Markedness in Prominent Positions

Paul de Lacy
University of Massachusetts, Amherst
<delacy@linguist.umass.edu>

HUMIT
August 31, 2000

1 Empirical Issues

Greetings.

In this talk, I am going to focus on the nature of neutralization – which is the reduction of contrast in certain environments – and allophony –the alternation of phonemic realization in certain environments.

The ‘certain environments’ that are of interest here are ‘prominent positions’. Way back in the 1930s, Trubetzkoy (most notably) noticed that certain positions tend to resist neutralization. Trubetzkoy’s discussion remained unmatched in its detail until recently, in the work of Beckman (1998), Casali (1997), and Alderete (1995) – works that I’m sure most of you are familiar with.

Beckman’s inventory of prominent positions include Onsets, Word-Initial syllables, and Stressed Syllables, listed in (1). Please note the abbreviations I’ll be using in this talk. Most importantly, I will refer to the prominent positions as a class by an upper-case Pi.

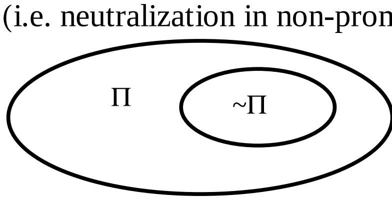
(1) *Prominent Positions* (Π): (i) onsets
(ii) stressed syllables ($\acute{\sigma}$)
(iii) root-initial syllables (σ_1)

As I mentioned a second ago, Trubetzkoy provided detailed evidence that prominent positions resist neutralization. Put another way, the inventory of contrasts found in *non*-prominent positions is a subset of those found in prominent ones. This situation is illustrated in the Venn diagram in (2).

(2) *The Subset Principle in Prominent Positions*:

Contrasts in non-Π $\subseteq$ Contrasts in Π

(i.e. neutralization in non-prominent positions)



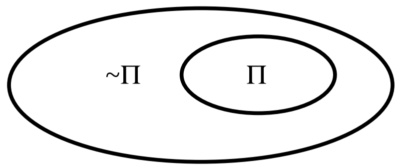
The implicit assumption in most(all?) post-Trubetzkoyan work is that (2) illustrates the *only* type of neutralization involving prominent-positions. Until very recently, the many works that have discussed this matter have excluded situations like those in (3).

In the first diagram in (3), the inventory in non-prominent positions is a *superset* of the prominent position's one. In other words, there are fewer contrasts in prominent positions than in non-prominent ones. This is Π-Neutralization: neutralization conditioned by being in a prominent position.

(3) *Empirical Issue*: Do other logical possibilities exist?

(i) Contrasts in non-Π ⊂ Contrasts in Π

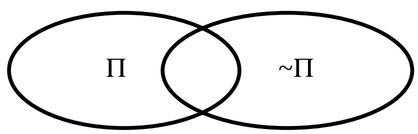
(i.e. neutralization in prominent positions)



The second type is where the inventories in prominent and non-prominent positions are not in a subset/superset relation, keeping all else equal. This is a situation of allophonic alternation: where the appearance of different allophones of a phoneme is conditioned by being in a prominent position. To give a quick example, in Nuer, the phoneme /F/ is realized as [pf] in word-initial position, but as [f] in non-initial position. Here, the prominent position σ_1 conditions which allophone appears where.

(ii) Contrasts in Π and those in ~Π are disjoint

(i.e. allophony conditioned by prominent positions)



So, are the post-Trubetzkoyan Prominent-Position Neutralization Phonologists right? Is it really true that the patterns in (3) do not exist?

My answer is outlined in (4). I will present some evidence today that all three possibilities exist. In fact, this claim is not so new: Trubetzkoy himself pointed out that the situations in (3) occur. Some recent work in the same vein has been and is being done by Steve Parker and Jennifer Smith at UMass.

(4) *Answer*:
- Yes, all three possibilities do exist. (Trubetzkoy 1939)
- *However*, the types in (3) are more restricted than the one in (2).
- The types in (3) only apply to classes defined by *sonority*, not by individual features such as Place, [back], etc.

The caveat on the situations in (3), though, is that they are more restricted than the standard type of neutralization in (2). Specifically, I will claim that neutralization and allophony in prominent positions only target classes of segments defined by sonority. Individual features such as [labial] and [back] can't be targeted for prominent position neutralization.

2 Theoretical Proposals

So much for the empirical stuff. On the theoretical side, as outlined in section 2, I'm going to argue that *markedness* constraints that specifically mention prominent positions are essential. However, the form of such constraints is limited by a general condition on constraint formation, outlined in (6). Basically, this says that a markedness constraint can't mention elements from different planes. Of course, we'll go over all this in detail when the time comes, I just like to give the punchline before the – joke.

(5) To account for the patterns in (3), I argue that:

- Markedness constraints motivate Π-neutralization (3i) and Π-allophony (3ii).
- These markedness constraints are formed by the combination of the sonority scale with prominent positions.
- More generally, the creation of markedness constraints is fairly free.
- However, a general principle restricts the form of markedness constraints:

(6) *The Planar Accessibility Principle*:

(i) Elements that appear on the prosodic plane: Root, μ, σ, Ft, …
(ii) Elements that appear on the featural plane: Root, [labial], [coronal],…

For any markedness constraint C^M,
and for every pair of elements e_1, e_2 in C^M,
e_1 and e_2 are on the same plane.

e.g. *σ/CODA is fine since both σ and CODA are on the prosodic plane.
*σ/[labial] is ill-formed since σ is on the prosodic plane and [labial] is on the featural plane.

3 Π-Allophony in Niuafo'ou

On to Niuafo'ou. As outlined in (7), Niuafo'ou is a Polynesian language. Like (almost) all Polynesian languages it has syllables with no codas and an optional onset. Syllables may be bimoraic – either with long vowels or falling diphthongs.

Main stress falls on the penultimate *vowel*, regardless of syllable structure.

(7) Niuafo'ou [ɲiuafoʔóu] is a Polynesian language, described by Tsukamoto (1988). The data and generalizations presented here are primarily from Tsukamoto's dissertation; I recently confirmed them with a native speaker.

(8) • Syllables are $(C)V_i(V_{i/k})$
• Stress falls on the penultimate *vowel* (like the closely related Tongan).
i.e. [ma.á.ma], *[má:ma]

• Vowels = /i e a o u/

Niuafo'ou has five vowels, and it a small number of consonants: of some slight significance for us is that all obstruents are voiceless.

Of real interest is a process of vowel devoicing. It has a fairly typical pattern: the high vowels [i] and [u] devoice between voiceless stops (I couldn't get any data for the glottal stop, by the way). You can see this happening in (9#2): *Say tapi.*

They also devoice after voiceless continuants, regardless of the voicing of the following consonant, as you can see in #3.

(9) *Vowel Devoicing*

High vowels devoice:

(1) between voiceless stops [p t k (ʔ?)]   (C̥^{stop}_ C̥^{stop})

(2) between a voiceless stop and a word boundary (C̥^{stop}_#)

[kàpi̥kápi̥]	*wedge*	*cf* [mokimoki̥]	*shatter*
[tápi̥]	*wipe*	*cf* [táŋi]	*weep*
[hàu.ʔa.lì.ki̥.sí.a]	*attended by chiefs*		

(3) after voiceless continuants [f s h] and before another consonant (C̥$^{+cont}$_C)

[mòfi̥mófi̥]	*slight fever*	*cf* mokimoki
[pàsi̥kála]	*bicycle*	
[lahi̥lahi̥]	*somewhat many*	*cf* [mòfuíke], *[mòfu̥íke]

It's not my aim to provide an extensive analysis of devoicing here; such an analysis is fairly tangential to the main point. Even so, I have provided a short (and *somewhat incomplete* discussion for completeness' sake below [in Appendix 1 on handout].

The main components of this analysis are that devoicing is controlled by consonants, and IDENT-onset-voice ensures this.

I use AGREE constraints to require agreement in voicing between adjacent elements, with continuant's [-voice] winning over the desire to spread [+voice]. You can see how this analysis works out in the tableaux in (10i-iii).

(10) *Analysis*:

The exact analysis of devoicing does not affect the argument. It is provided for the sake of completeness.

(i) Since onset consonants always retain their underlying specification for [voice], IDENT$_{ONSET}$[VOICE] must be dominant.

(ii) Since vowels adjacent to continuants devoice (e.g. *mofimofi*):

AGREE[-voice]$^{+\text{cont}}$ “Segments adjacent to continuants must be [-voice] if the continuant is [-voice]” is high-ranked.[1]

(iii) The other facts are accounted for by ranking

‖ AGREE[+VOICE] » AGREE[-VOICE] ‖

(10i)

	/lahilahi/	AGREE[-VOICE]$^{+\text{CONT}}$	AGREE[+VOICE]$^{+\text{CONT}}$	IDENT[VOICE]
☞	lahi̥lahi̥		x	x x
	lahilahi̥	x!		x
	lahilahi	x x!		

(10ii)

	/tapi/	AGREE[+VOICE]	AGREE[-VOICE]	IDENT[VOICE]
☞	tapi̥			x
	tapi		x!	

(10iii)

	/mokimoki/	AGREE[+VOICE]	AGREE[-VOICE]	IDENT[VOICE]
☞	mokimoki̥		x	x
	moki̥moki̥	x!		x x

For the sake of exposition, I’ll simply refer to these constraints and their effect as DEVOICE.

Summary: For the rest of this talk, I will call the set of constraints used above “DEVOICE”.

(i) ‖ DEVOICE » IDENT[voice] ‖

3.1 Exceptions

The point so far is that Niuafo’ou has a pretty typical system of vowel devoicing.
What’s interesting, tho’, are the exceptions.

Devoicing is blocked in two situations. One is prosodic word-initially, as you can see in (11i). Niuafo’ou speakers say [kití:], not [ki̥tí:].

(11) Vowels do not devoice in certain positions:

❑ Prosodic Word-initial syllables:

[kití:]	*game*	*[ki̥tí:]
[tutúku̥]	*stop*	*[tu̥túku̥]

[1] This is an incomplete bit: we need to specify direction somehow since it is only vowels *after* voiceless continuants that devoice: e.g. mifa, *mi̥fa.

The Niuafo’ou also do not devoice in stressed syllables, as shown in (11ii). Actually, there’s a nice alternation here: [lahi] is large, and the final [i] devoices. But when you add a mono-syllabic suffix like *ni*, the stress shifts and the [i] no longer devoices.

❏ Stressed syllables:

[lahíni]	*large+deictic*	*cf* [láhi̥] *large*
[hífo]	*descend*	*[hí̥fo]
[tùku̥túku̥]	*put down for a while*	*[tù̥ku̥tú̥ku̥]

So, how does this case relate back to the schema in (3)? Niuafo’ou vowels have two allophones: voiced and voiceless ones. Now, in the devoicing environment, the choice of allophone is conditioned by simply being in a prominent position. In other words, keeping the environment the same – the inventory of vowel allophones in prominent positions is disjoint with the set in non-prominent positions. This is a case of Π-allophony, and apart from the devoicing environment, is the same as the Nuer [f~pf] case I mentioned at the beginning.

(12) This is a case with *disjoint sets*:
In the devoicing environment, prominent positions ($\acute{\sigma}$, σ_1) contain voiced vowels while non-prominent positions contain devoiced vowels.

3.2 Analysis

In section 3.2, we confront the challenge that Niuafo’ou presents: how can we block the effects of devoicing in initial- and stressed syllables?

(13) <u>The Challenge</u>:
How can we block the effects of DEVOICE in stressed syllables and initial syllables?

We can at least eliminate one possibility: positional-faithfulness constraints cannot do the job. The problem with these comes from Richness of the Base. It is not enough to show that input /kiti:/ with a voiced initial vowel comes out right. We have to show that the input /ki̥ti:/ with a voiceless initial vowel also comes out as a well-formed word in the language. In other words, we need input /ki̥ti:/ with the voiceless vowel, to come out as [kiti:], with an initial *voiced* vowel.

As shown in the tableau in (14), this just doesn’t happen with positional faithfulness constraints. The problem is that faithfulness constraints *preserve* underlying contrast, so they induce a *phonemic contrast* between voiced and voiceless vowels. But there isn’t.

(14) <u>Faithfulness constraints aren’t any use</u>:

By Richness of the Base, we have to consider an input like /ki̥ti:/, with the initial vowel already devoiced. With a faithfulness constraint on initial syllables, the vowel will incorrectly remain devoiced:

/ki̥ti:/	IDENT$_{\sigma 1}$[VD]	DEVOICE
💣 ki̥ti:		
kiti:	x!	x

The result is that we need a markedness constraint – we have no choice in the matter. This markedness constraint has to both mention initial syllables and the fact that they don't like voiceless vowels. The minimal formulation of this constraint is presented in (15). As you can see, it forces an input initial-voiceless-vowel to appear voiced in all segmental environments.

(15) So, we need to use a **markedness constraint**: * σ_1/V̥

/ki̥ti:/	* σ_1/V̥	DEVOICE
ki̥tí:	x!	
☞ kití:		x

We need a similar constraint for stressed syllables, as in (16).

(16) Ditto for stressed syllables: *σ́/V̥

/tu̥ku̥/	* σ́/V̥	DEVOICE
tú̥ku̥	x!	
☞ túku̥		x

3.2.1 Π-Neutralization

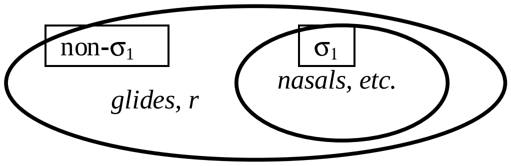
If this reasoning sounded a bit tortuous and opaque, *neutralization* in prominent positions may offer a clearer picture. There's a relevant case in Campidanian Sardinian, in section 3.2.1. In Campidanian Sardinian, you can't have PrWd-initial rhotics or glides, but they're fine elsewhere. This is a case of neutralization in prominent positions. As illustrated in (18), the inventory of contrasts in prominent positions is a *subset* of those in non-prominent positions.

(17) An example of neutralization in prominent positions is found in Campidanian Sardinian.

(18) Campidanian Sardinian (Bolognesi 1998)

- Does not allow rhotics or glides (prosodic) word-initially, but they can appear elsewhere.

• A metathesis process repairs PrWd-initial glides and rhotics



Again, positional faithfulness is of no use. Positional faithfulness strives to preserve initial underlying contrasts. It cannot effect neutralization. Neutralization is the job of markedness constraints.

(19) Positional faithfulness is of no use here.
- There is no ranking of IDENT-σ_1-[r], *r, and IDENT-[r] that could possibly result in [r] being banned from initial position.
- Positional faithfulness constraints promote retention of contrast. Neutralization of contrast can only be effected by markedness constraints.

4 The Π-Markedness Constraints

So far, I've argued that we need markedness constraints that are specific to prominent positions. However, proposing a few potentially adequate constraints leaves the job only half done. If these prominent-position-markedness constraints do exist, where do they fit in? We can rightly ask (as in 20) how they relate to other constraints we already have good evidence for.

(20) Question: Where do the *σ_1/V̥ and *σ́/V̥ constraints fit in?

I suggest that the prominent position constraints are really specific versions of the well-known and much-loved peak- and margin- sonority constraints of Prince & Smolensky (1993). Simply take Prince & Smolensky's constraints, and freely combine them with the prominent positions, and you get the constraints we need. The details of Prince & Smolensky's constraints are spelled out in (21) with one difference: instead of referring to '*margin*' as they do, I only refer to ONSET. The difference is pretty trivial, and hardly worth mentioning. The constraints that result from their combination with the prominent positions are presented in (22).

(21) Proposal:
They are formed by free combination with the sonority constraints of Prince & Smolensky (1993):

(i) NUC = syllable nucleus
ONS = syllable onset
Sonority scale: | vowels > glides > liquids > nasals > fricatives > stops |

(ii) ❑ || *ONS/vowel » *ONS/glide » … » *ONS/stop ||
❑ || *NUC/stop » *NUC/fricative » … » *NUC/vowel ||

(i) We can articulate the 'vowel' part of the sonority scale more fully, based on work on sonority-driven stress (see esp. Kenstowicz 1994) and the Niuafo'ou case:

| a > e, o > i, u > ə > ɨ > V̥ |

(22) Now combine the sonority constraints with prominent positions:
❑ || $*\sigma_1$/ONS/vowel » $*\sigma_1$/ONS/glide » … » $*\sigma_1$/ONS/stop ||
❑ || $*\sigma_1$/NUC/stop » $*\sigma_1$/NUC/fricative » … » $*\sigma_1$/NUC/vowel ||

❑ || *σ́/ONS/vowel » *σ́/ONS/glide » … » *σ́/ONS/stop ||
❑ || *σ́/NUC/stop » *σ́/NUC/fricative » … » *σ́/NUC/vowel ||

…etc…
☞ Also see Kenstowicz (1996)

For example, a constraint like $*\sigma_1$/ONS/glide bans glide onsets in initial syllables, while *σ́/NUC/ə bans schwas in stressed syllables, for example.

Now we can see where the Niuafo'ou constraint fits in: it spells out the subpart of the NUCleus hierarchy that deals with the low sonority voiceless vowels.

I suggest that the prominent positions combine *freely* with the sonority constraints. There are no 'gaps': any combination is possible. We'll return to the issue of freedom of combination in a moment, but before we do so, I want to quickly run through some typological predictions of this proposal.

5 Predictions

5.1 Onsets

The first and most obvious thing is that the sonority constraints also apply to onsets, not just nuclei. Since high-sonority onsets are dispreferred, they are even worse in prominent positions.

(23) The sonority hierarchy also applies to *onsets*:

e.g. *σ́/ONS/glide bans glides in stressed syllable onsets.

Actually, we've already seen a glimpse of this in Campidanian Sardinian where glides and rhotics are simply avoided outright.

In fact, there's further evidence for this from Niuafo'ou. As in a vast number of languages, high vowels turn into glides before other vowels, as in (24).

(24) Prediction borne out in Niuafo'ou:

(i) $V^{+high} \rightarrow$ glides /_ V

[juníti]	*unit*	*[iuníti]
[waéa]	*wire*	*[uaéa]
[welìŋatóni]	*Wellington*	*[ueliŋatoni]

	/iuniti/	ONSET	IDENT-μ
☞	i.u.ní.ti	x x	
	ju.ní.ti		x

The exception is rather telling: you can't form a glide *if* it would end up in a stressed syllable. Take a look at (25). *Say these!!*

(25) *except* when the glide will end up in a stressed syllable:

[iáte]	*yard*	*[játe]
[uáfu]	*wharf*	*[wáfu]
[uípi]	*whip*	*[wípi]

	/iate/	*σ́/ONS/glide	ONSET	IDENT-μ
☞	i.á.te		x x	
	já.te	x!		x

What this means is that glides in stressed syllable onsets must be explicitly avoided, and this is done as in the tableau in (25): with the constraint *σ́/ONS/glide outranking the glide-forming constraint ONSET.

(26) Note that we cannot use positional faithfulness here either: by Richness of the Base we need to explain why input /jate/ ends up as [iate]. Positional faithfulness won't achieve this.

In short, there's evidence that high-sonority onsets in prominent positions are avoided – as predicted by this approach.

5.2 Π–Neutralization

So far the main cases I've talked about have involved allophony triggered by prominent positions. However, one of the predictions made by the Prominent-position-markedness constraints is that *neutralization* should also take place. This is an unavoidable prediction since it's due to the basic mechanics of OT: ranking markedness constraints over faithfulness constraints causes neutralization, as you can see in (27).

(27) The **Π/sonority* constraints are predicted to effect neutralization, not just allophony:

	/wija/	*σ́/ONS/glide	IDENT-glide
	wíja	x!	
☞	vija		x

(27) actually illustrates Gujarati: [v] can appear everywhere, but initial /w/ neutralizes to [v]. Again, this is a case of a prominent position avoiding a high-sonority onset.

For other cases, see (29).

(28) Gujarati (Cardona 1965:28)

Glides are neutralized word-initially: /w/ → [v], as in the tableau above.

(29) <u>Other languages</u>:

Afrikaans	*no word-initial glides*
Golin (Bunn & Bunn 1970:4)	*no word-initial liquids*
Chamicuro (Parker 2000)	*no [h] or [ʔ] in onsets*
Huariapano (Parker 1998)	*no [h] in initial main-stressed σ*

So, the prediction that *neutralization* in prominent positions is borne out. In all the languages mentioned above, there are fewer contrasts in prominent positions than in non-prominent ones.

Another prediction also arises here: the sonority constraints embody an implicational scale. If a nasal onset is banned, for example, more sonorous onsets – liquids and glides – are also banned. What this means is that Π-neutralizations and –allophonies should also target sonority levels in the same way.

For example, (modulo other factors) we shouldn't see a neutralization that targets liquids in onset position without also targeting glides, or a neutralization that targets high vowels in stressed syllable nuclei without also targeting schwas, and so on.

From the cases I've accumulated, this prediction seems to be fairly true.

5.3 Symmetry of Repair

A prediction that's more interesting, in my opinion, is also due to the machinery of OT. As spelled out in (30), if a markedness constraint militates against a relation between two elements, there are often two ways to avoid violating that constraint.

(30) For any markedness constraint *α/β, either α or β can be affected depending on the ranking of constraints that *locate* (e.g. ALIGN) or *preserve* (i.e. FAITH) α/β:

(i) α is affected: || LOCATE/FAITH-β, *α/β » LOCATE/FAITH-α||
(ii) β is affected: || LOCATE/FAITH-α, *α/β » LOCATE/FAITH-β||

So, for Niuafo'ou I argued that we need the constraint *σ́/NUC/V̥. We saw that the Niuafo'ou response was to get rid of the voiceless vowel, as shown in (32).

(31) Example of present interest: The allophony case.
*σ́/NUC/V̥, where 'α'=σ́ and 'β'=NUC/V̥
This constraint can be satisfied by either eliminating the V̥ or by *moving the stress*.

(32) Eliminate V̥:

	/tika/	STRESS=PENULT	*σ́/NUC/V̥	DEVOICE
☞	(a) tíka			x
	(b) t̥íka		x!	
	(c) t̥iká	x!		

The alternative is to change the stressed syllable. If we move stress somewhere else, we also avoid violating *σ́/NUC/V̥. This is illustrated in (33).

(33) Move Stress:

	/tika/	DEVOICE	*σ́/NUC/V̥	STRESS=PENULT
	(a) tíka	x!		
	(b) t̥íka		x!	
☞	(c) t̥iká			x

The situation shown in (33) is a case of 'sonority-driven stress'. There's an oft-cited discussion by Kenstowicz which shows that such a move is warranted. In fact, the *σ́/NUC/α constraints I propose here correspond to his sonority and stress constraints. There's also a discussion in some work of my own.

(34) *Sonority-Driven Stress*
Such cases do exist (Kenstowicz 1996, de Lacy 1997, in prep.)
e.g. Jaz'va Komi (Itkonen 1955, Lytkin 1961)
Main stress falls on the leftmost syllable with a non-high vowel.

	/mijanlan^j/	IDENT-i/u	*σ́/NUC/i,u	ALIGN-σ́-L
	mijánlan^j			x
☞	míjanlan^j		x!	
	méjanlan^j	x!		

One interesting prediction made by the present approach, tho', is that onset sonority should also count in driving stress: constraints of the form *σ́/ONS/α should also drive stress. Have a look below [**Appendix 2** on handout] for an example.

Now, here I'm on controversial ground since the idea of onsets influencing stress is still much debated. Even so, it's hard to escape the evidence from the famous case of Pirahã, I think. There's also some more immediately relevant evidence, from the Arandic language Alyawarra.

As summarized in (35), stress avoids the initial syllable if it's onsetless in Alyawarra. An analysis is sketched in (36).

(35) Even *onset sonority counts*:
Alyawarra (Yallop 1977) (an Arandic language)

- Primary stress falls on either the first or second syllable.
  (i) Analyzed as undominated ALIGN-FT-L with dominated FTFORM=TROCHEE.

- Stress falls on the initial syllable *only if* it has an onset:
  rínha cf *ampá, ilípa*

(36) Analysis (after de Lacy 1997 and others)

	1. /rinha/	σ́/ONSET	FTFORM=TROCHEE
☞	rínha		
	rinhá		x!
	2. /ampa/	σ́/ONSET	FTFORM=TROCHEE
☞	ámpa	x!	
	ampá		x

What is interesting is the exception: stress avoids the initial syllable if it has a glide onset, as in (37). We can account for this simply by invoking *σ́/ONS/glide, just as we did in Niuafo'ou above.

(37) *Exception:* Stress does not fall on the initial syllable if its onset is a glide:
e.g. *walíjmparra*, **wálijmparra*
jukúntja, **júkuntja*

/junkuntja/	*σ́/ONS/glide	FTFORM=TROCHEE
júkuntja	x!	
☞ jukúntja		x

(38) A similar (and more interesting situation) exists for Pirahã (see references & analysis in de Lacy 1997).

In short, the predicted stress-effects made by the proposed constraints are borne out. For those of you who are interested, there'll be a far more comprehensive discussion in my forthcoming dissertation.

6 Impossible Π-Neutralizations and Allophonies

At this point, let's leave predictions behind, and consider what doesn't exist. The cases I've presented so far have all dealt with neutralizations and allophonies that refer to classes defined by sonority. As far as I know, there are no cases that target individual features like [labial], or [back]. So, we don't get cases where all labials are neutralized in initial syllables, but coronals and dorsals are not.

(39) Summary so far:
Π-neutralization and allophony is a response to constraints that refer to Π and classes defined by sonority.

(40) Empirical Issue:
Q: Do Π-neutralizations and allophonies ever refer to classes defined by feature classes like [labial], [back], etc.?
A: No.

There's further evidence for this from prominence-driven stress. You don't get systems where stress is attracted to a nucleus with a single feature, like [-back] or [labial]. You only get systems where stress is attracted to a vowel with a certain level of sonority.

As we've seen, since sonority-driven stress is the flip-side of prominent-position-neutralization, this is a significant fact.

(41) Further evidence for this comes from prominence-driven stress:

As shown above, the constraints *σ́/SONORITY can drive sonority-sensitive stress.

However, there are no prominence-driven stress systems in which stress is attracted to a particular syllable based on a single feature. (e.g. there is no stress system in which stress falls on the leftmost front vowel, ignoring back vowels).

See de Lacy (1997:esp. §1.1.3) for some discussion.

The question this poses for us is "Why not?" Or more specifically, why don't we get constraints of the form in **(38),** which ban a prominent position associated to a subsegmental feature?

(42) Theoretical Issue:

Q: Why not?

Or in present terms:

Why are there no constraints of the form *Π/F?

One answer is the 'axiomatic' response: we just don't get these type of constraints, through divine intervention or something similar. End of story.

The problem is that the combination of prominent positions with constraints seems rather free, at least for faithfulness constraints. For example, Beckman proposes that there are prominent-position instantiations for MAX, DEP, and IDENT, and others have argued the same for UNIFORMITY, INTEGRITY, LINEARITY, and even constraints on the OO dimension.

If prominent positions can combine so freely with faithfulness constraints, then why can't they combine rather freely with markedness constraints – especially **Feature* constraints?

What I think is happening here is that there is a meta-constraint on constraint formation, which is given in **(39ii)**. The broader idea is that markedness constraints can only prohibit (or require) certain structures and that those structures are bound within their particular plane, harking back to much older ideas about phonological representation.

(43) My Answer

(i) Sonority is a property of root nodes.

(ii) *Prosodic Plane* vs *Featural Plane*

- with root nodes at the axis.

(iii) *Planar Accessibility Hypothesis*:

Every element in M (M is a markedness constraint)
is on the same plane as every other element in M.

(iv) For precursors to this hypothesis, see Ito & Mester (1992) (also see Lacy (1997) for further references).

An idea like this has been around for a long while (Ito & Mester 1992, my own work and references therein).

Ito & Mester (1992) argue that there is a limit on what constraints and rules may mention in the same breath: since foot form doesn't seem to mention sonority, for example, they suggest that the root node level is just too far away from the foot level to be mentioned in the same constraint. I explored a similar idea for prominence-driven stress in my 1997 work, and Paul Hagstrom (then from MIT) also discussed a similar restriction in a paper of his on the ROA.

(44) Example 1: *σ́/ONS/glide (where 'glide' is a sonority level).
- More explicitly: *{A(σ́, ONSET_i) & A(ONSET_i, Root_k) & S(Root_k, *glide*)}
  - (i) A(α,β) is the association relation
  - (ii) S(α,β) is the 'sonority' function.
- σ́, onset, Root are all on the prosodic plane.

(45) Example 2: *+SON/-VOICE "no voiceless sonorants"
- More explicitly: *{A(Root_i, [+son]) & A(Root_i, [-voice])}
- Root, [+son], [-voice] are all on the featural plane.

(46) Example 3: *σ́/NUC/[-back]
- More explicitly: *{A(σ́, nuc_i) & A(nuc_i, Root_k) & A(Root_k, [-back])}
- σ́ and *nuc* are on the prosodic plane, but [-back] is on the featural plane.

What this means is that prominent positions may well be combined fairly freely with other markedness constraints, as long as they don't end up with constraints that refer to featural material.

6.1 Implications

6.1.1 Positional Markedness

While this proposal means that *Π/F constraints are out, it has a number of implications, discussed in section 6. Basically what it means is that traditional neutralization has to be done with positional faithfulness constraints (as discussed in §6.1.1), and we need to decouple prosodic domains from featural constraints like the OCP (as in §6.1.2). I invite you to read over these sections at your leisure, we won't have time to cover them right now.

(47) *Non-Π (traditional) Neutralization*:
- Must be effected by FAITHFULNESS constraints, Beckman (1998)-style:

  || FAITH-Π-F » *F » FAITH-F ||

  e.g. || IDENT-σ́-[labial] » *[labial] » IDENT-[labial] ||

(48) cf *Positional Markedness constraints*: || *non-Π/F » FAITH-F || (e.g. Zoll 1998)
|| *ŏ/[labial] » IDENT-[labial] ||

(49) The issue that positional markedness raises: if **non-Π/F* constraints are ok, why aren't **Π/F* constraints allowed?

6.1.2 Featural constraints with Prosodic Domains

(50) The PAH also means that constraints that refer to featural conditions within prosodic domains cannot exist. A classic case is the OCP, as applied to dissimilation: e.g. OCP_σ(labial) ≈ *$\{$ [labial]…[labial] $\}_\sigma$

(51) The PAH requires the featural condition to be decoupled from the statement of domain.

- This is not an unwelcome requirement, since constraints have become more and more context-free, with domain- and environment-restrictions due to the interaction of faithfulness or related constraints.

(52) *An Advertisement*: For an OCP approach that decouples the condition and the domain, see Struijke & de Lacy (to appear (in October)).

7 Summary

So, let me conclude. What I have argued today is that the relations between prominent and non-prominent positions illustrated in (3) do exist, just as Trubetzkoy claimed over sixty years ago.

(53) *Empirical*:
- Neutralization in prominent positions is attested.
- Allophony conditioned by prominent positions is attested.

I have also *suggested* that – just as with faithfulness constraints – prominent positions can combine fairly freely with markedness constraints.

(54) *Theoretical*:

The Π-markedness constraints result from relatively free combination of prominent positions with other constraints.

- Combination is limited by the Planar Accessibility Hypothesis:
  "You can have elements from different planes in the same markedness constraint."

The main limitation is the Planar Accessibility Hypothesis.

(55) *<u>Future Issues</u>:*

• Is the PAH correct? Can we absolutely do without any constraint of the form *π/F (π a prosodic element, F a feature)?

Of course, this talk raises a few issues, as in **(51)**. Is the Planar Accessibility Hypothesis correct? Can we really do without markedness constraints that mention both prosodic nodes and segmental features at once?

I will conclude by noting that the PAH does have some explanatory power as a meta-principle of constraint formation. It isn't merely a restatement of the problem since it has a far wider effect than on just the prominent-position markedness constraints. However, it would be nice to reduce its effects to something more fundamental, eliminating it as an axiom of the grammar.

Paul de Lacy

Department of Linguistics
South College
University of Massachusetts
Amherst
MA 01003
USA

<delacy@linguist.umass.edu> or <paul@de.lacy.to>
<u>http://www-unix.oit.umass.edu/~delacy</u>

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Questions Raised in the Question Period:

My thanks to those people who asked questions. Also many thanks to those people who offered supporting examples and (potential) counter-examples.

Answers to some of the questions are given below:

Q1. Doesn't a constraint like *σ́/NUC/glide break the PAH? Isn't 'glide' on the faetural plane?
A1: I see sonority as a property of root nodes. After all, sonority is the 'summation' of featural properties – it isn't a subsegmental feature itself. We could even see sonority as being represented as a feature on the root node itself. The value of the sonority feature would have to match that of the subsegmental features in some way. In any case, I think there's a good case to be made for sonority as a prosodic property, not as a subsegmental feature.

Q2: How about Tone?
A2: Tone's a little tricky, since some people have suggested that it's on a 'tonal' plane, distinct from the prosodic and subsegmental one. It certainly isn't part of the prosodic hierarchy like 'σ', 'μ', 'Ft', and so on. This means that the PAH only allows constraints that refer to tones, moras, and nothing else since only tones and moras (assuming that μ=TBU) appear on the tonal plane. This is clearly undesirable.

We need some loosening of the PAH here, so as to treat tone as a prosodic element, on the same par as σ, μ, Ft, etc.. Intuitively, this seems very fair, since tone has almost always been treated as prosodic. Exactly how to formalize this, though, is a little tricky.