

Arnott lists nineteen ‘extensions’ in Gombe Fula (p. 334; examples pp. 340-364)

(4)	Label	Shape	Label	Example
	1	- <u>d</u>	Denominative (DEN)	fur- d -a ‘be grey’
	2	-t	Reversive (REV)	taar- t -a ‘untie’
	3	-t	Repetitive (REP)	soor- t -o ‘sell again’
	4	-t	Reflexive (REF)	ndaar- t -o ‘look at oneself’
	5	-t	Retaliative (RET)	jal- t -o ‘laugh at... in turn’
	6	-t	Intensive (INT)	yan- t -a ‘fall heavily’
	7	-d	Associative (ASS)	nast- id -a ‘enter together’
	8	-d	Comprehensive (COM)	janng- id -a ‘read, learn all...’
	9	-n	Causative (CAU)	woy- n -a ‘cause to cry’
	10	-r	Modal (MOD)	<u>be</u> -mah- ir -i <u>di</u> ‘they built them with’
	11	-r	Locative (LOC)	’o-’yiw- r -ii ‘he came from’
	12	-an	Dative	’o-wolw- an -ii ‘spoke to’
	13	-indir	Reciprocal	<u>be</u> -koomn- indir -ii ‘they greeted e.o.’
	14	-ootir	Reciprocal	<u>be</u> -tokk- ootir -i ‘they followed e.o.’
	15	-kin	Simulative	wum- kin -o ‘pretend to be blind’
	16	-law	Celerative	’o-mabb- ilaw -ii ‘he shut... quickly’
	17	-oy	Distantive	yahu wi-’ oy - <u>be</u> ‘go and tell them’
	18	RED-n	Iterative	’o-wari- war -in-ii ‘he kept coming’
	19	RED-tir	Iterative-Reciprocal	<u>be</u> don-pii- pii -tir-a ‘they keep hitting e.o.’

The consonantal extensions sometimes take the form -iC; I treat [i] as epenthetic because its distribution is predictable: the -C form occurs after roots ending in most single consonants, while the -iC form occurs after roots ending in consonant clusters and variably after some single consonants.

12-19 conform to Scope hypothesis (Rice 2000): affix order corresponds to semantic scope

- (5) Simulative -*kin* precedes Celerative -*law* Simulative -*kin* precedes Distantive -*oy*
 ’o-dan-**kin**-**ilaw**-ake mi-dan-**kin**-**oy**-to
 ‘He quickly pretended to be asleep’ (p. 368) ‘I’ll go over there and pretend to be asleep’ (p. 368)

Reciprocal -*ootir* precedes Distantive -*oy*

be-ndonnd-**ootir**-**oy**-ii

‘They went and helped each other up with their loads’ (p. 369)

Homophonous or identical extensions can cooccur:

- (6) T-T T-T
 mi-femmb-**it-it**-oto mi-’yam-**t-it**-oo-be
 1sg-shave-REF-REP-future 1sg-ask-INT-REP-subjunctive-3pl
 ‘I will shave myself again’ (p. 365) ‘(If you want,) I’ll interrogate them again’ (p. 365)

mi-fod-**t-it**-oo-dum

1sg-pull-INT-REP-subjunctive-3sg

‘(If you want,) I’ll pull it tight again’ (p. 365)

heesh-**it-it**-

be.older-INT-INT

‘be [much] older than’ (p. 366)

’o-’yam-i,
 3sg-ask-past

T
 ’o-’yam-**t**-ii,
 3sg-ask-REP-past

T-T
 ’o-’yam-**t-it**-ii,
 3sg-ask-REP-REP-past

T-T-T
 ’o-’yam-**t-it-it**-i
 3sg-ask-REP-REP-REP-past

‘He asked, and asked again, and again, and again’ (p. 366)

ndaar-u-mi,

ndaar-**t**-ii-mi,

ndaar-**t-it**-ii-mi,

ndaar-**t-it-it**-ii-mi

look-past-1sg look-REP-past-1sg look-REP-REP-past-1sg

look-REP-REP-REP-past-1sg

‘I looked, and looked again, and again, and again’ (p. 366)

T-T
fabb-it-it-
 postpone-INT-INT
 ‘defer, postpone’ (p. 366)

N-N
 ko hebb-**in-in**-i-maa tummude
 what be.full-CAU-CAU-past-2sg calabash
 ‘What made you fill the calabash?’ (p. 366)

N-N
 ko jipp-**in-in**-i-mo kare maako
 what get.down-CAU-CAU-past-3sg load big
 ‘What made him put down his load?’ (p. 366)

Arnott’s examples obeying TDNR

(7) a. T precedes D

’o-mabb-**it-id**-ii jolde fuu
 3sg-close-REV-COM-past doors all
 ‘He opened all the doors’ (p. 367)

’o-jab-**t-id-ir**-an-ii-yam depte ’e semmbe
 3sg-take-INT-COM-MOD-dative-past-1sg books with force
 ‘He snatched all my books from me by brute force’ (p. 367)

b. T precedes N, N precedes R

’o-yam-**d-it-in-ir**-ii-mo lekki gokki kesi
 3sg_i-healthy-DEN-REV-CAU-MOD-past-3sg_j medicine other new
 ‘He_i cured him_j with some new medicine’ (p. 368)

c. T precedes R

war-**t-ir**- ’o-mabb-**it-ir**-ii yolnde hakkiil
 come-REV-MOD- 3sg-close-REV-MOD-past door slowly
 ‘bring back’ (p. 367) ‘He opened the door slowly’ (p. 367)

d. D precedes R

no-njood-**od-or**-too-mi ’e mabbe
 how-sit-ASS-MOD-rel.fut-1sg with 3pl
 ‘How shall I sit/live with them?’ (p. 367)

to-njoob-**od-or**-too-mi ’e mabbe
 where-sit/live-ASS-LOC-rel.fut-1sg with 3pl
 ‘Where should I sit with them?’ (p. 367)

Arnott’s examples violating TDNR

(8) a. D precedes T

mi-wol-**d-it**-at-aa ’e mabbe
 1sg-speak-COM-REP-fut-neg with 3pl
 ‘I won’t speak with them again’ (p. 368)

b. N precedes T

mi-hul-**n-it**-oo-mo
 1sg-fear-CAU-RET-subjunctive-3sg
 ‘(If he frightens me,) I’ll frighten him in turn’ (p. 368)

- c. N precedes D
 'o-nyaam-**n-id-ii-di**
 3sg-eat-CAU-COM-past-3pl
 'He fed them all' (p. 368)

- d. R precedes D
 mi-war-**t-ir-id-an-te-di** mi-yaa-**r-id-ii-di**
 1sg-come-REV-MOD-COM-DAT-future-3pl 1sg-take-MOD-COM-past-3pl
 'I'll bring them all back to you' (p. 368) 'I took them all' (p. 368)

Arnott p. 367: "Variation from the usual order seems to be confined to cases where the basic radical and first extension... frequently occur together as an extended radical..."

Lexicalized forms often have idiomatic meanings not predictable from the meaning of their parts, but these forms do not have idiomatic meanings.

- Arnott assumes that *mi-wol-d-it-at-aa 'e mabbe* 'I won't speak with them again' contains a lexicalized stem, *wold* 'speak with' (from *wol* 'speak' plus *-d* Comprehensive)
- This saves the TDNR generalization, but the only evidence for this lexicalized stem is that otherwise the suffix order in this example violates the TDNR generalization.
- Thus, the claim that the exceptions are lexicalized is circular.

'Exceptional' forms will be addressed again later.

1.2 A P >> M account of Gombe Fula affix order

P constraint prohibits decrease in sonority from one suffix to the next:

- (9) *FALLINGSONORITY (EXT): Within EXT, when any consonant C₁ precedes consonant C₂, C₂ may not be less sonorous than C₁.

M constraint (SCOPE; Condoravdi and Kiparsky 1998) requires order to correspond to scope:

- (10) SCOPE: Morphological constituency reflects scope.

The ranking P >> M selects forms with the TDNR order, even when the order violates SCOPE.

- (11) **'o-irt-**in-ir-ii** kam supu 'o kuddu 'He made me stir the soup with a spoon'¹
 CAU-MOD

/irt, -r, -n/	*FALLINGSONORITY(EXT)	SCOPE
irt-ir-in-	*!	
☞ irt-in-ir		*

This ranking allows for 'exceptional' forms, selected by CONTIGUITY (McCarthy and Prince 1995)

- (12) CONTIGUITY: Elements that are adjacent in the input must be adjacent in the output.

- (13) 'o-nyaam-**n-id-ii** 'He fed all (of them)'
 CAU-COM

/nyaamn, -d/	*FALLINGSONORITY(EXT)	SCOPE	CONTIGUITY
☞ nyaamn-id-			
nyaam,di,n-			*!

¹ This form is not attested, but constructed based on Arnott's generalization for the sake of the argument since none of Arnott's examples violates SCOPE. This will be discussed again later.

3 problems for the sonority-based P >> M analysis of Gombe Fula:

- [t] and [d] cannot be ordered by sonority if voicing is not relevant for sonority (Cho 1991).
- The relevant consonant sequences are always separated by epenthetic vowels.
- Arnott provides no examples where Scope is violated.

Is P >> M necessary?

1.3 Senegalese Pulaar (spoken near Matam, Senegal)

Consonantal extensions of Senegalese Pulaar

(14)	Shape	Label	Example
	- <u>d</u>	Denominative (DEN)	mi-dom- d -ii 'I became thirsty'
	-t	Separative/Reversive (SEP)	mi-udd- it -ii baafal ngal 'I opened the door'
	-t	Repetitive (REP)	'o-haal- t -ii 'he spoke again'
	-d	Comprehensive/Associative (COM)	mi-udd- id -ii baafe de 'I closed all the doors'
	-n	Causative (CAU)	mi-jang- in -ii 'I taught'
	-r	Modal/Instrumental/Locative (MOD)	mi-dog- r -ii pade 'I ran with shoes'

Scope-based order (more examples of each type provided in Appendix)

- (15) a. T-D
 min-cok-**t-id**-ii baafal ngal
 1pl-lock-REP-COM-past door det.
 'We all locked the door again together'
 (Someone else locked it before)
- b. D-T
 mi-yaa-**d-it**-ii 'e makko
 1sg-go-COM-REP-past with 3sg
 'I went with her again'
- c. T-D
 'o-sok-**t-id**-ii baafe de fof
 3sg-lock-SEP-COM-past doors det. all
 'He unlocked all the doors (at once)'
- d. D-T
 'o-sok-**d-it**-ii baafe de fof
 3sg-lock-COM-SEP-past doors det.all
 'He unlocked all the doors (in seq.)'
- e. T-N
 'o-sood-**it-in**-ii-een deftere nde
 3sg-buy-REP-CAU-past-1pl book det.
 'She made us buy the book again'
 (We bought it before voluntarily)
- f. N-T
 'o-sood-**in-it**-ii-een deftere nde
 3sg-buy-CAU-REP-past-1pl book det.
 'She made us buy the book again'
- g. T-R
 mi-irt-**it-ir**-ii supu 'o kuddu goddo
 1sg-stir-REP-MOD-pastsoup det. spoon different
 'I stirred the soup again with a different spoon'
- h. N-D
 be-njal-**n-id**-ii-mo
 3pl-laugh-CAU-COM-past-3sg
 'We all made him laugh together'
- i. R-D
 be-talg-**ir-id**-ii boggol ngol labi
 3pl-cut-MOD-COM-past rope det. knife
 'They all cut the rope with a knife together'

Invariable order consistent with scope

(16) a. T-N

'o-habb- it-in -ii-kam	hoggol	ngol		(*'o-habb-in-it-ii-kam)
3sg-tie-SEP-CAU-past-1sg	rope	det.		
'He made me untie the rope'				

b. T-R

a-sok- t-ir -ii	baafal	ngal	coktirgal	(*a-sok-r-it-ii)
2sg-lock-SEP-MOD-past	door	det.	key	
'You (sg.) unlocked the door with a key'				

Fixed order inconsistent with scope

(17) T-R

mi-udd- it-ir -ii	baafal	ngal	sawru	(*mi-udd-ir-it-ii)
1sg-close-REP-MOD-past	door	det.	stick	
'I closed the door with a stick again' (the same stick)				

Variable order not inconsistent with scope

(18) a. D-N ~ N-D

mi-woy- d-in -ii-be	~	mi-woy- n-id -ii-be
1sg-cry-COM-CAU-past-3pl		
'I made them cry together'		

b. D-R ~ R-D

mi-nyot- id-ir -ii	simisaaji	meselal	~	mi-nyot- ir-id -ii
1sg-sew-COM-MOD-past	shirts	needle		
'I sewed all the shirts with a needle'				

Variable order sometimes inconsistent with scope

(19) a. N-R ~ R-N

'o-irt- in-ir -ii-kam	supu	'o	labi	~	'o-irt- ir-in -ii-kam
3sg-stir-CAU-MOD-past-1sg	soup	det.	knife		
'He made me stir the soup with a knife' (he used a knife)					

b. R-N ~ N-R

'o-nyot- ir-in -ii-kam	simis	'o	meselal	~	'o-nyot- in-ir -ii-kam
3sg-sew-MOD-CAU-past-1sg	shirt	det.	needle		
'She made me sew the shirt with a needle' (I used a needle)					

Three generalizations regarding the ordering of consonantal verb suffixes in Senegalese Pulaar:

(20) a. Repetitive *-t* precedes Modal *-r* regardless of their relative scope.

b. Causative *-n* and Modal *-r* are freely ordered with each other regardless of their scope.

c. Otherwise, order is determined by scope.

Pulaar does not obey the TDNR generalization:

-All possible pairwise combinations of T, D, N, R are attested except for R-T.

-One of the 3 ordering generalizations happens to agree with TDNR ((20)a), but the others do not.

1.4 Scope-Template account of Senegalese Pulaar

Rice (2000) argues that scope determines order when there is a discernible scope relation among affixes.

Otherwise, order is arbitrary (templatic). Templates are 'emergent'; SCOPE always outranks TEMPLATE.

However, both rankings, SCOPE >> TEMPLATE and TEMPLATE >> SCOPE, are attested:

-SCOPE >> TEMPLATE: Athapaskan (Rice 2000), Chichewa (Hyman 2003)

-TEMPLATE >> SCOPE: Nimboran (Inkelas 1993), Swahili (Stump 1993)

(No evidence for P >> SCOPE.)

In Senegalese Pulaar, TEMPLATE is broken down into three constraints:

(21) T_{REP} PRECEDES R: Repetitive *-t* precedes Modal *-r*.

N PRECEDES R: Causative *-n* precedes Modal *-r*.

R PRECEDES N: Modal *-r* precedes Causative *-n*.

N PRECEDES R and R PRECEDES N are both needed to account for free ordering of Modal *-r* and Causative *-n*

Pulaar affix order is analyzed by ranking the templatic constraints above SCOPE

-Scope determines order as long as the template is not violated.

The ranking T_{REP} PRECEDES R >> SCOPE successfully selects forms where the template and scope agree:

(22) mi-irt-**it-ir**-ii supu 'o kuddu goddo 'I stirred the soup again with a different spoon'
REP-MOD

/irt, -t, -r/	T _{REP} PRECEDES R	SCOPE
☞ irt-it-ir-		
irt-ir-it-	*!	*

This ranking selects forms where satisfaction of TEMPLATE forces a violation of SCOPE:

(23) mi-udd-**it-ir**-ii baafal ngal 'I closed the door with a stick again'
REP-MOD

/udd, -t, -r/	T _{REP} PRECEDES R	SCOPE
☞ udd-it-ir-		*
udd-ir-it-	*!	

This ranking also selects forms with order underdetermined by the template, allowing SCOPE to choose:

(24) mi-habb-**id-it**-ii boggi di 'I untied all the ropes (in sequence)'
COM-SEP

/habb, -t, -d/	T _{REP} PRECEDES R	SCOPE
habb-it-id-		*!
☞ habb-id-it-		

The variable *-n-r* ~ *-r-n* order is selected by variable constraint ranking.

-Ranking #1: N PRECEDES R outranks SCOPE, which outranks R PRECEDES N. This selects forms where Causative *-n* precedes Modal *-r* whether the order agrees with scope ((25)a) or not ((25)b).

(25) a. 'o-irt-**in-ir**-ii-kam supu 'o labi 'He made me stir the soup with a knife'
CAU-MOD (he used a knife)

/irt, -n, -r/	N PRECEDES R	SCOPE	R PRECEDES N
☞ irt-in-ir-			*
irt-ir-in-	*!	*	

- b. 'o-irt-**in-ir**-ii-kam supu 'o kuddu 'He made me stir the soup with a spoon'
CAU-MOD (I used a spoon)

/irt, -r, -n/	N PRECEDES R	SCOPE	R PRECEDES N
irt-in-ir-		*	*
irt-ir-in-	*!		

-Ranking #2: R PRECEDES N >> SCOPE >> N PRECEDES R. This selects forms with the ordering *-r-n* whether the order agrees with scope ((26)a) or not ((26)b).

- (26) a. 'o-irt-**ir-in**-ii-kam supu 'o kuddu 'He made me stir the soup with a spoon'
MOD-CAU (I used a spoon)

/irt, -r, -n/	R PRECEDES N	SCOPE	N PRECEDES R
irt-in-ir-	*!	*	
irt-ir-in-			*

- b. 'o-irt-**ir-in**-ii-kam supu 'o labi 'He made me stir the soup with a knife'
MOD-CAU (he used a knife)

/irt, -n, -r/	R PRECEDES N	SCOPE	N PRECEDES R
irt-in-ir-	*!		
irt-ir-in-		*	*

The two constraint rankings are summarized below:

- (27) Ranking #1: T_{REP} PRECEDES R, N PRECEDES R >> SCOPE >> R PRECEDES N
Ranking #2: T_{REP} PRECEDES R, R PRECEDES N >> SCOPE >> N PRECEDES R

By using template constraints and SCOPE, all M constraints, we can capture Pulaar affix order without P >> M. We now reexamine Gombe Fula to see whether scope plays a role in this dialect as well.

1.5 Scope-based reanalysis of Gombe Fula

Strikingly, all of the ordering data provided in Arnott 1970 are consistent with (28):

- (28) Scope determines affix order.

Of Arnott's 5 exceptional (i.e., non-TDNR) examples, 3 are explainable by scope. In (29), the intended meaning is for Repetitive to have scope over Comitative. Therefore, the 'exceptional' order follows from scope.

- (29) D-T
mi-wol-**d-it**-at-aa 'e mabbe
1sg-speak-COM-REP-future-negative with 3pl
'I won't speak with them again' (p. 368)

In (30), Comitative has scope over Causative. This exception again follows from scope.

- (30) N-D
'o-nyaam-**n-id**-ii-di
3sg-eat-CAU-COM-past-3pl
'He fed them all' (p. 368)

In (31), Retaliative has scope over Causative, since in the alternative interpretation, [[fear in turn] cause], the innermost portion 'fear in turn' is unintelligible. Therefore, this exception follows from scope.

- (31) N-T
 mi-hul-**n-it**-oo-mo
 1sg-fear-CAU-RET-future-3sg
 ‘I’ll frighten him in turn’ (p. 368)

Two remaining exceptions:

- | | |
|--|---|
| <p>(32) mi-yaa-r-id-ii-<u>di</u>
 1sg-take-MOD-COM-past-3pl
 ‘I took them all’ (p. 368)</p> | <p>mi-war-t-ir-id-an-te-<u>di</u>
 1sg-bring-REV-MOD-COM-DAT-fut-3pl
 ‘I’ll bring them all back to you’ (p. 368)</p> |
|--|---|

These are hard to interpret since the function of Modal is unclear, but they do not contradict Scope.

Since no example violates Scope, we have no evidence for a non-Scope principle playing any role.

Furthermore, the scope-based analysis explains the exceptional forms that Arnott ignored.

Recall the 3 problems with the P >> M analysis of Gombé; all are avoided under the new scope-based analysis:

- [t] and [d] cannot be ordered by sonority if voicing is not relevant for sonority
 - Sonority plays no role in the current analysis; -t and -d are ordered by scope.
- The relevant consonant sequences are always separated by epenthetic vowels
 - Since this analysis does not refer to sonority, no extension of the concept is needed.
- Arnott provides no examples where SCOPE is violated.
 - The new analysis does not require positing forms not attested in the grammar.

A final advantage of the scope-based analysis: the behavior of consonantal extensions is unified with the other extensions (#12-19), which are also ordered according to scope.

Neither Senegalese Pulaar nor Gombé Fula exhibits phonologically driven affix order. Order is scope-driven, with some exceptions in Senegalese Pulaar that are not phonologically conditioned.

2. Other results of the survey

Only 4 other possible cases were identified in a survey of hundreds of languages representing all major language families. The existence of templatic affix order is common (see Bloomfield 1962, Zwicky 1985, Anderson 1986, Simpson and Withgott 1986, Speas 1990, Stump 1992, 1993, Inkelas 1993, Hyman and Inkelas 1999, and Good 2003), so the lack of cases of phonologically conditioned affix order is striking and may in itself be considered a negative result for the P >> M prediction. The remaining cases are summarized below:

2.1 Washo (Hokan, California/Nevada; Jacobsen 1973)

Jacobsen 1973 claims that suffixes are reordered “to insure an even distribution of stressed and unstressed syllables, and to draw most sequences of unstressed syllables to the end of the word” (p. 9).

In some examples, affixes occur in an order contrary to their scope relations (Jacobsen 1973: Appendix).

- (33) Causative occurs ‘later’ than expected

a. [geyúliyé:sha]

g^e-yúli-**é:s-ha**

Imper-die-Neg-Caus

Order is [[[die] NEG] CAUS]

*g^e-yúli-**ha-é:s**

*Imper-die-Caus-Neg

‘don’t kill it!’

BUT scope reading is [[[die] CAUS] NEG]

- b. [leyúlidúwahayi]
 1^o-yúli-**dúwe'**-**ha**-i
 1-die-want.to-Caus-Imp Order is [[[die] want] CAUS] IMP]
 * 1^o-yúli-**ha**-**dúwe'**-i
 * 1-die-Caus-want.to-Imp BUT scope reading is [[[die] CAUS] want] IMP]
 'he wants to kill me'

- (34) Imperative occurs 'later' than expected
 [léme'és:shuyi]
 1^o-íme'-**és:s**-**hu**-i
 1-drink-Neg-Imp Order is [[[drink] NEG] IMP]
 * 1^o-íme'-**hu**-**és:s**-i
 * 1-drink-Imp-Neg BUT scope reading is [[[drink] IMP] NEG]
 'we (pl. incl.) aren't drinking'

- (35) Dual Inclusive occurs 'later' than expected
 [léme'és:ilegi]
 1^o-íme'-**és:s**-**fi**-leg-i
 1-drink-Neg-Dual.Incl-Rec.Past-Imp Order is [[[drink] NEG] DU INCL]...
 * 1^o-íme'-**fi**-**és:s**-leg-i
 * 1-drink-Dual.Incl-Neg-Rec.Past-Imp BUT scope reading is [[[drink] DU INCL] NEG]...
 'we (du. incl.) didn't drink'

- [léme'hé:fi'ti'i]
 1^o-íme'-**hé:f**-**fi**-ti'-i
 1-drink-Interr-Du.Incl-Inter.Fut-Imp Order is [[[drink] INTERR] DU INCL]...
 * 1^o-íme'-**fi**-**hé:f**-ti'-i
 * 1-drink-Du.Incl-Interr-Inter.Fut-Imp BUT scope reading is [[[drink] DU INCL] INTERR]...
 'are we (du. incl.) going to drink?'

- (36) Plural Inclusive occurs 'later' than expected
 a. [léme'hé:fhugabi]
 1^o-íme'-**hé:f**-**hu**-gab-i
 1-drink-Interr-Pl.Incl-Dist.Fut-Imp Order is [[[drink] INTERR] PL INCL]...
 * 1^o-íme'-**hu**-**hé:f**-gab-i
 * 1-drink-Pl.Incl-Interr-Dist.Fut-Imp BUT scope reading is [[[drink] PL INCL] INTERR]...
 'are we (pl. incl.) going to drink?'

- b. [léme'eshé:fhugabi]
 1^o-íme'-**és:s**-**hé:f**-**hu**-gab-i
 1-drink-Neg-Interr-Pl.Incl-Dist.Fut-Imp Order is [[[drink] NEG] INTERR] PL INCL]...
 * 1^o-íme'-**hu**-**és:s**-**hé:f**-gab-i
 * 1-drink-Pl.Incl-Neg-Interr-Dist.Fut-Imp BUT scope reading is
 'aren't we (pl. incl.) going to drink?' [drink] PL INCL] NEG] INTERR]...

Under P >> M, interrankings of foot structure constraints with SCOPE may select the correct outputs. However, we can analyze this as prosodic subcategorization: stressed suffixes subcategorize for a (trochaic) foot to their left. Further research may reveal whether such an analysis is consistent with the phonology of Washo.

2.2 Awtuw (Ram, Papua New Guinea; Feldman 1986)

Descriptively, the Awtuw verb has 13 affix slots (Feldman p. 53).

-The plural *-m* occurs in suffix position +3 or +6.

-m cannot appear in +3 if -re (Future) or -rere (Desiderative) appears in +5 UNLESS -iy (Imperfective) or -kay (Perfect) is in +2.

-m cannot appear in +3 if -(k)ek (Conditional) is in +4 and nothing follows it (Feldman p. 71).

-In these cases, -m will appear in +6.

-m can occur in +6 with any verb that has tense but not Conditional marking.

-m in +6 can co-occur with -m in +3 with no apparent meaning change.

The alternation between positions +3 and +6 for plural marking may be phonologically motivated.

-The alternation seems to optimize syllable structure in many contexts.

-Below are some (hypothetical) forms constructed based on Feldman's generalizations (parenthesized (y) undergoes optional y-deletion):

(37) V-final root: /wa/ 'swim'

	<u>Slot 3 Plural</u>	<u>Slot 6 Plural</u>	<u>Both</u>
Imperfective Future	wa-(y)- m-re	wa-(y)-re- m	wa-(y)- m-re-m
Imperfective Desiderative	wa-(y)- m-rere	wa-(y)-rere- m	wa-(y)- m-rere-m
Imperfective Past	wa-(y)- m-e	wa-(y)-e- m	wa-(y)- m-e-m
Non-Imperfective Future	*wa-m-re	wa-re- m	*wa-m-re-m
Non-Imperfective Desiderative	*wa-m-rere	wa-rere- m	*wa-m-rere-m
Non-Imperfective Past	wa- m-e	wa-- m	wa- m-e-m

(38) C-final root: /wan/ 'hear'

	<u>Slot 3 Plural</u>	<u>Slot 6 Plural</u>	<u>Both</u>
Imperfective Future	wan-i(y)- m-re	wan-i(y)-re- m	wan-i(y)- m-re-m
Imperfective Desiderative	wan-i(y)- m-rere	wan-i(y)-rere- m	wan-i(y)- m-rere-m
Imperfective Past	wan-i(y)- m-e	wan-i(y)-e- m	wan-i(y)- m-e-m
Non-Imperfective Future	*wan-m-re	wan-re- m	*wan-m-re-m
Non-Imperfective Desiderative	*wan-m-rere	wan-rere- m	*wan-m-rere-m
Non-Imperfective Past	wan- m-e	wan-e- m	wan- m-e-m

(39) CC-final root: /uwk/ 'cut'

	<u>Slot 3 Plural</u>	<u>Slot 6 Plural</u>	<u>Both</u>
Imperfective Future	uwk-i(y)- m-re	uwk-i(y)-re- m	uwk-i(y)- m-re-m
Imperfective Desiderative	uwk-i(y)- m-rere	uwk-i(y)-rere- m	uwk-i(y)- m-rere-m
Imperfective Past	uwk-i(y)- m-e	uwk-i(y)-e- m	uwk-i(y)- m-e-m
Non-Imperfective Future	*uwk-m-re	uwk-re- m	*uwk-m-re-m
Non-Imperfective Desiderative	*uwk-m-rere	uwk-rere- m	*uwk-m-rere-m
Non-Imperfective Past	uwk- m-e	uwk-e- m	uwk- m-e-m

In each example where -m is prohibited from occurring in +3, the ungrammatical form would have had a more complex consonant sequence than the grammatical form:

-2 consonants vs. 1 after V-final roots, 3 vs. 2 after C-final roots, and 3 vs. 4 after CC-final roots

Note, however, that sequences of 2 consonants are permitted, as in several examples above, even where a form with only 1 consonant in the same position is available.

-e.g., wan-i(y)-m-re is allowed even though wan-i(y)-re-m has no [mr] sequence

Therefore, the alternation only makes sense for C- and CC-final roots.

A search of Feldman's word lists (pp. 209-217) reveals that all V-final roots end in [a].

-If at one stage the V-final roots were C-final, the +3~+6 plural alternation is explainable for all roots

-This may mean that Awtuw once had phonological affix order, but the pattern was obscured by

the development of V-final roots and can no longer be analyzed synchronically using P >> M
 -Otherwise, this is a case of morphologically, not phonologically, conditioned ordering

2.3 Witsuwit'en (Athabaskan, British Columbia; Hargus and Tuttle 1997)

s- Negative prefix occurs inside the Tense/Aspect prefix (p. 207)

- | | | | | |
|------|-----------------------------|------|------------------------|-------|
| (40) | we-c'- E -s- | 'En' | we-ts'- ∂ -s- | tl'et |
| | Neg-Unsp.Obj-Prog-Neg- | | Neg-1pl-Impf-Neg- | |
| | 's/he doesn't see anything' | | 'we're not farting' | |

With 'inner' subjects, *s*- occurs outside the Tense/Aspect prefix, avoiding a complex coda (p. 207)

- | | | | | |
|------|-------------------------------------|------|----------------------------|-------|
| (41) | we-c'-[]-s- E -xw- | 'En' | we-s- ∂ -xw- | tl'et |
| | Neg-Unsp.Obj-[Epenth]-Neg-Prog-2pl- | | Neg-Neg-Impf-2pl- | |
| | 'you (pl.) don't see anything' | | 'you (pl.) aren't farting' | |

Hargus and Tuttle: normal order is Neg-T/A-, but the order changes so *s*- can be a coda, unless this would create a complex coda.

Hargus and Tuttle (p. 207) analyze this via P >> M using the following constraints:

- (42) *COMPLEX
 ALIGN-CODA-S_{NEG}: S_{NEG} should be a coda.
 TENSE-STEM: Align the right edge of the Tense prefix to the left edge of the verb stem.
 NEG-STEM: Align the right edge of the Negative prefix to the left edge of the verb stem.

The ranking *COMPLEX >> ALIGN-CODA-S_{NEG} >> TENSE-STEM >> NEG-STEM selects the observed orderings.

-This analysis is contingent on the correctness of Hargus & Tuttle's claim that the verbal 'augment' in Athabaskan is a tense/aspect prefix rather than an epenthesized [].

-It is also possible that the surface ordering results from phonological metathesis, in which case it could be handled in the phonology without P >> M.

2.4 Doyayo (Adamawa-Ubangi, Cameroon; Wiering and Wiering 1994)

A series of consonantal suffixes is ordered by scope, except the *-m* pluralizing suffix is first in any combination.

- | | | | | |
|------|------------------|-----------------------------|-----------------|--------------------------|
| (43) | haa | 'be sour' | EE | 'sing' |
| | haa- m | '(several things) are sour' | EE- m | 'sing (many songs)' |
| | haa- m -z | '(several things) turned' | EE- m -l | 'sing (many songs)' |
| | *haa-z- m | sour (rapidly)' | *EE-l- m | (over a period of time)' |

In addition, *-m* occurs before the final consonant of a C-final verb root.

- | | | | | |
|------|-----------------|-----------------------------|-----------------|--------------|
| (44) | tus | 'spit out' | kab | 'catch' |
| | tu, m ,s | 'spit out (several things)' | ka, m ,b | 'catch many' |
| | *tus- m | | *kab- m | |

To account for the placement of *-m*, the following markedness (P) constraint is proposed:

- (45) *VC_m. : [m] cannot be the second consonant in a coda cluster.

A family of M constraints aligning affixes to the right of the stem causes affixes to be suffixed:

- (46) ALIGN ([m]_{Af}, R, stem, R): The right edge of *-m* coincides with the right edge of a stem.
 ALIGN ([z]_{Af}, R, stem, R): The right edge of *-z* coincides with the right edge of a stem.

The ranking *VC_m. >> ALIGN selects the correct output when *-m* is affixed to a V-final root (47), a C-final root (48), and a root with another modificational suffix (49).

- (47) [haa-m] ‘(several things) are sour’ (cf. [haa] ‘be sour’)

/haa, -m/	*VCm.	ALIGN
☞ haa-m		
ha,m,a		*!

- (48) [tu,m,s] ‘spit out (several things)’ (cf. [tus] ‘spit out’)

/tus, -m/	*VCm.	ALIGN
tus-m	*!	
☞ tu,m,s		*

- (49) [haa-m-z] ‘(several things) turned sour (rapidly)’

/haa, -m, -z/	*VCm.	ALIGN (m)	ALIGN (z)
☞ haa-m-z		* (z)	
haa-z-m	*!		* (m)
ha,m,a-z		**! (a,z)	

However, it is possible to analyze these facts without P >> M: the placement of [m] could result from simple phonological metathesis.

-In fact, the generalization that [m] always comes first in consonant clusters is surface-true in Doyayo and is not specific to the -m suffix (Wiering and Wiering 1994: 70).

2.5 Summary of survey results

The survey revealed only 5 putative cases of phonological affix order.

- One case (Fula) is demonstrated to be driven by scope, not phonology.
- One case (Washo) can be seen as prosodic subcategorization.
- One case (Awtuw) does not have synchronic phonological affix order (but may have historically).
- Two cases (Witsuwit'en and Doyayo) may result from simple phonological metathesis.

3. Conclusion

The OT ranking schema P >> M overgenerates with respect to phonologically conditioned affix order. Apart from the general prediction that phonologically conditioned affix order should exist, P >> M allows for some types of ordering phenomena that are not likely to be found:

- A tonal OCP constraint could force H- and L-toned affixes to order themselves in such a way as to prevent sequences of like tones without dissimilation.
- To avoid consonant clusters and vowel hiatus, a series of several C and V affixes could undergo reordering rather than epenthesis and glide insertion.
- A prefix could act as a suffix just in order to break up an illegal consonant cluster; for example, imagine a language like English where instead of epenthesis, affix reordering is used to prevent illegal clusters of sibilants in 3sg present verbs: /un-hinge-s/ ‘hingeuns’; /re-touch-es/ ‘touchres’; /pre-wash-es/ ‘washpres’.

The result of this survey is consistent with Yu’s (2003) observation that P >> M overgenerates in the domain of infixation. Yu proposes to avoid this problem via a universal ranking M >> P. The present survey supports this proposal since P >> M is not needed to account for the (very limited or nonexistent) range of phonological conditions on affix order. This leaves open the question of how to account for the remaining phenomena previously accounted for by P >> M (e.g., suppletive allomorphy and mobile affixes).

This survey also raises the question of *why* phonologically conditioned affix order is not widely attested, since phonological effects are manifested in other domains of morphology. This question remains for future research.

Appendix: Further Senegalese Pulaar examples

Repetitions of the same suffix

(50)	T	T-T
'o-irt-ii, 3sg-stir-past 'He stirred it again and again'	'o-irt-it-ii, 3sg-stir-REP-past	'o-irt-it-it-ii... 3sg-stir-REP-REP-past
mi-nyot-ii, 1sg-sew-past 'I sewed it again and again'	mi-nyot-it-ii, 1sg-sew-REP-past	mi-nyot-it-it-ii... 1sg-sew-REP-REP-past
'o-habb-ii, 3sg-tie-past 'She tied it again and again'	'o-habb-it-ii, 3sg-tie-REP-past	'o-habb-it-it-ii... 3sg-tie-REP-REP-past

Combinations of homophonous suffixes

(51)	T-T	
mi-habb-it-it-ii 1sg-tie-SEP-REP-past 'I untied the rope again'	boggol ngol rope det.	'o-sok-t-it-ii 3sg-lock-SEP-REP-past 'She unlocked the door again'
be-ngudd-it-it-ii 3pl-close-SEP-REP-past 'They opened the door again'	baafal ngal door det.	

Repetitive *-t* ordered after Comprehensive *-d* when Repetitive has scope over Comprehensive².

(52)	D-T		T-D
'o-haal-d-it-ii 3sg-speak-COM-REP-past 'He spoke with me again'	'e am with 1sg	~	'o-haal-t-id-ii 3sg-speak-REP-COM-past (...so many times that I am tired of it)
mi-yaa-d-it-ii 1sg-go-COM-REP-past 'I went with her again'	'e makko with 3sg	~	mi-yaa-t-id-ii 1sg-go-REP-COM-past (...so many times that I am tired of it)
'o-def-d-it-ii 3sg-cook-COM-REP-past 'He cooked a sweet potato with her again'	'e makko with 3sg		faataata~ sweet potato
'o-def-t-id-ii 3sg-cook-REP-COM-past (...so many times that he is tired of it)	'e makko with 3sg		faataata sweet potato

Repetitive *-t* ordered before Comprehensive *-d* when Comprehensive has scope over Repetitive

(53)	T-D
be-ngudd-it-id-ii 3pl-close-REP-COM-past 'They all closed the door again together' (Someone else closed it before)	baafal ngal door det.

² Since this meaning is idiosyncratic and not predictable from the meanings of the component morphemes, I assume the T-D ordering here is an idiomatic construction. One could account for it via a constraint specific to this construction favoring the T-D order.

(I ate it before voluntarily)

(We bought it before voluntarily)

Separative *-t* always precedes Modal *-r*. In Separative-Modal combinations, only forms where the Modal has scope over the Separative are produced (as in English, sentences like ‘We un-sewed the shirts with a needle,’ where the needle is used to do the sewing but not the unsewing, are rejected).

- (59) T-R
 mi-udd-it-ir-ii baafal ngal sawru (*mi-udd-ir-it-ii)
 1sg-close-SEP-MOD-past door det. stick
 ‘I opened the door with a stick’
- ’o-habb-it-ir-ii hoggol ngol jungo makko (*’o-habb-ir-it-ii)
 3sg-tie-SEP-MOD-past rope det. hands 3sg
 ‘He untied the rope with his hands’

Repetitive *-t* precedes Modal *-r* when Modal has scope over the Repetitive

- (60) T-R
 ’o-udd-it-ir-ii baafal ngal sawru wodndu (*’o-udd-ir-it-ii)
 3sg-close-REP-MOD-past door det. stick different
 ‘He closed the door again with a different stick’
- ’o-sok-t-ir-ii baafal ngal coktirgal godngal (*’o-sok-r-it-ii)
 3sg-lock-REP-MOD-past door det. key different
 ‘She locked the door again with a different key’
- R
 mi-udd-ir-ii baafal ngal juude am
 1sg-close-MOD-past door det. hands 1sg
 ‘I closed the door with my hands...’
- T-R
 mi-udd-it-ir-ii baafal ngal sawru (*mi-udd-ir-it-ii)
 1sg-close-REP-MOD-past door det. stick
 then I closed the door again with a stick’

Unexpectedly, Repetitive *-t* also precedes Modal *-r* when Repetitive has scope over Modal

- (61) T-R
 mi-habb-it-ir-ii hoggol ngol juude am (*mi-habb-ir-it-ii)
 1sg-tie-REP-MOD-past rope det. hands 1sg
 ‘I tied the rope with my hands again’
- ’o-sok-t-ir-ii baafal ngal coktirgal (*’o-sok-r-it-ii)
 3sg-lock-REP-MOD-past door det. key
 ‘She locked the door with a key again’ (the same key)

When Comprehensive has scope over Causative, Causative *-n* precedes the Comprehensive *-d*

- (62) N-D
be-jang-in-id-ii-mo be-nyaam-n-id-ii rawaandu ndu
 3pl-learn-CAU-COM-past-3sg 3pl-eat-CAU-COM-past dog det.
 ‘They taught him together’ ‘They fed the dog together’

N-R

'o-irt-in-ir-ii-kam supu 'o kuddu
3sg-stir-CAU-MOD-past-1sg soup det. spoon
'He made me stir the soup with a spoon' (I used a spoon)

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Department of Linguistics
UC Berkeley
1203 Dwinelle Hall
Berkeley CA 94720-2650
paster@socrates.berkeley.edu