Invariance under Re-Ranking

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(1) **Nonconflict**. Just as conflict among constraints is a primary source of interlinguistic variation, so *nonconflict* is a source of invariance and implication.

(2) Any ranked set of constraints imposes a harmonic order on the elements of candidate sets.

- With conflict, the order can change with changes in ranking.

  e.g. Align-Left(σ′) >> Align-Right(σ′) **<u>σ′</u>** σ ≻ σ **<u>σ′</u>**

  Align-Right(σ′) >> Align-Left(σ′) σ **<u>σ′</u>** ≻ **<u>σ′</u>** σ

- With nonconflict, the harmonic order remains the same, no matter what the ranking.

$*[_\sigma$ŋ >> * ŋ	{na, an} ≻ aŋ ≻ ŋa	| (0,0)≻(0,1)≻(1,1)
* ŋ >> $*[_\sigma$ŋ	{na, an} ≻ aŋ ≻ ŋa	| Conflict needs (0,1) *vs.* (1,0)

- This remains true when other constraints intervene that do not affect the relation: for example, IDENT(PL) does not change the relative *markedness* of the outputs aŋ and ŋa.

(3) A set of nonconflicting constraints is therefore associated with a linguistic scale, which holds constant under all rankings.

(4) Thesis: linguistic scales are embodied in sets of nonconflicting constraints.

Their universal behavior then follows from the effects of ranking: patterns of preservation, truncation, collapse of categories.

(5) Thesis: nonconflicting *special* to *general* relationships are explicated in terms of the scale that underlies the relevant constraints.

I. Stringency Hierarchies and Scalar Collapse

(6) Many linguistic constraints and proposed constraints fall into more & less restricted variants: one variant bans a proper subset of the items banned by the other. One constraint is more *stringent* in its demands than the other. (Originally pursued by Kiparsky, Green)

- F/Ons(+voi) *vs.* F(+voi) Positional Faithfulness (Beckman, Lombardi et seq.)
- $*[_\sigma$ŋ *vs.* * ŋ Positional Markedness (Zoll, Itô & Mester, Steriade, etc.)
- $*C_\sigma]$ *vs.* $*CC_\sigma]$ *ditto*
- HdLft/Subord *vs.* HdLft (Grimshaw)
- *[+hi] *vs.* *[−lo]

(7) **Background scalar theory**. Imagine a multipolar linguistic scale

a ≻ b ≻ c ≻d

(8) Consider every bifurcation of the scale:

B_1 = abc|d B_2 = ab|cd B_3 = abc|d (B_1 =$*[_\sigma$ŋ = {na,an}, aŋ | ŋa) (B_2 = *ŋ={na,an} | aŋ , ŋa)

(9) These form a set of constraints in the relation of stringency (cf. “special” to “general”). As we advance from left to right, each constraint accepts a proper subset of its predecessors’ acceptees // rejects a proper superset of its predecessors’ rejectees (hence is *more stringent*).

(10) Binary constraints in stringency order (more→)

	B_1	B_2	B_3
a	0	0	0
b	0	0	1
c	0	1	1
d	1	1	1

(11) These B_i play a central role in characterizing the set DNC of all constraints that *do not conflict* by virtue of never contradicting the underlying scale a≻b≻c≻d.

By 'not contradict', we mean that distinctions may be lost, but never reversed.

(12) Full DNC on 4 elements

	B_1	B_2	T_{12}	B_3	T_{13}	T_{23}	Q_{123}
a	0	0	0	0	0	0	0
b	0	0	0	1	1	1	1
c	0	1	1	1	1	2	2
d	1	1	2	1	2	2	3

(13) The ternary T_{ij} and the quaternary Q_{123} can all be expressed as *sums* of the B_i .

$T_{12} = B_1 + B_2$ $T_{13} = B_1 + B_3$ $T_{23} = B_2 + B_3$ $Q_{123} = B_1 + B_2 + B_3$

(14) The DNC includes every possible "coarsening" or respectful collapse of the scale.

- Imagine the full scale as a|b|c|d. A "coarsening" is obtained by removing some bars. This yields the $2^{n-1} - 1$ elements of DNC[n]. (Make that 2^{n-1} if B_0, assigning no viols., is included.)
- The *addition* of B_i's is just the inclusion of their |'s in the scale sequence: a|bcd+ab|cd=a|b|cd.
- Each B_i is equivalent to a set of order statements. B_1 = {a>d, b>d, c>d}. Summation is the same as the union of these sets of order statements.

(15) The B_i therefore form a kind of *basis* for the DNC family.

(16) **Claim:** The effects of summation can be obtained by *ranking* the B_i *with respect to other constraints.*

(17) The behavior of a 3 point scale. Consider a central aspect of Nakanai reduplication (Carlson, Spaelti). The first C is copied, and the first V with it – *except when* the 2nd vowel is more sonorous:

buli	**bu**-**bu**li	u=i	'rolling'	
giu	**gi**-**gi**u	i=u	'peeling'	
sae	**sa**-**sa**e		'climb'	
beta	**ba**-bet**a**	a>e	'wet'	■ **NB. 2nd vowel chosen.**
toa	**ta**-to**a**	a>o	'treading/kicking'	■
biso	**bo**-bis**o**	o>i	'ones of Biso subgrp'	■
pita	**pa**-pit**a**	a>i	'muddy'	■

‣This supports a scale **a ≻ e,o ≻ i,u** (higher sonority vowels being better *better* qua nucleus).

(18) This closely resembles cases where main stress goes on the heaviest syllable, where weight is determined by vowel quality.

Chukchee exhibits a scale **áéó** ≻ **íú** ≻ ə́, keyed to this generalization: In base-final words, mainstress on penult unless antepenult is better. (Kenstowicz)

(19) A Frankensteinian exploration. We abstract an exemplary case along Chukchee lines, with the Nakanai hierarchy and initial-orientation:

Constraints:	*í	No high vowels under main stress
	*íé	No nonlow vowels under main stress
	Main-L	Mainstress initially aligned.

(20) B_1 / B_2 classification of constraints

	B_1 = ***í**	B_2 = ***íé**
á	0	0
é	0	1
í	1	1

(21) **4 Rankings.**

a. Strictly Initial.	Main-L >>***í**, ***íé**
b. Totally Scale observing.	***í**, ***íé** >> Main-L
c. STG (Paninian)	***í** >> Main-L >> ***íé**
d. GTS (AntiPaninian)	***íé** >> Main-L >> ***í**

(22) To see the effects, we need only examine cases where the sonority/stress scale pulls against initial stressing. (The other cases simply go with initial stress, which faces no opposition.)

	Main-L	**Sonority**
/pita/	**pí**ta	pi**tá**
/pite/	**pí**te	pi**té**
/peta/	**pé**ta	pe**tá**

In the following, the sonority-dominant candidates are bolded.

(23) Strictly initial **Main-L >> *í, *íé**

W ~ L	Main-L	*í	*íé
píta ~ **pitá**	W	L	L
píte ~ **pité**	W	L	
péta ~ **petá**	W		L

Comparative notation. In competition W~L, the cell contains the key to the item preferred, if any: W for the first, L for the second, blank for neither. All L's must be preceded by W in their row.

***Effective scale*: no distinctions.**

(24) **STG (Paninian)** ***í** >> Main-L >> ***íé**

W ~ L	*í	Main-L	*íé
pitá ~ píta	W	L	W
pité ~ píte	W	L	L
péta ~ **petá**		W	L

Effective scale: **á, é ≻ í** = B_1

(25) **Totally Scale observing**. ***í**, ***íé** >> Main-L

W ~ L	*í	*íé	Main-L
pitá ~ píta	W	W	L
pité ~ píte	W		L
petá ~ péta		W	L

Effective scale: **á ≻ é ≻ í** = $B_1 + B_2$

(26) **GTS (AntiPaninian)** ***íé** >> Main-L >> ***í**

W ~ L	*íé	Main-L	*í
pitá ~ píta	W	L	W
píte ~ **pité**		W	L
petá ~ péta	W	L	

Effective scale: **á ≻ é,í** = B_2

(27) **Paninian vs. AntiPaninian rankings**.If we identify such constraints as ranging from less to more stringent (B_1, B_2,...B_n), from 'special' to 'general', then we may distinguish the types of rankings by whether they follow the Paninian maxim – 'special' holding its own against 'general' – or whether they contravene it – with 'general' crucially ranked above 'special'.

NB. for **AP**, we demand crucial domination. For P, only the possibility of S>G ranking.

3-scale **a ≻ b ≻ c**:

(28) **Paninian**:	**a b c**	**a b | c**	**a | b | c**
	(23)	(24)	(25)
		B_1	$B_1 + B_2$
(29) **Anti-Paninian**:	**a | b c**		B_2 , (26)

4-scale: **a ≻ b ≻ c ≻ d**

(30) **Paninian**:	*(i)* **a b c d**	*(ii)* **a b c | d**	*(iii)* **a b | c | d**	*(iv)* **a | b | c | d**
		B_1	$B_1 + B_2$	$B_1 + B_2 + B_3$
(31) **Anti-Pan** `	*(i)* **a | b c d**	*(ii)* **a | b c | d**	*(iii)* **a | b | c d**	*(iv)* **a b | c d**
	B_3	$B_1 + B_3$	$B_2 + B_3$	B_2

(32) **Paninian rankings**

P(i)	LFT >> *{d}, *{c-d}, *{b-d}	LFT >> B_1 , B_2 , B_3
P(ii)	*{d} >> LFT >>*{c-d}, *{b-d}	$\mathbf{B_1}$ >> LFT >> B_2 , B_3
P(iii)	*{d}, *{c-d}>> LFT >> *{b-d}	$\mathbf{B_1}$, $\mathbf{B_2}$ >> LFT >> B_3
P(iv)	*{d}, *{c-d}, *{b-d}>> LFT	$\mathbf{B_1}$, $\mathbf{B_2}$, $\mathbf{B_3}$ >> LFT

(33) **AP** rankings

(i).	*{b-d} >> LEFTMOST >>*{d}, *{c-d}	$\mathbf{B_3}$ >> LFT >> B_1 , B_2
(ii).	*{d}, *{b-d} >> LEFTMOST >> *{c-d′}	$\mathbf{B_1}$, $\mathbf{B_3}$ >> LFT >> B_2
(iii).	*{c-d}, *{b-d}>> LEFTMOST >> *{d}	$\mathbf{B_2}$, $\mathbf{B_3}$ >> LFT >> B_1
(iv).	*{c-d} >> LEFTMOST >>*{d}, *{b-d′}	$\mathbf{B_2}$ >> LFT >> B_1, B_3

(34) Result: The effective scale induced by ranking some collection {B_i} above a conflicting, constraint (like LFT here) is the ***sum*** of the {B_i}.

(35) Paninian ranking produces scales achieved by summing the B_i in sequence: B_1+ B_2 + B_3 ...
This yields all collapses of the scale *from the top*: a|b|c|d, ab|cd, abc|d

(36) AP rankings yield *all other* sums.
This yields every other collapse of the scale: a|bcd, a|bc|d, a|b|cd, ab|cd

(37) **Conclusion**: free ranking of the B_i produces every possible collapse of the scale.
The Paninian rankings authorize a top-down collapse only.
This is the meaning of the Paninian/Antipaninian distinction in this context.

(38) **What is real and what is not?** In simplest case, standard weight scale: CVV > CVC > CV.
Paninian collapse: CVV, CVC > CV. (typical Latin/Arabic type QS)
AntiPaninian Collapse: CVV> CVC, CV (common: Southeastern Tepehuan, Selkup, Khalkha, etc....)

•Along same lines: uncollapsed SupHv > Hv > Lt (Kelkar's Hindi: P&S 1993). And we see SupHv > Hv, Lt at the end of words in various Arabic languages.

(39) **Stress/Sonority interactions.** (K = Kenstowicz 1994:ROA-33, dL = de Lacy 1997:ROA-236)
- Symbology: **L**= low (a), **M**=mid (b), **H** = high (c), **R** = 'reduced/central' (d)
- **Underlying scale: L′ ≻ M ′ ≻ H′ ≻ R′**

Language	**Scale**	***Remark***
★**Mokshan Mordwin** [K]		
ä,eo > iu,ə	LM > HR	AP(iv)
Peak: leftmost heaviest.		
(nb crucial exx. of iu ≡ ə missing!! Kenstowicz notes.)		
(if H>R, then Piii, same as Chukchee)		
Mari ('Literary' = Cheremis) [K]		
ä,eo,iu > ə	LMH> R	P(ii)
Peak: nonfinality, rightmost full V, else leftmost.		
Kobon [K]		
a > eo > u i > ö ɨ	L>M>H>R	P(iv)
Peak: in final 2-σ window, most sonorous; else initial (?) in window.		

Chukchee [K]

a,eo > iu > ə LM>H>R P(iii)

Peak: In base-final words, penult unless antepenult is stronger.

Kara [dL]

aː > aX. > a. > VX. > V. L> MHR AP(i)

Peak: righmost heaviest in words with a non-lightest syllable; else leftmost.
With dL, note scale sorts first by a/non-a, then by μμ/μ. So *{ R' −M'} >> *μ' >> Rtmost.
¿¿Assume non-*a* (CV) is lexically unstressable, *{R'}>>∃Hd(PrWd), but stressed by phrasal default??

(40) **AP revealed**. We have therefore found cases where scale-coarsening follows the AP model. This provides evidence for the admissibility of AP rankings, and for the formulation of the relevant constraints by scale-bifurcation. (On this point, see also de Lacy 1997, 2000).

(41) **BUT. A counter-ploy**. We assume a Peak-Prominence hierarchy, in which the desirability of the peak tracks the intrinsic prominence of the vowel that realizes it. Suppose we *also* introduce a Trough-Obscurity counterhierarchy running the opposite way (cf Prince & Smolensky 1993:ch 8; Kenstowicz 1994).

$*\breve{L} \prec \breve{M} \prec \breve{H} \prec \breve{R}$ *bad →...→ good*

yielding the following family of binary stringency constraints by the usual scale-bifurcation method:

$B_1 = *\{\breve{L}\}$, $B_2 = *\{\breve{L}, \breve{M}\}$, $B_3 = *\{\breve{L}, \breve{M}, \breve{H}\}$

(42) Now Paninian summation yields these patterns:

(i) R˘ | H˘ | M˘ | L˘ (ii) R˘ H˘ | M˘ | L˘ (iii) R˘ H˘ M˘ | L˘

(43) But, because there is only **one** peak, each of these is equivalent to a structure on the *peak* scale !

(i) L′ | M′ | H′ | R′ (ii) L′ | M′ | H′ R′ (iii) L′ | M′ H′ R′

(44) Pattern (iii) is *{L˘} >> LEFTMOST >> the rest. This says: avoid ă at all costs: i.e. seek á whenever possible. So this is equivalent to the constraint *{R', H', M'}: so L' | M' H' R' = a|bcd = AP(i) in ex. (31) above.

E.g. AP(i) on 3-scale is {pe**tá**, pi**tá**, **pí**te) – avoiding only ă.

(45) Pattern (ii) is *{L˘}, *{L˘, M˘} >> LEFTMOST >> the rest. 'Seek to stress *a*; lacking that, *eo*; else leftmost.' So this is equivalent to a|b| cd = AP(iii).

(46) So this simply treats (some) AP-fusion as P-fusion from the other end of the scale!

(47) **Nevertheless: Mokshan Mordwin** (39) still does not fit this type! Assuming that the crucial missing datum can be filled in, and goes our way, we have a solid argument.

(48) **Local Conclusion**. AP ranking in peak-prominence scales allows for fusion of adjacent categories, with possible simplification of allowed constraint types. In this way, universal distinctions at the middle and bottom end of scales can be hidden in particular grammars, without entailing that higher-end distinctions must also be collapsed, even as the full universality of constraints is maintained.

II. Protecting Panini in free DNC systems

(49) **The raw & the cooked.** Because the 'special' - 'general' relation is familiar, ubiquitous, and natural, confusions about it are plentiful.

The observations just made will lay many of these to rest. (Draculatory, it is to be feared..)

(50) **False Belief Alert #1**. "It follows by logic that the general cannot be ranked above the special."

■Even among DNC constraints in which a spec/general relation can be discerned, ranking may be obtained via transitivity wrt a third party constraint.

("Panini's Thm" is often adverted to here. But (a) it asserts no such thing, and (b) it is irrelevant to DNC.)

(51) **Bad Attitude Alert.** "It is perverse, unexpected, and unintelligible to rank the general above the special."

■ It is merely an empirical question about what kinds of scales are operative in grammar.

(52) **False Belief Alert #2**. "You can tell from the phraseology of constraints when they fall into the special-general relation.".

■ The activity of constraints is determined by the surviving candidate sets it faces in its position in the hierarchy. It will therefore vary from input to input.

What's in these sets is determined by the winnowing activity of higher-ranked constraints. Imagine two constraints A, B that *overlap* in their domain of relevance. Higher-ranked constraints can eliminate one 'ear' or the other of their Venn diagram, reducing one to a subset of the other. I.e. eliminating $A-B$ yields $A \rightarrow A \cap B \subseteq B$.
Example: F/Initial vs. F/σ′ . If all initials are stressed, and there are other stresses, then F/σ′⇒F/init, but not v.v. (Prince & Tesar, 1999). If only initials are stressed, and there are words w/o stress, then F/init ⇒F/σ′ , but not v.v.

(53) **False Belief Alert #3.** "Constraints phrased as 'special/general' are in the stringency relation and cannot conflict."

■ Constraints are local and defined on the *elements* of linguistic form. Linguistic forms may contain many such elements. Therein lies the seeds of conflict.

(54) **Conflict!** Consider NoCoda: $*C_\sigma]$ *vs.* NoDoubleCoda: $*CC_\sigma]$.

How conflict?? Violating NDCoda implies violating NCoda.

	"Special" $*CC_\sigma]$	"General" $*C_\sigma]$
CvC	0	1
CvCC.	1	1
CvC. ~ CvCC.	W	

Conflict requires the presence of both W and L in the same row.

(55) But **multiple occurrences** can lead to outright conflict.

	"Special" $*CC_\sigma]$	"General" $*C_\sigma]$
maptk.	1	1
map.tik.	0	2
maptk. ~ map.tik.	L	**W**

(56) **A painful case**. This is a serious anomaly. From Moreton 1999, we know that a markedness relation A≻B implies that A↛B and that B→A may be a possible mapping.

Let *C_σ] >> *CC_σ] "G" >> "S"

Then CvCCC. ≻ CvC.CvC

The "favored" CCC cluster can therefore resist change (A↛B) and may be its target (B→A).

(57) We predict: **epenthesis systems** in which e.g **/mapt/ →ma.pit** in obeisance to NoDoubleCoda, but in which **/maptk/ → maptk**. *not* *map.tik, due to blocking from dominant NoCoda. (From B. Hayes)

(58) We predict: **deletion systems** in which **/maptik/ → maptk**. (From M. Hiller.)

(59) **Possible Sources** of the disaster.

- Use of set-inclusion/binary stringency constraint format
- Free ranking of constraints
- Method of evaluating forms

(60) **Possible remedies**

(a) **Impose an Elsewhere-Condition**/Proper-Inclusion-Precedence-Principle as a meta-condition on rankings. [NB. "Panini's Theorem" has no relevance to this case whatsoever.]

■ ***Rejected.*** This is essentially impossible, due to remark (52). Further, it seems distinctly odd to assume that the speaker/hearer's mind/brain has *meta*-knowledge of constraint-innards and the details of candidate set structure.

(b) **Develop some localistic method** of evaluation, instead of summing instances of violation over whole forms. (Cf.. proposals by Zoll, Müller, Eisner, inter alia)

■ ■ ***Attractive*****,** but not pursued here.

(c) **Abandon the special/general set-inclusion format** in favor of fixed rankings (as in Prince & Smolensky 1993).

■ ■ ■We pursue a variant here.

(61) **If I forget thee.** The problem is that "G" *forgets* a distinction made by "S", lumping together two things that are separate on the overall scale. Then these 'same' things are compared according to the usual method, by which fewer is of course better.

- If G *does not forget* S, then the catastrophe cannot happen.
- Only Paninian ranking effects will be achievable.

(62) **Proposal**: **Internal Domination**.

Suppose, given a scale $\langle a_i, > \rangle$ on a set of elements a_i, we construct every possible *compound constraint* joining any of the *a_i 's by '>>' such that the resulting compound constraint *respects the scale relations.*

a ≻ b ≻ c ≻ d

[*d]	abc ≻ d	Least Stringent	'Special'
[*d>>*c]	ab ≻ c ≻ d	↓	↓
[*d>>*c>>*b]	a ≻ b ≻ c ≻ d	Most Stringent	'General'

These 'domination compounds' are then the constraints in CON embodying the scale.

○ ***Let them be freely ranked.***

○ This is another kind of DNC system.. For no constraint pair C,D is it true that (x≻y/C) and (y≻x/D).

(63) **Some Impossible Constraints**. Given this scale,

[*c]	says	"abd≻c"	but	☐ c≻d
[*b]	says	"acd≻b"	but	☐ b≻c, b≻d
[*d>>*b]	says	"ac≻b≻d"	but	☐ b≻c.

(64) **Multiple violation.** If scalar constraints are as in (62), the multiple violation problem (55) disappears, by virtue of the properties of strict domination (exactly as in the familiar fixed-ranking hierarchy treatment). Since the 'general' constraint is now [*CC. >> *C.], any occurrence of .CVCC. will be fatal if the alternative only includes instances of CVC.

(65) Resolution of Multiplicity problem.

maptk →	G = [*VCC. >>*VC.]		S = *VCC.
map.tik.		**	
maptk.	* !		*
map.tik ~ .maptk.	W	L	W

(66) Fixed Ranking *d >> *c >> *b is an exact equivalent of Paninian order *{d} >> *{d,c} >> *{d,c,b}
(Constraints cannot be meaningfully repeated, and the lower *d, e.g., merely repeats the higher.)
Domination compounds are an exact equivalent of fixed ranking.
Therefore, only Paninian scale collapses are allowed.

(67) **Question**: if domination compounds exactly mirror fixed rankings in their effects, what's the sense of introducing them? What's the content of eliminating fixed ranking in favor of domination compounds??
Answer: Domination compounds can be motivated by other considerations.

(68) **Tesar's problem**.. Imagine a stress system with strictly bisyllabic trochees, and rightmost mainstress. Now suppose that in addition a foot always appears initially (Cf.. Polish with the opposite ranking):
ALIGN(PrWd,F,L) >>ALIGN(PrWd, Hd,R).
We obtain the following:

(<u>σ́σ</u>)	2σ
(<u>σ́σ</u>) σ	3σ
(σ̀σ) (<u>σ́σ</u>)	4σ
(σ̀σ) σ (<u>σ́σ</u>)	5σ
(σ̀σ) σ σ (<u>σ́σ</u>)	6σ

Pattern: mainstress is penultimate, *except in trisyllabic words*. Unattested, I believe.

•Attested edge foot patterns are like Polish: main always penultimate, with an initial foot when there's space:
***Lú**blin, re.**pór**ter, **prò**pa.**gán**da, **sàx**o.fo.**nís**ta,...* (Rubach & Booij 1985)
•Or initial always main, as in Garawa (Furby 1974)
***yá**mi, **pún**ja.la, **wát**^{j}im.**pà**nu, **ká**ma.la.**rìn**ji, ..., **ná**ri.ŋin.**mù**kun.**jì**na.**mì**ra.*
[eye, white, armpit, wrist, at your own many]
•Or always antepenultimate when there's enough room, given QS – as roughly in English.
***cí**ty, **ó**pera, psy.**chó**logy, Phìla.**dél**phia*: at least the choice is not determined by word length.
(See extensive survey in Hayes 1995. p. 198-205.)

(69) **Solution**: there are no constraints ALIGN(PrWd,*F*,E).

(70) Only Alignment of *Head*, with nonhead as *minimal violation*.
Align(PrWd,*Hd*,R)>>ALIGN(PrWd,*Hd*,L) .

(71) The goal. When Align-Hd-R is dominant, everything is as before. But subordinated Align-Hd-L still discriminates between imperfect possibilities, favoring an initial foot even if it's less-than-PrWd-head.

(72) But ALIGN(PrWd,*Hd*,E) admits of *two* dimensions of violation:

- **Bad location**. The foot thus aligned may be distant from the edge E.
- **Bad prominence**. The foot thus aligned may not be maximally prominent ('head') in its PrWd.

(73) Given the dominance of Rt (final) Hd alignment, the choice for ALIGN(PrWd,*Hd*,L) is between e.g.:
σσσ(σ́σ) foot is indeed PrWd *Hd*, but not *initial*.
(σ̀σ)σ(σ́σ) 1st foot is *initial*, but it is not PrWd *Hd*.

(74) *Location, location*. Location wins over prominence. [Loc(x) >> Prom(x)]

(75) Resolved if we regard "ALIGN(PrWd,*Hd*,E)" as a composite under local domination:
"Align-Head-L" = ∀PrWd ∃F [ALIGN(PrWd, F, L)>>HD(F,PrWd)]

Align-F thus never loses sight of the will to headship.

(76) Initial feet emerge from subordinated Head-alignment

	[ALIGN(PrWd, F, R)>> HD(F,PrWd)]		[ALIGN(PrWd, F, L)>>HD(F,PrWd)]	
σ σ σ (σ́σ)			*** !	
☞ (σ̀σ) σ (σ́σ)				*

(77) The trisyllable goes for penultimate stress, like all other forms.

	[ALIGN(PrWd, F, R)>> HD(F,PrWd)]		[ALIGN(PrWd, F, L)>>HD(F,PrWd)]	
☞ σ (σ́σ)			*	
(σ́σ) σ	* !			

(78) A possible improvement. Rather than using Align(PrWd, **F**) inside the constraint, we might use Align(PrWd, **u**), for u=any prosodic category. The headship requirement independently pushes the choice to u=F rather than say σ.

(79) **An odd distribution from simple constraints.** "Contrast only in the environment favoring neutralization".

Assume these constraints:

M: *si	F: IDENT(s)	*i.e.* IDENT(+ant), IDENT(−ant)
M: *š	F: IDENT(š)	
M: *s		

(80) Ranking: IDENT(s) >> *si >> *š >> IDENT(š), *s

Yields these mappings:

s →s everywhere	IDENT(s) undominated
ši → ši	*si >> *š, so *ši≻si*)
š →s elsewhere	*š>>Ident(š)

(81) Resulting System: **sa, se, so, su, si**
ša, *še, *šo, *šu* **ši

‣ Outcome: **s** and **š** contrast only in the environment most conducive to their neutralization.

(82) Source of problem: IDENT(+ant) and IDENT(−ant) are allowed to lead separate lives.

(83) Suppose we identify "Ident(ant)" as [Ident(+ant)>>Ident(−ant)]. The odd system disappears.
IDENT(+ant) cannot be separated from IDENT(−ant).

(84) Why not revert to **symmetrical IDENT**(ant), penalizing equally [+a] →[−a] and [−a] →[+a]?

(85) **'Majority Rule'**. (Lombardi 1999, Baković 1999bc). A dominance harmony system running on AGREE using **symmetrical IDENT** is predicted to be sensitive to the *ratio* of +α to −α in the input.
We want (say) /e/ to be dominant, so that ...a...e... →...e....e... always. *But look what happens*:

	AGREE(bck)	IDENT(bck)	Remarks
e - e - a → ☞ **e - e - *e***		*	☞ a→e 1×
a - *a* - a		**	e→a 2×
e - a - a → e - *e* - *e*		**	a→e 2×
☜ ***a* - a - a**		*	☞ e →a 1×

(86) **Majority Rule No Longer**. If 'Ident(α)' = [IDENT(−α)>>IDENT(+α)] when we are given *[+α]>>*[−α]

	AGREE(bck)	[IDENT(−bck)>>IDENT(+bck)]		Remarks
e - a - a → ☞ **e - *e* - *e***			**	☞ a→e 2×
a - a - a		* !		e→a 1×
e -e - a → ☞ **e - e - *e***			*	☞ a→e 1×
a - *a* -a		* ! *		e→a 2×

(87) This is the Faithfulness analog of the Markedness-based NoCoda/NoDoubleCoda problem. It resolves in the same way. **Domination obliterates multiplicity**.

(88) **Conclusion**. Linguistic scales give rise to sets of non-conflicting constraints. From the nature of OT interaction, it follows that the scales are preserved under re-ranking. The way that adjacent scalar categories collapse in the face of other extra-scalar constraints is determined by the internal structure of the scale-encoding constraints. We have examined two conceptions of that internal structure. Further investigation will determine whether one ousts the other, or whether the world is divided between them.

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