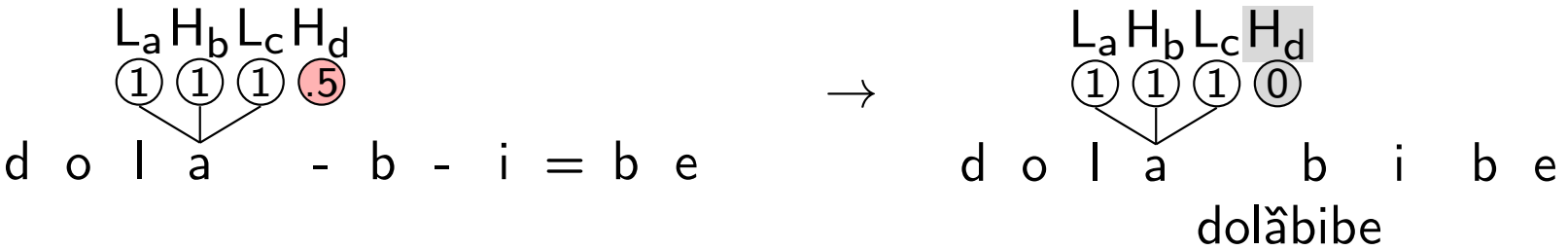
DMP and GNAG: Two Cooperation Mechanisms

1. Cooperation by coalescence

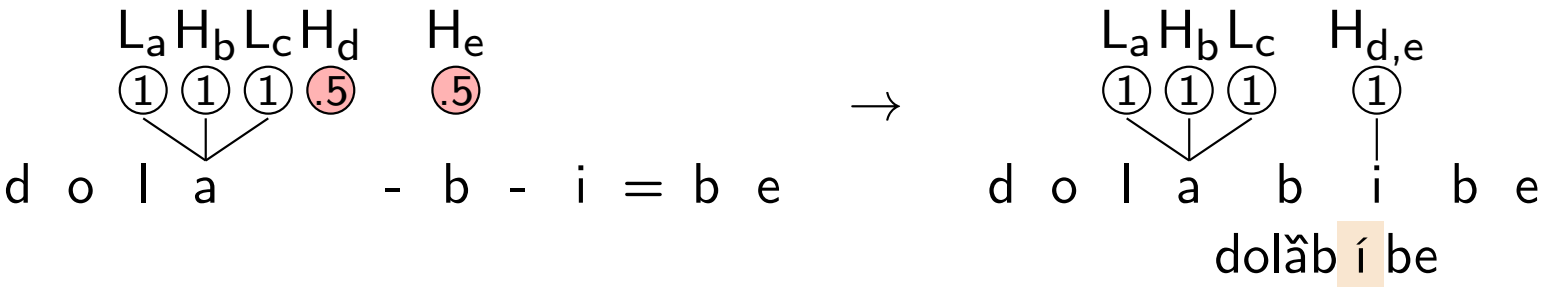
- weak elements can only surface if they fuse with an identical element
  (cf. the original argument for GSR in Smolensky and Goldrick (2016))

(8) Mian tonal overwriting and coalescence

a. Weak floating H can not be realized: Imperfective /-b/



b. Two weak floating H's can fuse and associate: Non.hod.pst /-b/



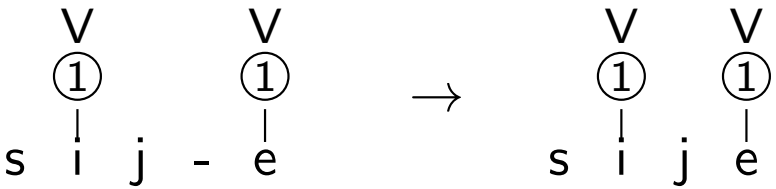
DMP and GNAG: Two Cooperation Mechanisms

2. Cooperation by association

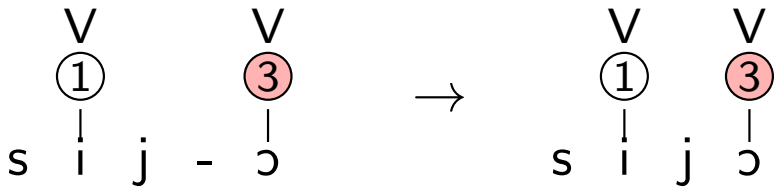
- only elements with a certain activity can overwrite elements with a certain other activity

(9) Guébie FVH

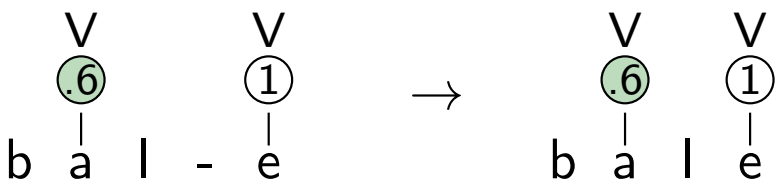
a. V does not overwrite



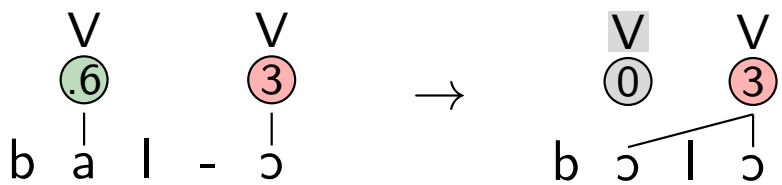
b. Strong V does not overwrite V



c. V does not overwrite V



d. Strong V overwrites weak V



DMP restriction within GNAG

- independently motivated phonological restrictions on colaescence and association:
  - coalescence only applies under adjacency
  - association lines may not cross (Goldsmith, 1976, 1999)

GNAG: Cooperation if (tier) adjacency

- ➙ DMP is predicted iff the cooperating phonological material is phonologically adjacent
- ➙ blocking of DMP is predicted iff the cooperating phonological material is phonologically not adjacent

Two competing restrictions on DMP

(10) Summary: Adjacency vs. phase-membership restriction

			GNAG	CbP
1.	Adj	SamePh	DMP	DMP
2.	Adj	DiffPh	DMP	No DMP
3.	NoAdj	SamePh	No DMP	DMP
4.	NoAdj	DiffPh	No DMP	No DMP

2. The typology of DMP: Restricted by adjacency

A representative typology

(11) DMP criterion
A phonological process P1* is doubly morphologically conditioned if it applies to phonological forms F that share the morpho-syntactic context feature C_1 and the morpho-syntactic or lexical context feature C_2 and is absent in all phonological forms F in contexts that lack C_1 and/or C_2.
(*P1=change of segmental features, change of segmental length, change of tone, deletion of segments)

- 35 DMP patterns from 33 different languages:

(12)

	My DMP data sample		All languages	
Africa	8	22,85%	2367	27,6%
Papunesia	8	22,85%	2212	25,8%
NM America	8	22,85%	791	9.2%
Eurasia	7	20%	2004	23,4%
S America	3	8,57%	716	8.4%
Australia	1	2,86%	388	4.5%
Total	35		8572	

Database: Types of DMP

	Language	Process
1.	Finnish	D/FC-V
2.	Yeri 1	FC-V
3.	Lakhota	FC-V
4.	German	FC-V
5.	Hungarian 1	D/Sh-V
6.	A. Nuuchahnulth	FC-C
7.	Guébie A	FC-V
8.	Guébie B	FC-V
9.	Mee	TO
10.	Yeri 2	FC-V
11.	Biloxi	FC-V
12	Yine	D-V
13.	Somali	TO
14.	Diegueno	Sh/L-V
15.	Sacapultec	L-V
16.	Alabama	D-C/Rh
17.	Murle	D-C/Rh
18.	Dinghai	FC-V
19.	Amahuaca	D-S
20.	Amuzgo	TO
21.	Maskelynes	FC-V
22.	Abui	FC-V/C, D-V
23.	Fwe	FC-C

	Language	Process
24.	Tauya	FC-C
25.	Hungarian 2	FC-V
26.	S.K. Korean	TO
27.	Chimila	FC-C
28.	Mao	TO
29.	Japanese	FC-C
30.	Hiaki	L-C/V
31.	Nhanda	FC-V
32.	Neve'ei	FC-V
33.	Donno So	TO
34.	Chichewa	TO
35.	Mian	TO

D	= deletion
FC	= feature change
L	= lengthening
Sh	= shortening
TO	= tonal overwriting
C	= consonant
Rh	= rhyme
V	= vowel

The typology of DMP: Testing the phonological adjacency restriction of GNAG

1. Is the targetted phonological element at the edge of the morpheme?
2. Are the cooperating morphemes adjacent at the edge that is targetted?

(13)

	DMP	Target	
Example 1	$\underline{\text{Rt}}$+Sf	FinV	→ Phonological adjacency
Example 2	$\underline{\text{Rt}}$+Sf	InV	→ No phonological adjacency
Example 3	$\underline{\text{Rt}}$+Sf+Sf	FinV	→ No phonological adjacency

Database: DMP → phonological adjacency?

	Language	DMP	Target
1.	Finnish	Rt +Sf	FinV
2.	Yeri 1	Rt +Sf	FinV
3.	Lakhota	Rt +Sf	FinV
4.	German	Rt +Sf	RmV
5.	Hungarian 1	Rt +Sf	RmV
6.	A. Nuuchahnulth	Rt +Sf	FinC
7.	Guébie A	Rt +En/Sf	AllV
8.	Guébie B	Rt +En/Sf	OnlyV
9.	Mee	Rt +En/Sf	FinTBU
10.	Yeri 2	Rt < Ifx >	FinV
11.	Biloxi	Rt +Wd	FinV
12	Yine	Rt /Sf +Sf	FinV
13.	Somali	Rt +nc	RmV
14.	Diegueno	Rt +nc	RmV
15.	Sacapultec	Rt +nc	RmV
16.	Alabama	Rt +nc	FinC/Rh
17.	Murle	Rt +nc	FinC/Rh
18.	Dinghai	Rt +nc	FinV
19.	Amahuaca	Rt +nc	FinS
20.	Amuzgo	Rt +nc	AllTBU
21.	Maskelynes	Rt +nc	OnlyV

	Language	DMP	Target
22.	Abui	Rt +nc/Sf	FinC/RmV
23.	Fwe	Rt /Sf +nc	FinC
24.	Tauya	Rt +Sf	InC
25.	Hungarian 2	Rt +Sf	InV
26.	S.K. Korean	Rt +Sf	InTBU
27.	Chimila	Rt +Sf	FinV
28.	Mao	Rt +Sf	OnlyTBU
29.	Japanese	Rt +Rt	InC
30.	Hiaki	nc +Rt	LmV/IvC
31.	Nhanda	Sf +Sf	FinV
32.	Neve'ei	Prfx +Rt	FinV
33.	Donno So	Rt+Wd +En	AllTBU
34.	Chichewa	nc +nc +root	AllTBU
35.	Mian	Rt +Sf +Sf	OnlyV

Fin = final
In = initial
Iv = intervocalic
Lm = leftmost
Rm = rightmost

→ all targets of DMP are phonologically adjacent to their trigger(s)

Blocking of DMP: Yine

(Matteson, 1965; Lin, 1997; Zimmermann, 2013; Hanson, 2010)

- an arbitrary class of suffixes$_{\alpha_-}$ causes deletion of a preceding vowel
- only an arbitrary class of morphemes$_{\alpha}$ undergoes this deletion

(14) Doubly conditioned vowel deletion in Yine (Hanson, 2010)

a.	n-heta$_{\alpha}$-$_{\alpha_-}$lɨ 1sg-see-3sgm	netlɨ	'I see him/it'
b.	n-hinka$_{\alpha}$-na$_{\alpha}$-tnaka$_{\alpha}$-$_{\alpha_-}$lɨ 1sg-shoot-cmpv-reit-3sgm	nɨnkanatnaklɨ	('I shot one again')
c.	tçirika$_{\alpha}$-ka$_{\alpha}$ rub-smlf	tçirikaka	'to ignite'
d.	n-heta$_{\alpha}$-wa-$_{\alpha_-}$lɨ 1sg-see-impfv-3sgm	netawalɨ	'I'm still looking at it'

→ vowel deletion is blocked if trigger and undergoer are non adjacent: *netwalɨ (14-c)

Database: Blocking of DMP and non-adjacency

- 8 patterns have a context where DMP is blocked although both cooperating morphemes are present ('NoDMP')
- 8 patterns have a context where the cooperating elements are underlyingly non-adjacent ('ulNA')

	Language	NoDMP	ulNA
1.	Finnish	NA	No DMP
3.	Lakhota	NA	No DMP
7.	Guébie A	-	DMP+OW
8.	Guébie B	NA	No DMP
12	Yine	NA	No DMP
20.	Amuzgo	Comp	-
27.	Chimila	NA	No DMP

	Language	NoDMP	ulNA
28.	Mao	NA	No DMP
33.	Donno So	NA NA	No DMP

Comp = competition
NA = non-adjacency
OW = overwriting

- → 7 patterns: blocking ↔ non-adjacency
- → Guébie A: DMP despite underlying non-adjacency: Overwriting, cf. below
- → Amuzgo: blocking of DMP without underlying non-adjacency: Competition, cf. below

2.2. And the evidence for phase-based locality?

Data discussed in Sande (2020)

- 6 examples for DMP are discussed
- for 7 contexts, both theories make the same prediction:

(15) Same prediction for phase-based locality and adjacency

			GNAG	CbP	Observed
Sacapultec	Adj	SamePh	DMP	DMP	DMP
Guébie	Adj	SamePh	DMP	DMP	DMP
Amuzgo	Adj	SamePh	DMP	DMP	DMP
	NoAdj	DiffPh	No DMP	No DMP	No DMP
Donno So	Adj	SamePh	DMP	DMP	DMP
Siouan	Adj	SamePh	DMP	DMP	DMP
Amahuaca	Adj	SamePh	DMP	DMP	DMP

Empirical evidence for phase-based locality in Sande (2020)

- 'non-adjacent elements can co-trigger a phenomenon, as long as they are introduced in the same phase (Amuzgo, Donno So, Guébie).'
  (Sande, 2020, 479+487, emphasis mine)

(16) Three problems for phonological adjacency

		GNAG	CbP	Observed
Guébie	NoAdj SamePh	**No DMP**	**DMP**	**DMP**
Amuzgo	NoAdj SamePh	**No DMP**	**DMP**	**DMP**
Donno So	NoAdj SamePh	**No DMP**	**DMP**	**DMP**

My claim: No DMP under non-adjacency in any of these cases

- Guébie: There is underlying morpheme non-adjacency but **surface adjacency of phonological elements** via overwriting.
- Amuzgo: There is a straightforward **morphological re-analysis** as a suffixing exponent.
- Donno So: Tonal overwriting affects a larger domain but **DMP is blocked if the cooperating elements are not adjacent.**
  (The original source Heath (2015) reveals a different empirical generalization than implied in Sande (2020) where no examples for a non-adjacent DMP context are given)

2.3. Surface adjacency in Guébie

DMP in Guébie (Sande, 2017, 2019, 2020)

- some $_{\alpha_F}$enclitics/suffixes trigger FVH that only some roots$_{\text{🔒}}$ undergo

(17) Full V-Harmony in Guébie (Sande, 2020, 466+467)

a. Undergoer root+triggering suffix: FVH

bala$^{3.3}$🔒=$_{\alpha_F}$ɔ$^{2.32}$	bɔlɔ$^{2.32}$	'hit him"
jili$^{2.3}$🔒=$_{\alpha_F}$ɔ^{2}	jɔlɔ$^{2.32}$	'steal him'

b. Non-undergoer root+triggering suffix: No FVH

sijo$^{2.3}$=$_{\alpha_F}$ɔ$^{2.32}$	sijɔ$^{2.32}$	'wipe him'
tɛlɨ$^{3.3}$=$_{\alpha_F}$ɔ^{2}	tɛlɔ$^{3.2}$	'carve him'

c. Undergoer root+non-triggering suffix: No FVH

bala$^{3.3}$🔒=e^{3}	bale$^{3.3}$	'hit me'
jɨla$^{3.2}$🔒-ɔ^{2}	jɨlɔ$^{3.2}$	'be asked'

DMP in Guébie: ulNA contexts

- speaker variation if a suffix intervenes between trigger$_{\alpha_{-}}$ and $_{\alpha}$target

(18) Guébie B: FVH blocked across an intervener (Sande, 2020, 467)

a. bala$_{\alpha}$-ll=$_{\alpha_{-}}$ɔ balalɔ 'hit'.pfv-appl-3.sg.acc

b. jɪla$_{\alpha}$-A=$_{\alpha_{-}}$ɔ jɪlaɔ 'ask'-caus-3-sg-acc

➙ non-adjacency → No DMP

(19) Guébie A: FVH across an intervener (Sande, 2020, 467)

a. bala$_{\alpha}$-ll=$_{\alpha_{-}}$ɔ b ɔ l ɔ lɔ 'hit'.pfv-appl-3.sg.acc

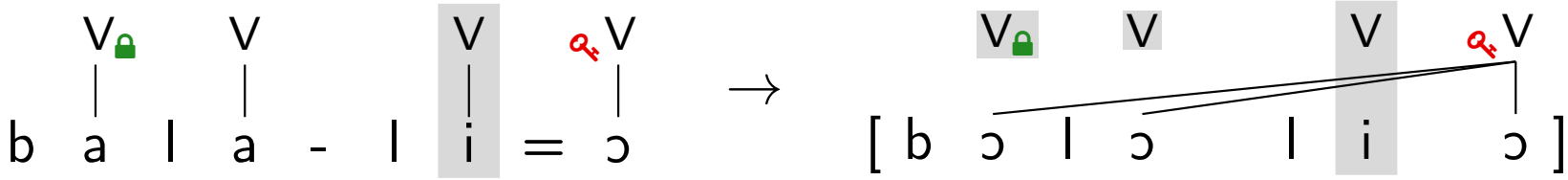
b. jɪla$_{\alpha}$-A=$_{\alpha_{-}}$ɔ j ɔ l ɔ ɔ 'ask'-caus-3-sg-acc

➙ DMP although trigger and target are non-adjacent?

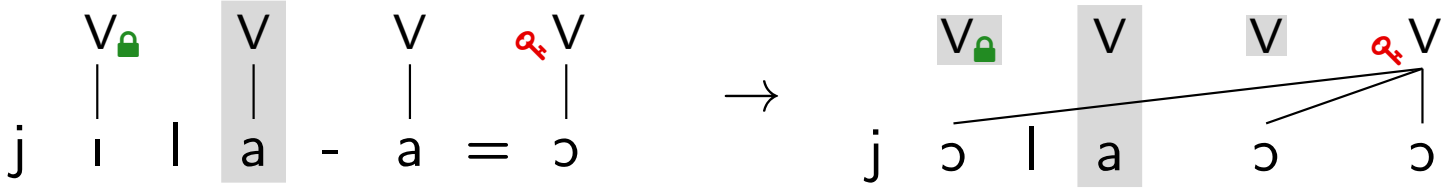
No non-adjacency in Guébie A: Overwriting of interveners

(20) GNA account of FVH: Association adjacency

a. Underlying non-adjacency: appl



b. Underlying non-adjacency: caus



➙ the cooperating phonological elements are **phonologically adjacent**: trigger can associate to target without any crossing association lines

2.4. An adjacent suffix in Amuzgo

DMP in Amuzgo (Kim, 2016, 2018; Kim and Sande, 2020; Palancar, 2021)

- has five level tones (H, M, M+, L, L+)
- 1/2.ps.sg are marked by tonal overwriting patterns which are specific to stem classes: DMP
- 3.ps.sg shows underlying stem tones

(21) Person tone overwriting (Kim, 2016, 206)

	'sing'$_{a}$	'enter'$_{b}$	'eavesdrop'
3.sg	ʔ^{H}-ta^{M}	ʔ^{H}-βa^{M}	ʔ^{H}-nda^{M}
1.sg$_{a}$	ma^{M}-ta HM	ma^{M}-βa HM	ma^{M}-nda^{M}
2.sg$_{b}$	ma^{M}-ta-ʔ^{M}	ma^{M}-βa-ʔ HM	ma^{M}-nda-ʔ^{M}

(22) Inflectional tone classes (Kim, 2016, 215)

class	A/I	B/J	D	K	G	N	E	F	L	O	C	H	M
1.sg	HM	HM	HL	M	L	M	M	L+	L+	L	HM	L	HL
2.sg	HM	M	L	HL	HM	L	M	L+	L	L	L+	M	HL

Blocked DMP in Amuzgu

- causative: /si^{H}-/ prefix and tonal overwriting for some forms

(23) Causative formation (Kim, 2018, 10-13)

a. 'Higher' tones: HM in 1/2

	'shrink'	'beat, stir'	'widen'
3.sg	si^{H}-chho^{H}	si^{H}-nʲʔen^{MH}	si^{H}-to^{M+}
1.sg	si^{H}-chhɔ^{HM}	si^{H}-nʲʔɛn^{HM}	si^{H}-tɔ^{HM}
2.sg	si^{H}-chhoʔ^{HM}	si^{H}-nʲʔenʔ^{HM}	si^{H}-toʔ^{HM}

b. 'Lower' tones: Underlying tone throughout

	'level'	'dissolve'	'char'
3.sg	si^{H}-su^{M}	si^{H}-nda^{HM}	si^{H}-nʔen^{L+}
1.sg	si^{H}-suʔ^{M}	si^{H}-nda^{HM}	si^{H}-nʔɛn^{L+}
2.sg	si^{H}-su^{M}	si^{H}-ndaʔ^{HM}	si^{H}-nʔenʔ$^{L+}$

Blocked DMP in Amuzgu

➙ no person tones (=DMP) in the causative

(24) No person tones in the causative (Kim and Sande, 2020, 4)

	'run' compl	'cause to run' compl
3.sg	hna^{M}-nɔ̃^{M}	si^{H}-na^{M}-nɔ̃^{M}
1.sg	hna^{M}-nɔ̃ HM	si^{H}-na^{M}-nɔ̃^{M}
2.sg	hna^{M}-nɔ̃ʔ L+	si^{H}-na^{M}-nɔ̃ʔ^{M}

- crucial for the argument: Other prefixes (25) surface with person-tones

(25) Other prefixes do not block DMP (Sande, 2020, 487)

	incompletive	potential	
3.sg	ʔ^{H}-k^{w}heʔ^{MH}	n^{H}-k^{w}heʔ^{MH}	/k^{w}heʔ^{MH}/ 'arrive (here)'
1.sg	ma^{M}-k^{w}hɛ L	n^{H}-k^{w}hɛ L	
2.sg	ma^{M}-k^{w}heʔ L	n^{H}-k^{w}heʔ L	

Blocked DMP in Amuzgo: CbP

- all prefix contexts (caus, incmpl, pot,...) involve non-adjacency between the cooperating person-morpheme and the root
- DMP is still possible as long as no phase boundary is introduced (incmpl, pot,...)

→ the **causative introduces a phase boundary**

(26) a. Phase boundary: Blocked DMP

[**person features** (**Ph** [$\text{Voice}_{\text{Caus}}$ [**v** [verb root]]]]

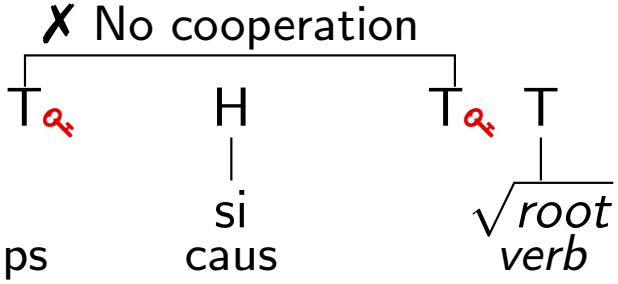
b. No phase boundary: DMP

[**person features** [$\text{Asp}_{\text{Incompl}}$ [**v** [verb root]]]]

The argument against phonological adjacency

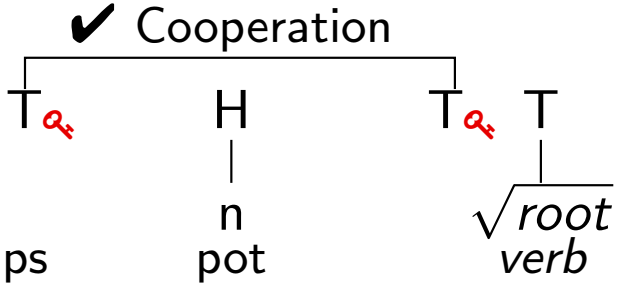
- in a GNA(G) account, blocking of DMP in the causative can be explained by phonological non-adjacency

(27) Prefix tones block cooperation in the Causative



- but then the DMP in the inc/pot involves **non-adjacency**!

(28) Prefix tones don't block cooperation in the potential



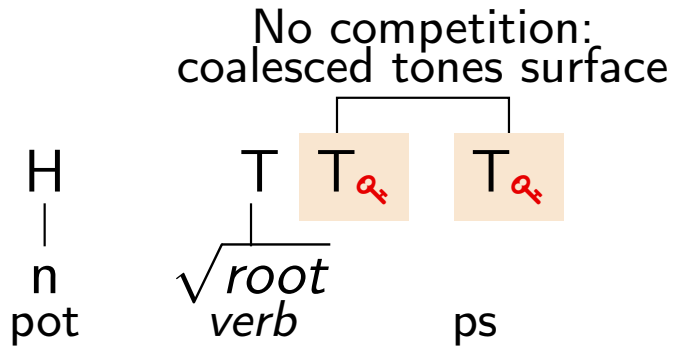
GNAG's answer: Reanalysis as a suffix

- person tones are assumed to be suffixing and thus **always adjacent** to the root
  (the only segmental person marker (2.sg /-ʔ/) is a suffix! (Kim, 2016, 205))

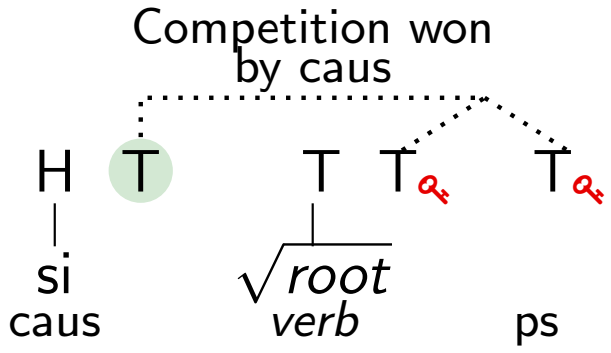
- blocking of DMP in the causative: the causative triggers tonal overwriting that is 'more important' than the DMP overwriting
  = **competition** of different morphological tone patterns

(29) Adjacency between suffixed person tones and the root

a. Potential



b. Causative



The typology of DMP and phonological adjacency

The 35 DMP patterns are all restricted by phonological adjacency

1. The cooperating elements are adjacent in all cases of successful DMP.
2. If the cooperating elements are not adjacent, DMP is blocked.

   Cf. below: Guébie
3. If DMP is blocked, the cooperating elements are not adjacent or the DMP pattern competes with another morphological alternation.

   Cf. below: Amuzgo

3. A representational account of DMP: GNAG

3.1. Background

Background assumptions: GNAG

1. Morpheme-specific phonology follows from Generalized Nonlinear Affixation

2. All linguistic symbols have **activity** that can gradiently differ and result in **gradient constraint violations**:
   - weaker element are not protected 'as much' by faithfulness constraints
   - markedness constraints are not violated 'as much' by a weaker element

   (GSR, e.g. Smolensky and Goldrick, 2016; Rosen, 2016, 2019; Zimmermann, 2019, 2021; Walker, 2020)

3. There is no deletion: Non-realization=zero activity

   (cf. 'containment' (Prince and Smolensky, 1993/2002; van Oostendorp, 2003; Revithiadou, 2007))

4. Coalescence is only possible between adjacent elements (including elements with activity 0!)

3.2. Mian in GNAG

Recall: Tone overwriting in Mian

- only the combination of two triggers$_{\alpha_{\pm}}$ results in H-overwriting

(30) a. Triggering root+triggering suffix: H on subject marker

dolɑ̂$_{\alpha_{\pm}}$-b$_{\alpha_{\pm}}$-i=be	dolɑ̂b í be	'I poured'
singɑ̂$_{\alpha_{\pm}}$-b$_{\alpha_{\pm}}$-i=be	singab í be	'I wrote'

b. Triggering root+non-triggering suffix: No H

dolɑ̂$_{\alpha_{\pm}}$-b-i=be	dolɑ̂bibe	'I am pouring'
singɑ̂$_{\alpha_{\pm}}$-b-i=be	singabibe	'I am writing'

c. Non-triggering root+triggering suffix: No H

gwi-b$_{\alpha_{\pm}}$-i=be	gwibibe	'I poisoned'
ge-b$_{\alpha_{\pm}}$-i=be	gebibe	'I said'

GNAG representations

(31) GNAG representations for Mian

Roots		Suffixes	
a. Non-trigger	b. Trigger	c. Non-trigger	d. Trigger
	L H L H 1 1 1 .5		H .5
s i n g a	d o l a	b	b

Gradient constraint violations: Intuition

- a weak tone cannot be realized and activity can't be added
- adjacent identical tones can coalesce and **fuse their activity**

Constraints

(32)

a. *Wk_T: Assign -(1-x) violations for every tone T⊗ if x<1.

b. $Id(A)_T$: Assign -Δ violation for every input tone(s) T with the sum of activity x that correspond(s) to output tone(s) N with the sum of activity y where Δ is the differential between x and y.

c. T→TBU: Assign -x violation for every tone that is not associated to a TBU.

d. MaxT: Assign -x violations for every input tone T⊗ that corresponds to output tone T⓪.

e. UnifT: Assign -1 violation for every output tone that corresponds to more than one input tones.

- Note the formulation of $Id(A)_\mu$: Adding/subtracting activity from a μ induces a violation but **joining activities by coalescence** does not

Tableau 1: Only one cooperating morpheme: No H-overwriting

(33)

	*Wk$_T$	Id(A)$_T$	T→TBU	MaxT	UnifT	$\mathcal{H}$
$L_a H_b L_c H_d$ (1) (1) (1) (.5) d o l a - b - i = b e	∞	∞	10	5	1	$\mathcal{H}$
a. $L_a H_b L_c$ (1) (1) (1) H_d (.5) d o l a b i b e			-0.5			-5
b. $L_a H_b L_c$ (1) (1) (1) H_d (.5) d o l a b i b e	-0.5					-∞
c. $L_a H_b L_c$ (1) (1) (1) H_d (1) d o l a b i b e		-0.5				-∞
☞ d. $L_a H_b L_c H_d$ (1) (1) (1) (0) d o l a b i b e				-0.5		-2.5

Tableau 2:Two cooperating morphemes: Coalescence and H-overwriting

(34)

	*Wk$_T$	Id(A)$_T$	T→TBU	MaxT	UnifT	$\mathcal{H}$
$L_a H_b L_c H_d \; H_e$ (1) (1) (1) (.5) (.5) — d o l a - b - i = b e	∞	∞	10	5	1	$\mathcal{H}$
a. $L_a H_b L_c H_d H_e$ (1) (1) (1) (.5) (.5) — d o l a b i b e			-1			-10
b. $L_a H_b L_c H_d H_e$ (1) (1) (1) (0) (0) — d o l a b i b e				-1		-5
☞ c. $L_a H_b L_c \; H_{d,e}$ (1) (1) (1) (1) — d o l a b i b e					-1	-1

3.3. Guébie A in GNAG

Recall: FVH in Guébie

- only the combination of a trigger$_{\text{🔑}}$ and an undergoer$_{\text{🔒}}$ results in FVH
- undergoer$_{\text{🔒}}$ can optionally loose their initial vowel

(35)

a.	bala$^{3.3}$$_{\text{🔒}}$	bala$^{3.3}$	∼ bra^{3}	'hit'
b.	sijo$^{2.3}$	sijo$^{2.3}$		'wipe'
c.	bala$^{3.3}$$_{\text{🔒}}$=$_{\text{🔑}}$ɔ$^{2.32}$	bɔlɔ$^{2.32}$	∼ brɔ^{2}	'hit him"
d.	sijo$^{2.3}$=$_{\text{🔑}}$ɔ$^{2.32}$	sijɔ$^{2.32}$		'wipe him'
e.	bala$^{3.3}$$_{\text{🔒}}$=e^{3}	bale$^{3.3}$	∼ bre^{3}	'hit me'
f.	bala$_{\text{🔒}}$-ll-$_{\text{🔑}}$ɔ	bɔlɔlɔ	∼ brɔlɔ	'hit him (with)'

(Sande, 2017, 137)

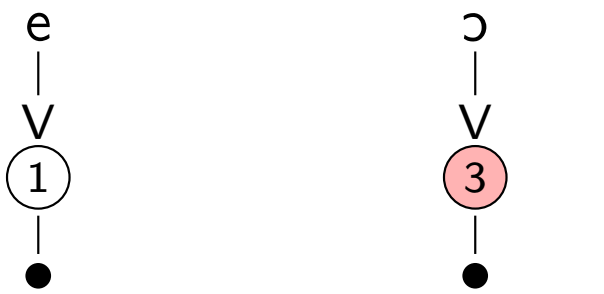
(Some of the optional V-deletion forms are not given as such in the source but constructed according to the generalizations given)

GNAG representations

(36) GNAG representations for Guébie A

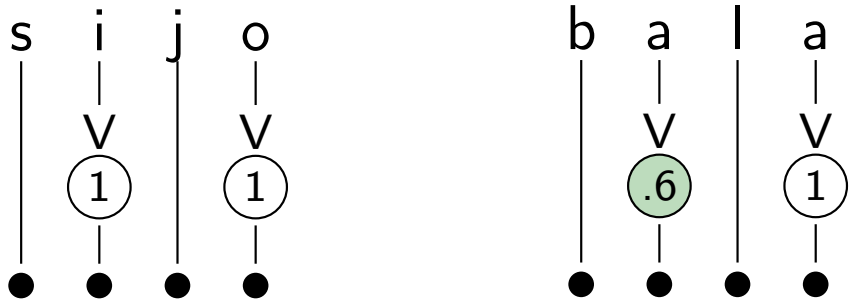
Enclitics

a. Non-trigger b. Trigger



Roots

c. Non-undergoer d. Undergoer



(●=segmental root node, V=vocalic (place) features)

Gradient constraint violations: Intuition

- a trigger violates the constraint favoring FVH more
- a trigger can associate to more root nodes more easily
- an undergoer is easier to delete
  (=UG for FVH and optional deletion!)

Constraints

(37)

a. #Vpl!: Assign -x violations for each V-place node V⊗ that is not associated to the initial root node of the PrWd.

b. M$_{\bullet}$: Assign -x violations for every input root node $\bullet_{\otimes}$ that corresponds to output root node $\bullet_{\textcircled{0}}$.

c. M$_{Vpl}$: Assign -x violations for every input V-place node V⊗ that corresponds to output V-place node V⓪.

d. M$_{\#Vpl}$: Assign -x violations for every input V-place node V⊗ that corresponds to output V-place node V⓪that is initial in a PrWd.

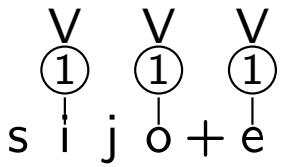
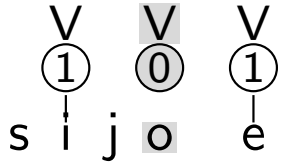
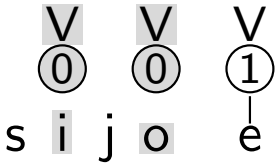
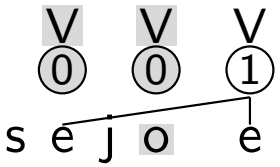
e. D$_{AL}$: Assign a violation mark for every association between a root node • and a V-place node V that is present in the output but not in the input.

f. *W$_{Vpl}$: Assign -(1-x) violations for every V-place node V⊗ if x<1.

g. *Sp$_{Vpl}$: For every configuration where a V-place node V⊗ is associated with *n* number of root nodes:
Assign (x-n) violations if (x-n)<0.

Tableau 1: No cooperating morpheme present

(38) Non-undergoer+non-trigger

	*W$_{Vpl}$ 312	M$_{\#Vpl}$ 245	*Sp$_{Vpl}$ 128	M$_{Vpl}$ 70	\#Vpl! 64	M● 0	D$_{AL}$ 0	$\mathcal{H}$
☞ a. 				-1	-1	-1		-104
b. 		-1		-2		-2		-340
c. 		-1	-1	-2		-1	-1	-469

(weights tested with the MaxEnt Grammar Tool (Hayes, 2009))

Tableau 2: Only one cooperating morpheme present

(39) Undergoer+non-trigger

V V V .6 1 1 b a l a + e	*W_{Vpl} 312	$M_{\#Vpl}$ 245	*Sp_{Vpl} 128	M_{Vpl} 70	#Vpl! 64	M● 0	D_{AL} 0	$\mathcal{H}$
☞ a. V V V .6 0 1 b a l a e	-0.4			-1	-1	-1		-222
☞ b. V V V 0 0 1 b a l a e		-0.6		-1.6		-2		-222
c. V V V 0 0 1 b e l a e		-0.6	-1	-1.6		-2	-1	-351

Tableau 2: Only one cooperating morpheme present

(40) Non-undergoer+trigger

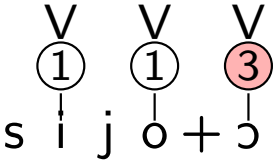
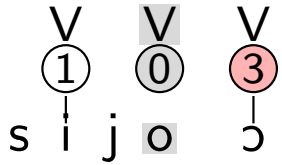
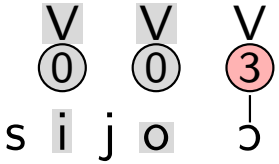
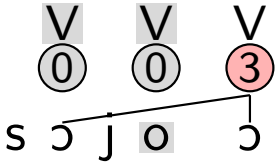
	*W$_{Vpl}$ 312	M$_{\#Vpl}$ 245	*Sp$_{Vpl}$ 128	M$_{Vpl}$ 70	\#Vpl! 64	M● 0	D$_{AL}$ 0	$\mathcal{H}$
								
☞ a. 				-1	-3	-1		-222
b. 		-1		-2		-2		-340
c. 		-1	0	-2		-2	-1	-340

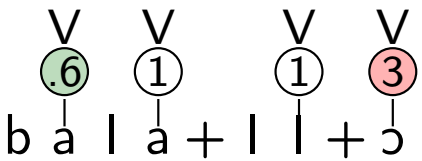
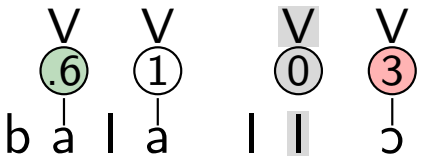
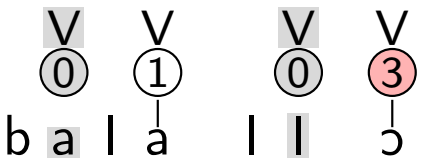
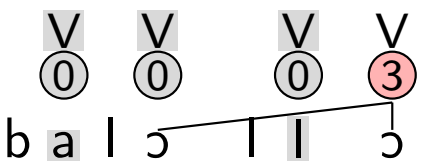
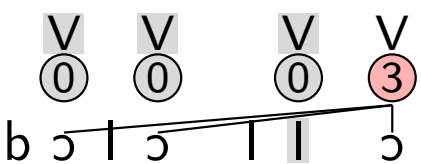
Tableau 4: Both cooperating morphemes present

(41) Undergoer+trigger

	*W$_{Vpl}$ 312	M$_{\#Vpl}$ 245	*Sp$_{Vpl}$ 128	M$_{Vpl}$ 70	\#Vpl! 64	M● 0	D$_{AL}$ 0	$\mathcal{H}$
V(.6) V(1) V(3) — b a l a + ɔ								
a. V(.6) V(0) V(3) — b a l a ɔ	-0.4			-1	-3	-1		-340
☞ b. V(0) V(0) V(3) — b a l a ɔ		-0.6		-1.6		-2		-222
☞ c. V(0) V(0) V(3) — b ɔ l a ɔ		-0.6	0	-1.6		-1	-1	-222

Tableau 4: Both cooperating morphemes and an intervener

(42) Undergoer+intervener+trigger

		*W$_{Vpl}$ 312	M$_{\#Vpl}$ 245	*Sp$_{Vpl}$ 128	M$_{Vpl}$ 70	\#Vpl! 64	M● 0	D$_{AL}$ 0	$\mathcal{H}$
									
a.		-0.4			-1	-4	-1		-399
b.			-0.6		-1.6	-3	-2		-399
☞ c.			-0.6		-2.6		-2	-1	-267
☞ d.			-0.6		-2.6		-1	-2	-267

And Guébie B?

(43) Intervention context: Speaker variation

	Guébie A	Guébie B
a. /sijo-e/	sije	
b. /sijo-ɑ꜀ɔ/	sijɔ	
c. /balaₐ-e/	bale ∼ ble	
d. /balaₐ-ɑ꜀ɔ/	bɔlɔ∼ blɔ	
e. /balaₐ-ll-ɑ꜀ɔ/	**bɔlɔlɔ∼ blɔlɔ**	**balalɔ∼ blalɔ**

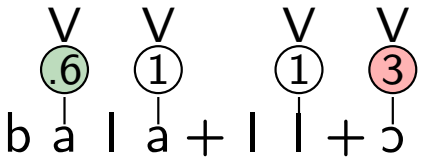
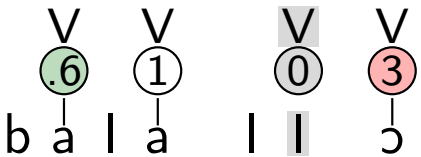
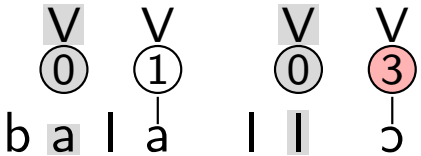
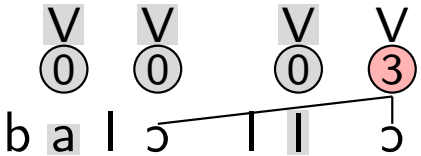
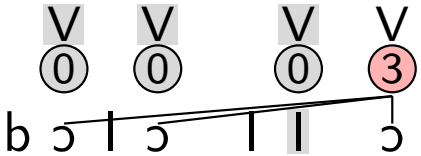
(44) GNAG account: Same representations + Different grammar

	$*W_{Vpl}$	$M_{\#Vpl}$	$*Sp_{Vpl}$	M_{Vpl}	#Vpl!	M●	D_{AL}
Guébie A:	312	245	128	70	64	0	0
Guébie B:	298	0	135	291	55	0	0

(weights tested with the MaxEnt Grammar Tool (Hayes, 2009))

Guébie B: Intervention tableau

(45) Undergoer+intervener+trigger in Guébie B

	*W$_{Vpl}$ 298	M$_{\#Vpl}$ 0	*Sp$_{Vpl}$ 135	M$_{Vpl}$ 291	\#Vpl! 55	M● 0	D$_{AL}$ 0$\mathcal{H}$	
☞ a. 	-0.4			-1	4	-1		-630.2
☞ b. 		-0.6		-1.6	-3	-2		-630.2
c. 		-0.6		-2.6		-2	-1	-756.6
d. 		-0.6		-2.6		-1	-2	-756.6

4. Summary and discussion

Summary of the main claims

1. The typology of DMP is restricted by **phonological adjacency**.
2. A formal implementation in GNAG correctly predicts this restriction from **independently motivated phonological concepts**.
3. DMP patterns provide **no argument for phase-based locality**; adding to the repeated criticism raised against phase-based locality in phonology in general (e.g. Bonet et al., 2019).

Is this an argument *against* phase-based locality in phonology?

1. An undergeneration argument:
Not all blocking of DMP is due to a phase boundary?

- it indeed can not: interveners can be in a structural position that is always present
  - e.g. Yine: one aspect marker is a non-undergoer and intervenes: blocking; another aspect marker is an undergoer and participates

→ but any undergeneration argument for CbP suffers since the the theory is of course perfectly **compatible with purely phonological explanations**

  - blocking of FVH across an intervener in Guébie B: 'the initial root vowel in alternating roots is deficient or 'weak"

(468, FN8, emphasis mine Sande, 2020)

Is this an argument *against* phase-based locality in phonology?

2. An overgeneration argument: Too many imaginable DMP patterns?

- there are no Adj DiffPh cases
- none of the 35 DMP's involves an alternation that **affects all material within a phase**
  - again: a retreat to phonological restrictions
    e.g. domain for tonal overwriting in Donno So: 'the relevant domain of application is a prosodic constituent [...] within the phase the phase'
    (476, FN11, emphasis mine Sande, 2020)

➙ A superset-theory argument

To correctly predict the typology of DMP, CbP needs to retreat to phonological explanations that are already sufficient in itself

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