

Markedness Exists

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Thank you for inviting me to talk here. And thank you for all coming to hear me at what must be a very busy time for you all. This talk will take about 50 minutes.

1. Aims & Issues

*As Ellen has just mentioned, I've just completed a book called 'Markedness: Reduction and Preservation in Phonology'. This talk summarizes some of the book's central arguments. In effect, it means you won't have to buy the book when it's published. So, in a way, you can think of it as me saving you 50 bucks. It also relates to my doctoral dissertation of a few years ago, and some recent work published in the journal **Phonology**.*

So, the topic is markedness. Concepts of markedness have been a central part of linguistic theorizing for several decades, at least since the Prague School in the 30s, but more recently embodied as SPE's ch.9, the various underspecification theories, and the Fixed Ranking proposals of Prince & Smolensky (1993).

Even though the concept has been around a long time, it turns out that we don't know answers to fundamental questions about markedness. This is clear when you start looking at the various definitions of 'markedness' – Greenberg's view of markedness differs widely from the SPE view, which differs from the Prague School view, and so on. In syntax and semantics, markedness is often talked about in conjunction with iconicity, and hierarchies such as animacy, person, and so on. But there are other senses of markedness in syntax, too, such as absolute universals like "a clauses' TP will always dominate its VP", and so on.

I'm not going to talk about syntax here, just phonology. Nevertheless a lot of what I have to say extends to syntax, too. And this is being explored by Ellen Woolford at UMass, among others.

So what am I going to say?

Well, I'm going to say (1): that there are i-language mechanisms that produce asymmetries in natural language; these asymmetries are what we call markedness. I'm going to explain what I mean by 'asymmetries' in a second. By the way, I'm going to set all of the theoretical discussion in Optimality Theory. However, in this talk my aim is to emphasize the leading ideas, which I think will exist beyond current formalisms.

(1) Aim

The aim of this talk is to argue that markedness exists.

- (a) It refers to a set of i-language mechanisms in phonology and syntax.
- (b) The mechanisms produce asymmetries in natural language

So, what is markedness? Now in (2). Whenever people discuss markedness, they are referring to certain observations about processes, at least. They occasionally refer to a great deal more, and we'll get back to this near the end of the talk.

But the main idea is that some segments or feature values are marked, and others are unmarked. Then there is a general notion of 'markedness reduction': language is trying to get rid of marked segments or features. So, processes turn marked structures into unmarked ones. As a further result, if an unmarked element undergoes a process, then so do the more marked ones (In 2b). In (2c), if an unmarked element triggers a process, so do the more marked ones.

(2) What is markedness?

'Markedness' is an informal term that refers to observations about the outputs, undergoers, and triggers of some process (Trubetzkoy 1939)

- There are segments/features that are classed as 'marked' and some that are 'unmarked'

(a) The output of processes is unmarked

(b) If an unmarked element undergoes a process, so do the more marked ones.

(c) If an unmarked element triggers a process, so do more marked ones. [more controversial]

To give a schematic example, we find languages in which an underlying /p/ becomes a glottal stop in a syllable coda. However, there are no languages in which underlying /ʔ/ becomes [p]. This follows if we say that [p] is marked and [ʔ] is unmarked. Because marked things can become unmarked, /p/ can become [ʔ]. Because unmarked things cannot become more marked, /ʔ/ cannot become [p].

To be a bit more precise, the source of the markedness here is Place of Articulation, which I'll call 'PoA'. The **segment** [p] is not more marked than the **segment** [ʔ]; /p/'s labial place of articulation is more marked than glottal PoA. Similarly, labials turn out to be more marked than coronals, and coronals can become glottals. Dorsals wind up at the top of the hierarchy, to give us (3e).

(3) An example: outputs

(a) In codas, /p/ may become [ʔ] (e.g. Ulu Muar Malay), but /ʔ/ never becomes [p].

(b) Therefore, [p] is more marked than [ʔ]

- more precisely: some feature value of [p] is more marked than the corresponding value of [ʔ] in some hierarchy.

(c) Similarly, /p/ may become [t] (e.g. Cantonese), but /t/ never becomes [p]; also /t/ may become [ʔ].

(d) From (b) and (c): | labial > coronal > glottal |

(e) From inspecting dorsals, we find the **PoA hierarchy**:

| dorsal > labial > coronal > glottal |

At this point, I guess I should apologize for going through this whole 'markedness' thing so slowly. I'm sure you know it all already. I've only done so because my review of the

literature made it clear that a lot of people don't fully appreciate the import of what I've just run over, and in fact some people disagree with it. The basic points are simply classic Prague School conceptions of markedness, tho'.

On top of that, what I've just said is controversial in a couple of ways.

Some people accept that there is markedness, and the sort of PoA asymmetries I've just run over require an i-language explanation. In other words, there are phonological principles that prevent /ʔ/ becoming [p], but allow /p/ to become [ʔ]. These are the [+acceptance, +part of i-lg] people in (4a). At the moment this is the majority view. However, it turns out that a lot of the reasons the majority view is accepted don't stand up to scrutiny; we'll talk a bit about this in section 5. Even so, I think it's right.

*However, it's becoming more popular to say that there are no markedness effects. In other words, /ʔ/ **can** become [p], and so on. This view is expressed in Elizabeth Hume's single and joint work, in which she focuses on labial markedness in particular. It is also discussed in Vaux's recent and ongoing work on epenthesis. These authors argue that there simply are no markedness asymmetries – anything can happen in phonology. Certainly, some things are more frequent than others, but anything can happen.*

There is a third point of view, expressed most clearly recently by Blevins (2004). That is that markedness asymmetries do exist, but not because of i-language mechanisms. Generally, anything is lawful, but not everything is expedient: the Phonological component can in principle generate anything, but external pressures make some options extremely unlikely. This view isn't original with Blevins, of course. It's what Ohala has been arguing for decades now, and is very popular in various British views of phonology, or the lack of it.

(4) *Current attitudes of the field*

(a) [+ACCEPTANCE, +PART OF I-LANGUAGE]

SPE (ch.9), Underspecification Theory, Prince & Smolensky (1993) and almost all work in OT since then.

(b) [–ACCEPTANCE]

Hume & Tserdanelis (2002), Hume (2003), Vaux (2001)

(c) [+ACCEPTANCE, –PART OF I-LANGUAGE]

Blevins (2004)

Both the (4b) and (4c) views are based on the apparent failure of markedness in some situations. In broad strokes, more and more people have been noticing recently that (5a): some phenomena traditionally believed to show markedness effects do not.

*For example, until recently it was believed that if **marked** things assimilate, so do **unmarked** things; this view was one of the empirical foundation stones of Underspecification Theory.*

*In other words, if labials assimilate, so do coronals. However, coronals could assimilate while labials don't. However, it's now clear from my work, and concurrently from Keren Rice's to some extent, that **anything** can assimilate. Coronals alone can assimilate, labials alone can assimilate, dorsals alone can assimilate, coronals and*

dorsals can assimilate while labials do not, dorsals and labials can assimilate while coronals do not, and so on in every imaginable combination.

This has profoundly shocked some people into rejecting markedness entirely.

Another issue that's popped up is in (5b): some languages seem to ignore markedness distinctions. Finally, in (5c), some languages differ as to what the least marked segment is.

(5) *Why be skeptical?*

(a) *Lack of expected markedness:*

Some phenomena traditionally believed to show markedness do not

e.g. undergoers of assimilation

(b) *Ignoring markedness:*

Some languages **ignore** markedness distinctions.

(c) *Markedness Variation:*

Languages **differ** as to what is the least marked segment

*Despite the skepticism, in this talk I am going to argue that markedness **does** exist, and that i-language principles **are** necessary to explain the patterns we see in natural language.*

What is needed is a full understanding of the principles that act on markedness in a grammar. Of course, there is markedness reduction: the need to eliminate marked elements. But I propose three others, in (6).

There is Preservation of the Marked in (6a) – the idea that highly marked elements can be especially preserved. This will explain (5a) – why we don't see markedness everywhere.

In (6b), there is conflation: a mechanism that allows hierarchies to be collapsed, but not reversed. This will explain (5b): why some markedness distinctions are ignored.

Finally, there is (6c): some hierarchies conflict, and this accounts for variation in the least marked element.

(6) *Markedness exists, but we also need:*

(a') Preservation of the Marked

(b') Conflation

(c') Hierarchy conflict

When these principles are taken together, they give us a theory of where markedness can and cannot appear. I guess I should note that this differs markedly from previous approaches, like Greenberg's, for example, which seem to take markedness diagnostics as primitives.

(7) *Implications of the principles*

- The proposals are a theory about where markedness asymmetries can and cannot appear.

By the way, one limitation of this talk is that it's not going to be data-heavy. I am happy to provide examples and references if called upon to do so, but because a lot of what I'm talking about is typology, I'm going to skip detailed expositions of single languages unless it's crucial.

2. Markedness reduction

In section 2.

I'm going to start by giving an example of markedness reduction. In (8a): no language has an epenthetic labial or dorsal. There is one caveat: assimilation and dissimilation can produce epenthetic labials and dorsals, but these cases are easily factored out.

The majority of epenthetic consonants are glottal. Some are coronal, but we're going to come back to these in a few minutes.

In the same way, as I mentioned a few minutes ago, the output of Place neutralization in codas is never labial or dorsal; it's almost always glottal, and sometimes coronal.

(8) *Consonant epenthesis*

Putting assimilation and dissimilation aside:

(a) epenthetic consonants are never labial or dorsal¹

(i) They're almost always *glottal* [ʔ h] (e.g. Mabalay Atayal)

(b) the output of Place neutralization is never labial or dorsal

(i) It's almost always *glottal* (e.g. Standard Malay)

So, why? Well, suppose the only constraints that control output PoA are those in (9). A constraint like $\ast\{\text{dors}\}$ is violated once for each dorsal in the output form. A constraint like $\ast\{\text{dors,lab}\}$ should be read disjunctively: it is violated for each dorsal or labial in the output.

(9) *Markedness reduction*

(a) $\ast\{\text{dors}\}$ "Incur a violation for each dorsal in the output."

(b) $\ast\{\text{dors,lab}\}$ "Incur a violation for each dorsal or labial in the output."

(c) $\ast\{\text{dors,lab,cor}\}$ etc.

(d) $\ast\{\text{dors,lab,cor,gl}\}$

You can see how these constraints work in tableau (10). The output is forced to have an epenthetic segment, and the PoA of the epenthetic consonant is determined by the output PoA constraints.

The interesting thing to note is that the constraints impose a hierarchy. No matter how you ranking these constraints, glottals will always come out as winners. This is evident straight away because all the other PoAs incur a subset of violations of the glottal stop

¹ Except for approximants, for incidental reasons.

(10) *Epenthesis*

/...a/	*{dors}	*{dors,lab}	*{dors,lab,cor}	*{dors,lab,cor,gl}
(a) ...ak	*!	*	*	*
(b) ...ap		*!	*	*
(c) ...at			*!	*
(d) ...a?				*

- There is no ranking of the constraints that will *disfavour* [ʔ]
- Faithfulness constraints are irrelevant

By the way, this view contrasts with the idea that there's a fixed ranking of PoA constraints, first suggested by P&S (1993), and still adhered to by many, but discredited by Alan Prince and myself in a series of publications, and I should add that I for one am utterly convinced by my arguments.

So, the PoA markedness hierarchy is a description of the effects of the form of the PoA output constraints. Because there is no constraint that favours, say, labials over glottals, there is just no way that we can get an epenthetic labial. The same result explains the output of neutralisation, which we'll see a bit more of in the next section.

Of course, I've asked you to trust my assertions that there are no cases of epenthetic labials and dorsals, and never neutralisation to labial and dorsal. The generalisations come from over 200 cases of each type. I'm happy to elaborate on this further if people would like.

(11) *Before we move on*

(a) I've asked your trust in my assertion that there are no cases of epenthetic labials and dorsals, and neutralization to labial or dorsal.

- The generalizations is made from a survey of over 200 typologically diverse languages.
- There are some putative counter-examples that turn out not to be relevant.

(b) Coronals can be epenthetic too... but we'll deal with this in section 5.

3. Preservation of the Marked

In section 3.

If markedness reduction seeks to turn marked elements into unmarked ones, a stumbling block seems to be that – in (12) – sometimes unmarked elements are eliminated by a process, but marked things survive intact. Check out (13): this shows a process of coda neutralization in the Nepalese language Yamphu. As you can see in (13a), an underlying coronal becomes a glottal.

However, underlying labials and dorsals – in (b) and (c) – remain labial and dorsal! This is shocking because it means that less marked things are eliminated while more marked things are not. It was/is generally thought that phenomena like Yamphu’s cannot exist because they fly in the face of markedness reduction: if languages seek to reduce markedness, why get rid of something relatively unmarked and **not** get rid of the more marked things?

(12) **The issue**

Sometimes only relatively *unmarked* elements are eliminated by a process...

(13) *Yamphu* coda PoA neutralization (from Rutgers 1998)

(a) /t/ → [ʔ] in codas

/næm:it/ → [næm:iʔ] ‘daughter-in-law’ (c.f. [nam:ið-æʔ] {instrumental})

/sit:-ma/ → [siʔma] ‘hit+{infinitive}’ (c.f. [sit:-a] ‘hit+{past}’)

(b) /p/ → [p] in codas

[k^hap] ‘language’

[kep-ma] ‘stick+{infinitive}’

(c) /k/ → [k] in codas

[æʔlik] ‘bendy’

[k^ha:k-ma] ‘scrape one’s throat + infinitive’

(d) /ʔ/ → [ʔ] in codas

[asiʔ] ‘previously’ (c.f. [asi.ʔ-em-ba] ‘before’)

[ji:w-æʔ-mu] ‘river-possessive-down’ (c.f. [kaniŋ-æʔæ] ‘we-poss.’)

The problem can be put in constraint terms too. In tableau (14), to get /t/ to become [ʔ] we need **{dors,lab,cor}* outranking constraints that will preserve PoA – IDENT{PoA}. However, if **{dors,lab,cor}* outranks IDENT{PoA}, what’s to stop labials and dorsals from neutralizing to glottal?

(14) *Markedness reduction*

/ʔit/	*{dors,lab,cor}	IDENT{PoA}
(a) ʔit	*!	
(b) ʔiʔ		*

Well, the solution is *Preservation of the Marked*, or *PoM* for short. The idea behind *PoM* is that highly marked elements can be specifically targeted for preservation. Dorsals are the most marked *PoA*, so there is a faithfulness constraint especially for them – *IDENT{dors}*, and so on as in (15).

(15) *Preservation of the marked*

(a') *IDENT{dors}* “If segment *s* is dorsal, then *s'* is dorsal”

(b') *IDENT{dors,lab}* “If segment *s* is dorsal or labial, then *s* and *s'* have the same *PoA*”

(c') *IDENT{dors,lab,cor}* etc.

(d') *IDENT{dors,lab,cor,gl}* etc.

PoM can block an otherwise general process. As you can see in tableau (16), *IDENT{dors,lab}* prevents the underlying labial from neutralizing.

(16) *PoM in action*

/...ip/	<i>IDENT{dors,lab}</i>	*{dors,lab,cor}	<i>IDENT{dors,lab,cor}</i>
☞ (a) ...ip		*	
(b) ...i?	*!		*

Note that the ranking still allows elimination of coronals. You can see this in the *Yamphu* word [soksæt], which means ‘squeeze and pull and the same time’.

(17)

/soksæt/	<i>IDENT{dors,lab}</i>	*{dors,lab,cor}	<i>IDENT{dors,lab,cor}</i>
(a) soʔsæʔ	*!		* *
(b) soʔsæt	*!	*	*
(c) soksæt		* *!	
☞ (d) soksæʔ		*	*

So, there are two forces: *markedness reduction* and *PoM*. If *reduction* beats *PoM*, we’ll end up with unmarked segments. This is illustrated in the first batch of systems in table (17). Table (17) lists coda stop inventories produced by *PoA* neutralization. So, *Kashaya* doesn’t preserve any marked thing and reduces everything to the least marked *PoA* -- glottal. *Chickasaw* reduces everything down to the low marked coronal and glottal *PoA*, and so on.

In contrast, in the second batch of languages – called ‘gapped’ in the table – *PoM* take precedence. In *Nganasan*, the more marked labial is preserved while the less marked coronal is not. *Nganasan* is interesting because the language also has some *markedness reduction* beating *PoM* as dorsals are eliminated.

As you can see, with *PoM* and *markedness reduction*, almost **anything** is possible in terms of what may undergo neutralization.

- (18) *PoM preserves marked elements, and markedness reduction seeks to eliminate them, so:*

Coda stop/nasal inventories produced by PoA neutralization

	dors	lab	cor	?	
harmonically complete				✓	Kashaya (Buckley 1994), Kelantan Malay (Teoh 1988, Trigo 1988), Toba Batak (Hayes 1986)
			✓	✓	Chickasaw (Munro & Ulrich 1985)
		✓	✓	✓	Standard Malay (§2.3.1)
	✓	✓	✓	✓	Pendau (Quick 2000§4.2.1)
			✓		Uradhi (Hale 1976, Crowley 1983)
		✓	✓		Formal Kiowa (Watkins 1984)
	✓	✓	✓		New Zealand English
gapped		✓		✓	Nganasan (Helimski 1998)
	✓			✓	Fuzhou (Yip 1982:646)
	✓	✓		✓	Yamphu, Cockney English (Sivertsen 1960)
	✓		✓	✓	Nambiquara (Kroeker 1972)
	✓		✓		Mordva (Zaicz 1998)

- All have alternations showing synchronic neutralisation
- i.e. (Almost) any inventory is possible.

To generalize, the outputs of neutralization do not show markedness effects, and it's all due to Preservation of the Marked.

At this point you might be wondering “If anything can happen in neutralization, why have markedness at all?” This amounts to (19): having freely rankable constraints.

*The problem with this view is of course that it fails to account for situations where markedness effects **are** apparent. And this leads us on to (20).*

- (19) *Why not deny markedness entirely?*
i.e. freely rankable *{dors}, *{lab}, *{cor}, *{glottal}?

- Problem: fails to account for epenthesis and neutralization asymmetries.

*With PoM, we can now answer the question “Why **should** epenthesis and neutralization outputs show markedness asymmetries? After all, the undergoers of neutralization do not, so what makes epenthesis and neutralization targets so special?”*

The answer is simply that Preservation of the Marked doesn't apply in these situations. For epenthesis, there's nothing to preserve underlyingly, so PoM will be irrelevant. The only thing that is relevant for epenthesis is constraints on the output, and as we saw in section 2, they all favour glottals over everything else.

(20) *This solves an unanswered question:*

Q: Why *should* consonant epenthesis and neutralization outputs show markedness asymmetries?

A: For those phenomena, preservation is irrelevant.

- For epenthesis, there's nothing underlying to preserve
- For neutralization, every option *equally* fails to preserve the underlying form, so preservation is irrelevant.

A similar situation is in the outputs of neutralization. Like epenthesis, PoM is irrelevant, but for different reasons. To give a concrete example, In (20), you can see that Standard Malay /k/ becomes [ʔ] in codas.

(21) Standard Malay codas [p t ʔ] (Lapoliwa 1981:88-9)

(a) /k/→[ʔ] in codas

Root	Final codas	Medial codas	Onsets
/baik/	baiʔ 'good'	baiʔ.-lah 'all right'	kə-bai.k-an
/didik/	di.diʔ 'educate'		didik-an
/duduk/	du.duʔ 'sit'	du.duʔ.-kan 'to seat'	du.du.k-i
/gərak/	gə.raʔ 'move'	gə.raʔ.-lah 'move it'	gə.ra.k-an
/pendek/	pen.dɛʔ 'short'	pə.ndɛʔ.-ɲa 'in short'	kə.-pən.de.k-an
/sorak/	so.raʔ 'shout'	so.raʔ.-ɲa 'way he shouted'	so.ra.k-i

(b) /p t/ surface faithfully

[i.kat]	'to tie'	[a.tap]	'roof'
[sa.kat]	'parasitic plant'	[lə.tup]	'to explode'
[su.ɲut]	'grumble'		

The question that we care about is why Malay's underlying /k/ doesn't become [p] or [t]. In fact, /k/ never becomes [p] in any language. The reason can be seen in tableau (21). The constraint $\ast\{\text{dorsal}\}$ outranks IDENT{dors} – this allows dorsals to be eliminated.

However, this is the last thing that faithfulness has to say in Malay. All the other options – [p], [t], and [ʔ] are equally unfaithful – they all fail to preserve /k/ to an equal extent. So, preservation is irrelevant here, and we have to rely on the PoA output constraints. As we saw, they all favour glottals, so Malay /k/ becomes a glottal stop.

{STEP THROUGH TABLEU}

(22) *Direction of neutralisation*

/...k/	$\ast\{\text{dors}\}$	IDENT{dors}	$\ast\{\text{dors,lab}\}$	$\ast\{\text{dors,lab,cor}\}$
(a) ...k	*!		*	*
(b) ...p		*	*!	*
(c) ...t		*		*!
☞ (d) ...ʔ		*		

- Neutralisation will always result in the least marked feature value

To summarize, the result in (22) is that markedness asymmetries will never be apparent when preservation is relevant. So, it will be apparent in things like epenthesis and the output of neutralization because faithfulness has nothing to say there. However, we should see no markedness effects in things like the undergoers of neutralization. Because inventories are produced by neutralization, we will see no asymmetries in inventories. We'll see none in the output of coalescence, and what undergoes assimilation, and so on.

I guess we could say that if preservation is involved, markedness is not.

(23) *PoM's Result*

Markedness asymmetries will never be overtly apparent when preservation is relevant.

- e.g. undergoers of neutralization, inventory structure, undergoers of assimilation, the output of coalescence, etc. will never show markedness asymmetries.

(24) *Further prediction*

Markedness reduction is *always* an option.

There is no phenomenon which must produce the most marked element (cf. de Haas 1988, cf. de Lacy 2002:ch.8)

4. Conflation

We've gone a good way to establishing where to expect markedness to appear. There's another crucial piece in the puzzle – in section 4.

Markedness distinctions are sometimes ignored. It's a bit difficult to illustrate exactly what is meant by this using PoA. I've usually talked about it in terms of sonority-driven stress, but here I'll talk about a case involving PoA neutralization here.

(25) **The issue**

Markedness distinctions are sometimes ignored.

If you take a look in (26), it seems like Kashaya has a simple case of neutralization of coda PoA to glottal.

(26) *Kashaya PoA neutralization* (excerpted from Buckley 1994:99ff*)

- (a) /ʃeʔeʔ/ → [ʃeʔeʔ] 'basket'
- (b) /ma:cac/ → [macaʔ] 'they'
- (c) /mihjoq/ → [mihjoʔ] 'woodrat'

So, we need the ranking in tableau (27) -- $\ast\{dors,lab,cor\}$ outranks $IDENT\{dors,lab,cor\}$. In fact, $\ast\{dors,lab,cor\}$ outranks every faithfulness constraint that would preserve it: e.g. $IDENT\{dors\}$, $IDENT\{dors,lab\}$, and so on.

(27) *Markedness reduction (as expected)*

/...k/	*{dors,lab,cor}	IDENT{dors,lab,cor}
(a) ...k	*!	
(b) ...t	*!	
(c) ...ʔ		*

However, neutralization is blocked in one situation: when the coda segment appears before another glottal – either [ʔ] or [h].

For example, in (a), underlyingly dental [t] **does not** become glottal stop before the suffix [ʔemu].

Similarly, /mihjoq/ does not become [mihjoʔ] before the suffix [-ʔ] ‘it’s a’

Underlying clusters of stop+glottal, as in /kilakh/ do not surface as [kilaʔ] or [kilah] – they remain faithful.

(28) *Neutralisation gets blocked*

- Neutralisation is blocked before another glottal

e.g. before –[ʔe:mu] ‘that is x’

- (a) /ʃeʔeʔ-ʔemu/ → *[ʃeʔeʔ-ʔemu] ‘that’s a basket’
- (b) /ma:cac-ʔemu/ → *[ma:caʔ-ʔemu] ‘that’s them’
- (c) /mihjoq-ʔ/ → *[mihjoʔʔ] ‘it’s a woodrat’
- (d) /kúlweth/ → *[kúlweʔh] ‘cattle’
- (e) /teph/ → *[teʔh] ‘unmarked game stick’
- (f) /kilakh/ → *[kilaʔh] ‘eagle’
- (g) /ʃakitáqh/ → *[ʃakitaʔh] ‘puffin’

So, what causes the blocking? It’s pretty clear – we need an OCP constraint that bans adjacent glottals. This will block [kilaʔh], for example. Of course, we have to think of an option where the underlying /h/ becomes aspiration on the glottal stop. OCP(glottal) will block that too if we conceive of this as something with a primary glottal and a secondary glottal PoA. In any case, aspirated glottal stops are articulatorily impossible.

In short, and unsurprisingly, neutralization is blocked whenever it would end up with adjacent glottals, or glottalized glottals, or aspirated glottals.

(29) *What causes the blocking?*

- The OCP (*glottal+glottal) blocks *[kilaʔh]

(i) It also blocks primary-secondary PoA being the same: e.g. *[kilaʔ^h]

So, here’s the question: if Kashaya is well behaved, what **should** happen?

Let’s take /kilak-h/ ‘eagle’. If it’s blocked from becoming [kilaʔh], it clearly should become [kila^h]. In other words, underlying /k-h/ should become [th]. This makes sense from a markedness point of view: the aim is to reduce markedness in codas, and if dorsals can’t become glottals, they should become the next least marked thing –

coronals. By the way, for those of you who are interested, this is what a Fixed Ranking theory like Prince & Smolensky's predicts **must** happen. And it does happen in some dialects of Spanish, but not in Kashaya...

(30) *What should happen?*

- If elimination of dorsals in codas is due to markedness reduction, and dorsals are blocked from becoming the least marked PoA (glottal) they should therefore become the next least marked PoA (coronal):
i.e. /...k-h/ should become [...th]
- And there is no problem with this option because [th] appears freely elsewhere.
(• This option does happen in some dialects of Spanish, in an analogous environment)

In (31). What happens is that when neutralisation is blocked, everything remains faithful. To put this in terms of conflation:

*Kashaya treats dorsals, labials, and coronals as **more marked** than glottals because it neutralises them to glottals when it can.*

*However, Kashaya treats dorsals, labials, and coronals as **equally marked with respect to each other**, because when neutralisation to glottal is blocked, there is no neutralisation to coronal.*

(31) *What does happen: conflation*

/...k-h/ remains faithful:

[kilakh] 'eagle', [ʃakitáqh] 'puffin', etc.

- So, dorsals, labials, and coronals are all seen as *more marked* than glottals.
- But otherwise there is no distinction: coronals are not treated as less marked than dorsals and labials.

What this means is that, in effect, it is never valid to say "x is more marked than y". For PoA in Kashaya, it's not true that "dorsals are more marked than coronals". Instead, it's true that "coronals are never more marked than dorsals". This allows for conflation: where dorsals and coronals can be treated the same in a language.

In constraint terms, conflation is handled by having constraints that assign equal violations to different levels of markedness.

(32) *The solution:*

It is not correct to say that 'dorsals are more marked than coronals'

Instead: 'coronals are never more marked than dorsals'

- The constraints express conflation:
*{dors,lab,cor} assigns *equal* violations to dorsals and coronals...

*This is illustrated in tableau (33). Input /k/ does not become [ʔ] because doing so would result in two glottals next to each other – as in candidate (a). So, why doesn't /k/ become [t]? Well, as you can see both [t] and [k] incur **equal** violations of *{dors,lab,cor}. This means that they are conflated. So, the lower-ranked faithfulness constraint can then show through. As it favours the faithful [k], the winner has a [k], not a [t].*

It's of course crucial to rank $\ast\{\text{dorsal}\}$ below the faithfulness constraint, otherwise dorsals would turn into [t].

(33)

/...k-h/	OCP	$\ast\{\text{dors,lab,cor}\}$	IDENT{dors,lab,cor}	$\ast\{\text{dors}\}$
(a) ?h	*!		*	
(b) th		*	*!	
(c) kh		*		*

- The constraints that favour dorsals over coronals (e.g. $\ast\{\text{dors}\}$, $\ast\{\text{dors,lab}\}$) are crucially ranked below the faithfulness constraint.

So, the moral of the story is, that – in (34) – it's not accurate to say that 'x is more marked than y'. Instead, 'y is never more marked than x', so allowing for the situation where x and y are equally marked. In terms of constraints, this situation comes about when x and y incur the same violations of active constraints. In Kashaya, the active constraint was $\ast\{\text{dors,lab,cor}\}$, and both dorsals and coronals violated it equally.

(34) *Result of conflation*

It is not accurate to say 'x is more marked than y';

instead, 'y is never more marked than x'

- This formulation x and y to be conflated.
- Formal result: conflation of x and y comes about when x and y incur the same violations of active constraints.

To summarize so far, we've seen that *Preservation of the Marked* can prevent markedness from being apparent in some phenomena.

Conflation means that languages will differ as to how many distinctions they'll use for any particular hierarchy. There's one last piece to the markedness puzzle, and this is hierarchy conflict, in section 5.

5. Conflict

Languages differ as to which segment is least marked. This has been seen as problematic for markedness. The simple problem is 'should we expect variation'? Doesn't markedness pick out one über-segment that is the ideal? Shouldn't we all be saying [ba]? The more complex problem is "how do we allow variation to happen in a constrained way? – if variation is allowed, won't we end up evacuating the idea of markedness entirely?"

(35) **The Issue**

There is variation as to which segment is least marked both across and within languages.

In (36), we get an idea of the extent of the variation for PoA. Some languages, like *Mabalay Atayal*, have epenthetic [ʔ]. But, famously, *Axininca Campa* has epenthetic [t].

We saw that Malay neutralizes PoA to glottal, but a number of languages neutralize to coronal, including Basque, Somali, and Taiwanese. The interesting thing about Taiwanese is that it otherwise has a glottal stop, so there's no reason not to neutralize to glottal stop.

(36) *Glottals and Coronals*

- Variation across languages

(a) Mabalay Atayal has epenthetic [ʔ], but Axininca Campa has [t]

(b) Some languages neutralize to coronal:

Basque to [t], Somali nasals to [n], Taiwanese to [t] (even though [ʔ] is available.

-- i.e. languages can choose between 'coronal' and 'glottal' as the least marked PoA.

- Variation within languages

Genovese neutralizes to glottal in codas but to coronal in onsets

In fact, the variation is even more interesting. In Genovese, coronals become glottal in codas, but glottals become coronal in onsets. In other words, Genovese treats both glottal and coronal as least marked, just in different environments.

The questions raised by this variation -- in (37) -- are (a) how do we account for the glottal-coronal variation, and (b) does variation weaken the theory? Or to put it a little differently, is it surprising that there's variation?

(37) *Two questions arise*

(a) How do we account for the coronal-glottal variation?

(b) Is variation in the least marked segment surprising? Does it weaken the theory?

The solution is very straightforward, and -- altho' hardly ever explicitly discussed -- I doubt if there'd be any objection to it. The idea is that hierarchies can partially conflict. So, while the PoA hierarchy has coronal as more marked than glottal, some other hierarchy has the opposite.

To make things a little more concrete, I suggest that the conflicting hierarchy is the sonority hierarchy. Glottals stand somewhere near the top of this hierarchy, certainly higher than voiceless stops, anyway.

(38) *How to account for variation*

(a) PoA: | coronal > glottal |

(b) 'H': | glottal > coronal |

- I suggest H is the sonority hierarchy. Glottals [ʔ h] consistently act as highly sonorous in many phonological phenomena.

- Sonority hierarchy: | ... glottals (>) glides > liquids > nasals > fricatives > stops |

Some might find this proposal hard to swallow for phonetic reasons. There is an idea that high sonority segments should be highly 'sonorous', which means something like 'loud', or whatever. However, no-one's ever been able to show that there's a direct

phonetic correlate with phonological sonority. I think of it as an arbitrary hierarchy. All the phonological evidence points to glottals being highly sonorous in any case.

Following Prince & Smolensky's (1993) proposal that syllable margins combine with sonority values, we get the constraint in (39a) which bans glottals in margins (a margin is an onset or coda). Following some proposals of mine about prominent positions, we also get the constraint in (39b), which bans glottals specifically in onsets.

(39) The constraints

(a) *MAR/glottal "No glottals in syllable margins (onsets, codas)
(after Prince & Smolensky 1993)

(b) *ONS/glottal "No glottals in onset"
(after de Lacy 2001; also see Smith 2003)

So, how do we get epenthetic coronals? Well, in tableau (40), you can see that if *MAR/glottal outranks all constraints that favour glottals over coronals (i.e. *{dors,lab,cor}, then coronals will be favoured over glottals. *{dors,lab} favours coronals over dorsals and labials.

(40) Epenthetic coronals (as in Asheninca Campa)

/a/	*MAR/glottal	*{dors,lab,cor}	*{dors,lab}
(a) a̰	*!		
(b) ap		*	*!
(c) at		*	

The important thing is that variation can happen even in the same language. Tableau (41) schematically illustrates the situation in Genovese, where there is neutralization to coronal in onsets, but glottal in codas. As you can see, *ONSET/GLOTTAL rules out a form with neutralization to glottal in onsets. Of the two candidates remaining, (c) wins because it violates *{dors,lab,cor} less by eliminating the coda coronal. In other words, we can generate variation within the same language.

One interesting aside is that there is no anti-Genovese where onsets become glottal and codas become coronal. This follows from the constraints as I have them.

(41) Variation in the same language: Glottal codas, coronal onsets

/kak/	*ONS/gl	*{dors,lab,cor}	*MAR/gl
(a) ?a?	*!		**
(b) tat		**!	
(c) ta?		*	*

• Note: Impossible to get neutralization to glottals in onsets and coronal in codas.

So, let's suppose that hierarchy conflict is ok. Does that mean that the theory can predict anything, as in objection (42)?

(42) *Skepticism*

- Does allowing hierarchy conflict mean that the theory predicts anything?

Well, what I'm advocating is incidental hierarchy conflict. The PoA and sonority hierarchies do conflict, but only for the reason that the segments that have the least marked PoA feature – glottal – also inadvertently happen to have a marked sonority value.

There is no direct hierarchy conflict. There is no anti-PoA hierarchy, for example. This ban on direct conflict follows from the theory I've proposed about hierarchies, but for the moment we can see it as a stipulation.

(43) *Response*

- (a) The sort of conflict I'm advocating is 'incidental' conflict

While glottals are the least marked feature value for PoA, it just so happens that they necessarily are more sonorous than coronal voiceless stops.

- (b) There is no direct conflict. i.e. there is no hierarchy | glottal > coronal |

Without direct conflict, this means that it is always possible to 'rank' segments in terms of markedness if they differ in just one feature. For example, [t] and [p] differ only in their PoA feature, so they are like a 'minimal pair' for markedness. Because labials are more marked than coronals, there is just no way that labials can ever trump coronals.

(44) *Labials and dorsals are still highly marked*

- (a) [p] differs from [t] *only* in PoA – i.e. a 'markedness minimal pair'.

- (b) Because | dorsal > labial > coronal |, dorsals and labials will *always* be more marked than coronals.

They can therefore never be epenthetic or the output of neutralization.

In fact, we can look at this issue of hierarchy conflict from another point of view. Is hierarchy conflict really a surprise? What would we have to do to ensure a theory that banned hierarchy conflict?

Well, in (45b) the first thing we need to do is ban direct conflict of hierarchies. This is the easy bit.

In (45c) what's much harder is to ban indirect conflict. For example, For PoA, coronals are more marked than coronals. For the sonority hierarchy, glottals are more marked than voiceless stops, which includes coronal voiceless stops.

Since glottals happen to have high sonority, and coronal voiceless stops happen to be voiceless stops, a ban on hierarchy conflict would somehow have to extract this implicational relation, and ban any hierarchy that could contradict it. It might be doable, but to suppose that there is a meta-restriction along the lines of (45c) has no precedent elsewhere in the theory.

(45) *Is hierarchy conflict a surprise?*

- (a) Is it possible to impose a meta-restriction on hierarchies to *avoid* conflict?
(b) It's possible to ban direct conflict:

- If $|\alpha F \rangle \beta F|$ in hierarchy H, then there is no hierarchy in which $|\beta F \rangle \alpha F|$
- (c) It's very difficult to ban indirect conflict:
 If $|\alpha F \rangle \beta F|$ in hierarchy H,
 and there is some feature value $[\gamma G]$ that is necessarily associated with $[\beta F]$,
 and some feature $[\delta G]$ that is associated with $[\alpha F]$,
 then there is no hierarchy in which $|\gamma G \rangle \delta G|$
- Many complexities in this restriction (e.g. “necessarily associated with”)

In contrast, it is much easier to say that a markedness relation in one hierarchy does not influence markedness relations in others.

The result of hierarchy conflict is – in (46) – that there is no such thing as the ‘unmarked segment or consonant or vowel’. A segment might have some unmarked features, but others might be marked. Variation is therefore expected depending on which feature is seen as more important in different languages, and different environments.

However, because conflict is only partial some segments will always be out. There'll never be an epenthetic [p] because [t] has less marked PoA and they have the same sonority, for example.

(46) *Result of hierarchy conflict*

There is no such thing as ‘the unmarked segment/consonant/vowel’

- Segment x may have an unmarked feature value $[\alpha F]$ wrt one hierarchy, but x may have a marked feature value $[\alpha G]$ in some other hierarchy.
- Variation is therefore expected, but not every segment is a possible default.

6. Is markedness in i-language?

So let's finish up with section 6.

What I've aimed to show in the preceding sections is that a full understanding of all the factors acting in the grammar gives us a complete theory of where to expect markedness. Specifically, Preservation of the Marked means that markedness effects won't be seen whenever preservation is relevant. Hierarchy conflict means that even when preservation isn't relevant, we should expect variation in what is ‘unmarked’. Finally, conflation means that we should expect variation as to whether different categories are treated distinctly or not.

So, what's left of PoA markedness? Well, the principles predict that labials and dorsals can never be epenthetic, and that PoA neutralization can never produces labials and dorsals.

However, I've been assuming that there are in fact i-language markedness principles behind these generalizations. Several recent articles and a book has claimed that there aren't. Hume & Tserdanelis (2002), Hume (2003), Vaux (2001 et seq.), and Rice (1996 et seq.) to some extent have argued that anything can happen – there are epenthetic dorsals and labials. I argue in my book that none of the cases they cite stands up to scrutiny. I'm happy to talk about this more in the question period, but what I want

to focus on here is the recent claim by Blevins (2004) that there *is* markedness, but not because of *i-language* mechanisms.

(47) *So, what's left to explain?*

- For PoA:
- labials and dorsals are never epenthetic
 - PoA neutralization never produces labials and dorsals
 - cf. Hume & Tserdanelis (2002), Hume (2003), Vaux (2001) who claim that anything is possible, and Rice (1996 et seq.) who claims that a lot more is possible under complex circumstances.
 - cf. me (in press) who argues they're wrong.

As in (48) Blevins has argued that "recurrent sound patterns have their origins in phonetically motivated sound change". In other words, there's no role for phonology in explaining markedness. Instead, Blevins suggest that we should understand lack of empirical attestation as due to diachronic factors – outside of i-language.

So, Blevins' approach is that -- in (b) – the phonology can generate anything in principle. However, the likelihood of some grammars being successfully learnt is very low. This explains all markedness effects.

(48) *Should i-language explain these facts?*

(a) Blevins (2004) *Evolutionary Phonology*:

- (i) "recurrent sound patterns have their origins in recurrent phonetically motivated sound change" (Blevins 2004:8).
- (ii) "Certain sound patterns are rare or unattested, because there is no common pathway of change which will result in their evolution" (Blevins 2004:9).

(b) *Summary*:

- (a) The phonological component can in principle generate *anything*.
- (b) The likelihood of some grammars being learnt is very low.
- (c) This explains all markedness effects.

To be absolutely clear about my position on this idea, I accept that restrictions on learning (both transmission and actuation) can influence the relative rarity of particular sounds or sound combinations. As an extreme case, no language has all the sounds of the IPA, and no language has just one consonant; these systems are probably out for functional reasons, and there's no way I'd want to try to make a Phonology that specifically banned them.

I also think that less extreme cases could benefit from this point of view. For example, [g] is easy to misperceive, or at least confuse with other sounds. So, actuation of a sound change involving [g] is more likely than one involving [b], hence there should be fewer [g]'s in the world. However, this frequency effect is fundamentally different from the sort of absolute markedness statements that we've been talking about so far. No language has epenthetic [g]. It's not a few dozen, five, or even one; none have [g]. It's just not clear from Blevins theory how we make the all important leap from 'few' to 'none'.

And there's another issue: the diachronic theory simply predicts far too much.

*To give an example, one of the most common sound changes in Oceanic languages is [t] to [k]. [t] to [k] happens outside Oceania in a Chipewyan dialect, too. It also occurred in **codas alone** in the change from Middle Chinese to Classical Fuzhou. It's currently a change in progress in Maracaibo Venezuelan Spanish, too.*

However, no language has neutralization of /t/ to [k].

No language has epenthetic [k], either.

If diachrony can produce it, then – as Blevins theory goes – so should synchronic grammars.

(49) *Diachronic-synchronic mismatches*

(a) A number of languages have *t → k

(i) Hawaiian, Luangiua and several other Oceanic languages (Lynch et al. 2002:ch.4)

(ii) Fort Chipewyan Chipewyan (Haas 1948?)

(iii) Maracaibo Venezuelan Spanish (Trigo 1988)

(iv) Classical Fuzhou (Chen 1973)

(b) No language has neutralization to [k]

(c) No language has epenthetic [k]

*Let's take a case in point. Proto-Eastern Polynesian probably had epenthetic [t]. In Hawaiian, the PEP reflex of [t] is [k]. Therefore, what epenthetic consonant would we expect in Hawaiian? Well, [k], right? But no. It's glottal stop. There is no evidence, in fact, that at **any** point the epenthetic consonant was [k].*

The i-language theory I've presented above explains this straightforwardly: there just isn't any way to produce an epenthetic [k].

(50) *Proto-Eastern Polynesian (PEP) → Hawaiian*

(a) PEP probably had epenthetic [t]

(b) PEP *t → Hawaiian k

(c) Therefore the epenthetic consonant at least *could* be [k]

(d) But it's [ʔ].

Apart from the point that there are diachronic changes that aren't synchronic ones, Kiparsky has recently observed that it's easy to string natural diachronic changes together to make crazy synchronic systems. His paper is a great read, so I won't spoil it for you here.

(51) *Kiparsky's (2004) point: crazy systems from natural changes*

- Natural diachronic changes (even ones with synchronic correlates) can easily result in unattested systems.

To summarize, the idea that all markedness effects can be ascribed to diachronic change is based on two demonstrably false assumptions:

(a) *every diachronic change is a synchronic change*

(b) *natural diachronic changes always lead to natural synchronic grammars*

*The result is that we still need i-language mechanisms. They restrict the **result** of diachronic changes, and are at least necessary to explain why we don't get epenthetic [k] or neutralization to [k].*

(52) *The Result*

i-language principles restrict the result of diachronic change.

The restrictions show markedness asymmetries, so there are markedness mechanisms in i-language.

*Finally, Blevins' proposal can be seen in the context of ideas that markedness has something to do with Performance. The most common markedness diagnostics you'll see are ones about Performance. For example, you'll be told that [t] is less marked than [p] because [t] is more frequent than [p] in the world's languages. However, the fact that [t] is more frequent than [p] doesn't necessarily have **anything** to do with i-language. It's probably influenced more by disease and war, and learnability.*

My parting shot is to point out that there are significant mismatches between Performance phenomena and i-language markedness. We saw that glottal was less marked than coronal on the PoA hierarchy, but [t] is more frequent than [ʔ]. Obviously some story has to be told about why [t] is more frequent than [p] in languages, but there's no reason to think that i-language has anything to do with it.

In fact, teasing apart Performance influences from i-language ones is important. Some recent work by Peperkamp, Dupoux, and their collaborators has shown that a lot of loanword adaptation is done 'pre-phonology', through misperception and mis-mapping to phonetic categories. So, we can't trust loanword adaptations to give us insight into markedness.

My thought is that only synchronic alternations can tell us anything about markedness, and about the workings of i-language generally at this point in our understanding of how Performance mechanisms work.

(53) *What about Performance?*

(a) Could we appeal to other Performance mechanisms?

- Markedness in i-language has often been confused with 'external' markedness.

(b) typological frequency, text frequency, inventory frequency

- No 'frequency diagnostic' shows the same relations as i-language markedness. Glottals are much less frequent than coronals and velars (from UPSID).

- 'Frequency diagnostics' show tendencies, not absolutes.

While [t] is typologically more common than [p], there are languages with [p] and no [t].

(c) loanwords, language disorders

- Recent work shows that many loanword adaptations are done pre-phonology (REFS?)
- Perhaps the same with language disorders

- (54) *The Result: i-language markedness & synchronic alternations*
The only sure way of getting insight into i-language markedness is through *synchronic alternations* (e.g. neutralization, epenthesis).

7. Conclusions

To conclude in (55), I have argued that there are i-language mechanisms that create asymmetries. Their effect is called ‘markedness’.

Markedness effects are visible only when two conditions hold.

One is that preservation is irrelevant.

The other is that there is no conflicting hierarchy that interferes.

The final point is that markedness cannot be reduced to external mechanisms like diachronic change. i-language markedness is -- simply put – different from what we see in language change and other clearly Performance-related phenomena. Consequently, only synchronic alternations provide certain evidence for markedness.

In short, markedness exists.

- (55) *Summary of points*
- (a) There are i-language mechanisms that create asymmetries (i.e. markedness)
 - (b) Markedness effects are visible only when
 - (i) preservation is irrelevant (due to ‘Preservation of the Marked’)
 - (ii) there is no conflicting hierarchy
 - (c) Only synchronic alternations provide certain evidence for markedness.

References

This talk is based on:

- de Lacy, Paul (in press) *Markedness: Reduction and preservation in phonology*. Cambridge University Press.
- de Lacy, Paul (2004) “Markedness and conflation in Optimality Theory,” *Phonology* 21: 154-200. [focuses on conflation alone]
- de Lacy, Paul (2002) *The formal expression of markedness*. PhD dissertation, University of Massachusetts, Amherst. [Rutgers Optimality Archive #542]

Other references

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Questions

1. “When you say *diachronic change doesn't matter to markedness*:
*It's clear that it **does** matter...*”

A: We need to be really clear about what i-language controls in diachronic change and what it doesn't. It merely controls the start point and the end point. That is, it controls the proto-grammar and the daughter grammar. It doesn't control the mapping. For example, in the change $*t \rightarrow k$, we need i-lg to make a grammar with a [t], and one with a [k]. Do we need i-language to tell us that the daughter [k] was once a proto-[t]?

There are two schools of thought. One is that all diachronic change is a grammatical change. So, a child learns language perfectly, then changes a ranking, and we get diachronic change. In this view, every diachronic change *must* be a synchronic one, **and** because the rankings are controlled by markedness, every diachronic change is a direct reflection of i-language markedness.

I think this view is certainly wrong. It's wrong for the simple reason that we get diachronic changes we never get synchronically. So, how does a change like $*t \rightarrow k$ happen? Dupoux & Peperkamp's work shows that learners can mismatch a string they hear to phonetic categories. It's quite possible that [t] is mismatched as phonetic [k]. No phonological change takes place, it's a phonetic one. So, the Phonology has nothing to do with it.