# Disagreeing with AGREE – sharing and subsegmental theory

Patrick Honeybone, University of Edinburgh
`patrick.honeybone@ed.ac.uk`

## 1. Introduction

This paper considers **purely formal issues** in the modelling of phonological processes (= "there's not much data")
- these are issues in (i) representational, segmental phonology and in (ii) 'assimilation theory'
- one basic question connected with these issues is: does phonology *progress* or does it go round in circles?

The paper is not really written in, or about, any one 'off-the-peg' phonological framework, *however*...
- ○ I make certain assumptions about how segmental structure works (described on pages **1+** and **2+**, below)
- ○ I discuss a number of constraints (and practically all phonological theories use constraints of some type...)
- ○ I criticise certain types of analysis in OT: mostly those using constraints like AGREE

---

**The structure of this poster paper**
There are two ways of reading this paper...
- the quick way: across the top 4 pages (**1**, **2**, **3**, **4**) which present the main points of the argument
- the long way: also with the bottom 4 pages (**1+**, **2+**, **3+**, **4+**) which give explanations and justifications

---

### 1.1. Theoretical assumptions
I make some assumptions here that, in the 'representational turn' in phonology in the 80s and early 90s, were largely unquestioned 'obvious truths', but which have since gone out of focus for some – perhaps because OT has diverted attention towards constraint interaction – these must be granted for the following argumentation...
- that subsegmental phonology is important
- that **privativity** is desirable in subsegmental structure (see plaudits for privativity below)
- that assimilations are important and can give us evidence for argumentation in subsegmental phonology, when coupled with the idea that assimilations are forms of the spreading of features (or similar), so that neighbouring segments *share* a subsegmental specification in some way

---

### 1.2. Possible and impossible processes and constraints
I argue here that the uncertain status for subsegmental phonology is problematic if phonological theory aims to predict what are 'possible' and what are 'impossible' phonological processes, focusing on assimilation
- ○ the assumption of spreading/sharing gives the basis for a constrained theory of assimilation – only those types of assimilation which actually occur should be modellable using the set and type of subsegmental units assumed; this kind of argumentation gave evidence that some (or all) of these units are privative

In a somewhat related way, we can note that crucial features of OT are that...
- ○ **violable constraints** are **freely rankable** with each other, *and thus that*…
- ○ any grammar that arises by any ranking of the constraints assumed in an OT analysis should be a **possible** language, if not actually an attested one

This is the notion of **factorial typology**, which is absolutely crucial to OT, as it is a functional restriction – the only real restriction – on '**what is a possible constraint**' (see the importance of factorial typology below)
- ○ otherwise, an analyst can simply make up any constraint they like for an analysis...

---

### 1.3. Spoiler
The conclusions to this paper will be that…
(1) we risk going round in circles in subsegmental phonology – back to before the advances of the 80s…
(2) *because* OT with AGREE is incompatible with privativity…
(3) and *because of this* OT with AGREE predicts impossible assimilations
(4) so either (i) OT is wrong, or (ii) OT with AGREE is wrong

## Plaudits for privativity

It is well known that several frameworks adopt exclusively privative (*aka* monovalent, unary) features as a matter of principle: such as Dependency Phonology (Anderson & Jones 1974, Anderson & Ewen 1987), Particle Phonology (Schane 1984, 2005), Government Phonology (Kaye, Lowenstamm & Vergnaud 1985, 1990), some models of feature geometry, such as the Parallel Structures Model (Morén 2003, to appear), and 'Strict' CVCV Phonology (Szigetvári 1999, Scheer 2004). It was also becoming accepted in 'mainstream' phonology in the 1990's, before OT diverted attention away from segmental concerns...

- "This treatment has the advantage of nullifying the major argument that [ − nasal] can spread and takes feature theory a step closer to general monovalency" (Kenstowicz 1994, 492)
- "The features of nasality, aspiration and glottalisation form a class [...] in that all assimilatory and dissimiliatory processes involving them refer to [+nasal], [+spread], [+constricted], never to the opposite values [...] The conclusion that nasality, aspiration, and glottalisation are privative features helps explain [...] frequent asymmetries in the patterning of nasal vs. oral sounds, or aspirated / glottalised vs. plan consonants." (Steriade 1995, 148-9)"

## Why privativity?

- if it is assumed that assimilations are composition processes that need a local source, assuming privativity helps **restrict** the modelling of what can spread (= what is a possible process) as there are no negative values to spread [= more restrictive]
- no negative values also greatly cuts down the overgeneration of segment types and possible inventories [= more restrictive 2]
- only having marked values in features encodes typological markedness in segmental structure better
- a privative model of features/elements fits better with the gestural approach for modelling speech, of the Articulatory Phonology type (which must be privative) [see also a model for phonology on page **2+**]
- subjectively, arguably, "the simpler the primitives, the more plausible they are" (Szigetvári 1999, 8)
- in OT, if all features are binary, you'd have an extreme proliferation of constraints:
  - IDENT(+voice), ALIGN(+voice), MAX(+voice), DEP(+voice) **AND** IDENT(−voice), ALIGN(−voice), MAX(−voice), DEP(−voice)

## Which features are privative?

It would be impossible to consider the arguments in detail here, I simply note common practice...

- in some models (mostly of a feature geometric nature), only certain features are privative
- in other 'elemental' models (because their specifications are often called elements), all elements are privative

**(i)** one of the features/elements most widely thought to be privative is that which accounts for **nasality**
- [nasal] = **N** = |n| = |nasality|  (Piggott 1992, Harris 1990, Anderson & Ewen 1987, Honeybone 2005a)

**(ii)** another case where there is considerable, although not total, agreement on privativity the case of **laryngeal features**
- there are a number of systems of features which are fairly equivalent (for the purposes of this paper...

| Lombardi (1994, 1999) | Harris (1990) Botma (2005) | Iverson & Salmons (1995, 1999) | Avery & Idsardi (2001) | |
|---|---|---|---|---|
| [aspiration] | **H** | [spread glottis] | Glottal Width | [spread] [constricted] |
| [voice] | **L** | [voice] | Glottal Tension | [stiff] [slack] |
| [glottalization] | **?** | [constricted glottis] | Larynx Height | [raised] [lowered] |

### How languages use laryngeal features

- although, again, I lack the space to justify the model, I assume here the '**Laryngeal Realism**' model of laryngeal specification...

| Letters | English | Spanish | | Letters | English | Spanish |
|---|---|---|---|---|---|---|
| ⟨p⟩ | /pʰ/ | /pº/ | | ⟨b⟩ | /pº/ | /b/ |
| ⟨t⟩ | /tʰ/ | /tº/ | | ⟨d⟩ | /tº/ | /d/ |
| ⟨k⟩ | /kʰ/ | /kº/ | | ⟨g⟩ | /kº/ | /g/ |
| specification | **H** / [spread] | Ø / non-spec | | | Ø / non-spec | **L** / [voice] |

**(iii)** there is also good evidence that other subsegmental units are privative, such as place features; one which will crop up later is...
- **palatality** = **I** = |i| = |palatality| (Harris 1990, Anderson & Ewen 1987, Honeybone 2005a)

## The importance of Factorial Typology

- "The set of all possible rankings generates what we can call a *factorial typology* of the domain to which the constraints are relevant" (Prince & Smolensky 1993, 33)
- "...the fundamental typological generalizations receive principled explication through the notion of *Factorial Typology*. [...] The typology of possible languages is then given by the set of all possible constraint rankings" (Prince & Smolensky 1993, 103)
- "Universal constraints and language-particular ranking yield a *factorial typology*, another key notion from Prince & Smolensky (1993). Every permutation of constraints in CON is predicted to be a possible human language, and the grammar of every observed human language must be one of those permutations. [...] Factorial typology makes a strong claim with important implications. It means, as a matter of simple methodological competence, that analysts must test every proposed constraint for its typological consequences under ranking permutation... " (McCarthy 2002, p.12)

# 2. What are assimilations? What can happen in assimilation?

Probably uncontentiously, I assume assimilation involves a segment taking on a property of an adjacent segment
- I deal here only with cases of local, 'contact' assimilation

Most of the discussion of assimilation in recent work on phonology focuses on **cross-morpheme 'C+C'** assimilation, and most recent discussion has focused on patterns of laryngeal assimilation
- eg, Ukrainian /jak ʒe/ → ja[g]ʒe 'how' BUT /bez tebe/ → be[z] tebe 'without you' (Kiparsky 1995)
- thus there is assimilation to 'voicedness' (= **L**, [voice]), but not to voicelessness (= Ø, non-specified)

I do not only discuss such 'cross-morpheme C+C' assimilation here, however
- I also consider other types: intramorphemic assimilation, V+C and C+V assimilations

## 2.1. Examples of assimilations
(5) a 'standard' example – 'English plural assimilation'
- /kat+z/ → [kats] *cats* BUT /kad+z/ → [kadz] *cads*; /kaː+z/ → [kaːz] *cars*; /kan+z/ → [kanz] *cans*
- / + z / assimilates to the **H**-|spread| specification of the preceding obstruent
    - indeed, all C+C laryngeal assimilation in English (and German) is to **H**-|spread|
    - so, really, 'voiceless' obstruents are nonspecified (*cat* = /kʰatʰ/, *cad* = /kʰatᵒ/) = 'Laryngeal Realism'
    - for more on the subsegmental phonology of this, see what do the symbols mean? below

(6) Common nasalisation in many languages
- /man/ → [mãn] *man*; /ɪn/ → [ĩn] *in*; *etc*.
- the vowels assimilate to the **N**-|nasal| specification of the following nasal
    - for more details, see what do the symbols mean? and a model for phonology below

(7) English and German *etc*. 'sonorant devoicing'
- /pʰrɪm/ → [pʰr̥ĩm] *prim*; /kʰlan/ → [kʰl̥ãn] *clan*
- /pʰlats/ → [pʰl̥ats] *Platz* 'place'; /kʰriːχən/ → [kʰr̥iːçən] *kriechen* 'creep'
- the sonorants assimilate to the **H**-|spread| specification of the preceding obstruent
    - for more details, see what do the symbols mean? and a model for phonology below

(8) SerboCroat–Bosnian/Serbian/Croatian 'mid vowel fronting' in possessives (*-ov* → *-ev*) and other morphemes
- the back mid vowel /ɔ/ becomes [ɛ] when it occurs after 'soft' consonants (= palatals/post-alveolars)
- /nos+ɔv/ → [nosɔv] *nos ~ nosov* 'nose ~ nose's'; /bɛn+ɔv/ → [bɛnɔv] *ben ~ benov* 'mole ~ mole's' **BUT**
- /mɪʃ+ɔv/ → [mɪʃɛv] *miš ~ mišev* 'mouse ~ mouse's'; /paɲ+ɔv/ → [paɲɛv] *panj ~ panjev* 'tree-stump ~ t-s's'
- the back mid vowel assimilates to the **I**-|palatality| specification of the preceding 'soft' consonants
    - for more details, see what do the symbols mean? and SC unrounding comes for free below

## 2.2. Possible and impossible assimilations
Focusing on (6 - 8), it is clear that there is an **asymmetry** in the types of assimilation that can occur...
- processes which would be the 'opposite' of (6), (7) and (8) do not occur
- /man/ → [mad]; /ɪn/ → [ɪd] – this would involve nasals assimilating to the non-nasality of the vowel
- /pʰrɪm/ → [prɪm]; /kʰriːχən/ → [kriːçən] – with obstruents assimilating to the laryngeal state of the sonorant
- /s+ɛv/ → [sɔv]; /n+ɛv/ → [nɔv] – front vowels becoming back when next to consonants without I-|palatality|

The commonness of (5-8) and absence of their opposites are predicted in derivational representational models which account for such assimilations as the spreading of privative subsegmental units, or in models which enforce the sharing of underlying material through hard constraints
- the non-occurring assimilations are impossible because the features which account for (5-8) are privative
- there is thus no 'opposite' negative value that could spread or be shared in their impossible 'opposites'
- this is a positive result – phonology is able to correctly predict that certain types of process which are imaginable, do not, in fact, occur: it gives us a notion of **impossible assimilations**

## What do the symbols mean?

Much of the subsegmental structure of the segments described above is actually not crucial for our purposes here − only the feature/element which is shared to drive the assimilation is important − but I give relatively full descriptions here, in an essentially 'standard Government Phonology' style...

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| $p^h$ | = \|labiality\|, \|occlusion\|, \|spread\| | : | $p^h$ = **U, ?, H** | | r | = \|coronality\| | : | r = **R** |
| $t^o$ | = \|coronality\|, \|occlusion\| | : | $t^o$ = **R, ?** | | r̥ | = \|coronality\|, \|spread\| | : | r̥ = **R, H** |
| s | = \|coronality\|, \|frication\| | : | s = **R, h** | | a | = \|lowness\| | : | a = **A** |
| ʃ | = \|palatality\|, \|frication\| | : | ʃ = **I, h** | | ã | = \|lowness\|, \|nasality\| | : | ã = **A, N** |
| n | = \|coronality\|, \|nasality\|, \|occlusion\| | : | n = **R, N, ?** | | ɪ | = \|palatality\| | : | ɪ = **I** |
| ɲ | = \|palatality\|, \|nasality\|, \|occlusion\| | : | n = **I, N, ?** | | ɔ | = \|labiality\|, \|lowness\| | : | ɔ = **U, A** |
| m | = \|labiality\|, \|nasality\|, \|occlusion\| | : | m = **U, N, ?** | | ε | = \|palatality\|, \|lowness\| | : | ε = **I, A** |

## A model for phonology

If we need (i) a categorial, underlying level which turns into a (ii) gestural, surface level, ready for speech planning, the two would ideally meld into or at least easily map onto each other, an attempt at this is shown below, which melds categorial Government-Phonology-like (Kaye, Lowenstamm & Vergnaud 1985, 1990, Harris 1990, 1994) representations into 'stretchable' Articulatory-Phonology-like (Browman & Goldstein 1989, 1992) representations...

o    a compelling argument would arise for privativity if it can be assumed to underlie the whole of phonology, from elements to gestures
o    assimilation can then be modelled *throughout* as the effect of a component-part of one segment on another segment
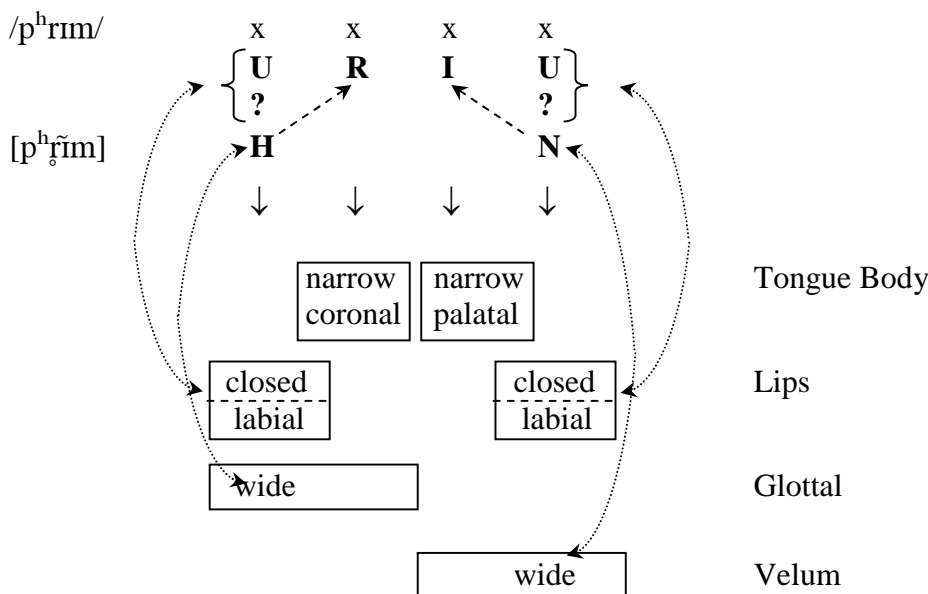


## SC unrounding comes for free

There is an open question in the analysis of SC 'mid vowel fronting' − if, as is assumed above...

• $ɔ = U + A$        and        $ε = I + A$        and        $œ = U + A + I$

...how come /ɔ/ plus the element I-\|palatality\| gives [ε] and not [œ], which would be the expected result of $U + A + I$?

o    it is clear that there must be some way of 'getting rid' of the underlying **U**
o    this looks like a problem for the type of analysis adopted here, unlike, for example that of Morén (2003, to appear), which otherwise has a not-dissimilar analysis, enforcing the sharing of V-place[cor], but has /ɔ/ (indeed all back vowels) nonspecified for place on economy grounds

However, there is another, more general and 'theory-free' way out of this...

• it is clear from a number of facts that there is a constraint (or, in OT terms, a highly ranked constraint) which entirely forbids front rounded vowels in SC; this is clear from the facts that...
o    there are no front rounded vowels in SC, but, *more interestingly and importantly*....
o    all loanwords with front rounded vowels are adapted as front unrounded vowels (see Striedter-Temps 1958, Popović 1960)
o    *thus...* unrounding of œ (= loss of **U**) 'comes for free' – it's already part of the grammar – when œ (or ø, y, ʏ) is encountered in SC, **U** is lost, to give ε or i; *so* when œ is 'created' through assimilation to **I**, **U** is immediately lost, giving ε (QED)
o    o    eg, German borrowings with /ø/ > SC /ε/ : *Börse* > *berza* 'stock market'; *Friseur* > *frizer* 'barber' (Striedter-Temps 1958)
o    o    eg, German borrowings with /y > SC /i/ : *Bühne* > *bina* 'stage'; *Perücke* > *perika* 'wig' (Striedter-Temps 1958)
o    o    this is persistent and consistent – see such recent borrowings as *fen* /fεn/ < *Fön* /føn/ 'hair dryer'

# 3. OT, Assimilation and AGREE

Something akin to a standard OT way to model assimilation has emerged, using a family of markedness constraints which penalise output sequences which do not have the same specification for a particular property

- these constraints have gone under a number of names (see AGREE **and equivalents** below)
- since at least Lombardi (1996, 1999), the constraint family is often referred to as the **AGREE** family

> I discuss this position here and argue that the conflation of the concerns from **1** and **1+** with the 'possible' and 'impossible' data from **2** and **2+** shows that this approach is very problematic
> - I develop the position to be criticised below, which may come across as something of a straw man, but it is the result of consistent application of formal positions developed elsewhere
> - some other recent work rejects AGREE, from an OT-internal perspective – see non-AGREE OT below – I do not deal with this in detail here, although it may well lead off in new, less problematic directions; such work does not seem to discuss the problems that I emphasise here (for a similar conclusion to that made here, but from different arguments, see Jansen 2004).

Lombardi (1996, 1999) accounts for C+C voicing assimilation using faithfulness constraints of the type...

- IDENT(Laryngeal) – Consonants should be faithful to underlying laryngeal specifications

...and using a markedness constraint of the type mentioned above...

- AGREE – Obstruents in a cluster should agree in voicing.

...because only laryngeal assimilation is discussed this constraint is not exploded to illustrate its family, but this can easily be done to account for the other types of assimilation discussed here (as can IDENT)...

- AGREE($N$) – in a VC sequence, the two segments must agree in terms of their specification for nasality (for $N$)
- AGREE($H$) – in a TR sequence, the two segments must agree in terms of their laryngeal specification (for $H$)
- AGREE($I$) – in a $C_I$Ɔ sequence, the two segments must agree in terms of their specification for $I$

---

## 3.1. Possible nasal assimilation again

For discussion here, I use only the example of nasal assimilation from (6), although the others would work as well *mutatis mutandis*; to do this the following faithfulness constraints are needed:

- IDENT($N$)$_{nasals}$ – nasals should be faithful to underlying specification for nasality (or some such FAITH($N$)$_{nasals}$ constraint)
- IDENT($N$)$_{vowels}$ – vowels should be faithful to underlying specification for nasality (or some FAITH($N$)$_{vowels}$ constraint)
- An undifferentiated IDENT($N$) will not suffice because it lets crucial candidates tie.

With these constraints, it is, of course, easy to model the assimilation, as with the three obvious candidates below – (a) is faithful, (b) has the same specification for nasality in the VC sequence, representing the assimilation, and (c) has the same specification for orality in the sequence, representing the 'impossible' assimilation

| (9) / man / | AGREE($N$) | IDENT($N$)$_{nasals}$ | IDENT($N$)$_{vowels}$ |
|---|---|---|---|
| a.    man | *! | | |
| b.☞ mãn | | | * |
| c.    mad | | *! | |

---

## 3.2. Impossible nasal assimilation again

This is the not the end of the analysis, however, as **factorial typology** (see **1** and **1+**) predicts that the other rankings of this sub-grammar are also possible languages. In considering the rerankings, we see the problem...

| 0) / man / | IDENT($N$)$_{nasals}$ | IDENT($N$)$_{vowels}$ | AGREE($N$) | | (11) / man / | AGREE($N$) | IDENT($N$)$_{vowels}$ | IDENT($N$)$_{nasals}$ |
|---|---|---|---|---|---|---|---|---|
| ☞ man | | | * | | a.    man | *! | | |
| .    mãn | | *! | | | b.    mãn | | *! | |
| .    mad | *! | | | | c.☞ mad | | | * |

The ranking in (11) predicts an 'impossible' assimilation. The problem is that AGREEment can be either to the positive value of a privative feature, or to its absence; this means that **privativity is annulled** because if phonology can consider the absence of a feature, that is the same, here, as dealing with a negative value

- the introduction of a 'nonce' constraint to forbid the problem candidate would be a cheat, going against the idea that constraints should represent general tendencies, not specific analyses

## AGREE and equivalents

Although Lombardi (1996, 1999) is probably the most influential, quite a number of analyses use constraints of the AGREE type, sometimes under other names...

- one quite early approach to OT segmental phonology is Pulleyblank (1997); this makes use of a family of 'IDENTICAL CLUSTER CONSTRAINTS' which are functionally equivalent to AGREE, such as...
- ICC(voicing) – a sequence of consonants must be identical in *voicing*
- ICC(place) – a sequence of consonants must be identical in *place of articulation*
- ICC(nasality) – a sequence of consonants must be identical in *nasality*

He models Zoque voicing assimilation in the way described above...

| / min–pa / | ICC(voice) | FAITH(voice) |
|------------|------------|--------------|
| minpa | *! | |
| ☞    minba | | * |

- Beckman (1997), as well as using positional faithfulness, uses Lombardi's AGREE, expanding its definition a little...
- AGREE(voice) – let *x* and *y* range over contiguous [–sonorant] segments. For all *x,y*, if *x* is [voice], then *y* must be [voice]. "Obstruents in a cluster must agree in voicing."

- Bakovic (1999) uses essentially the same constraint...
- AGREE[V] – adjacent output obstruents must have the same value of the feature [voice]
- As do, with slight variations, Borowsky (2000) and Al-Ahmadi Al-Harbi (2005) *etc...*

- Bakovic & Wilson (2000) use another constraint of this family...
- AGREE(ATR) – articulatorily adjacent vowels must have the same specification for the feature [ATR].


## Non-AGREE OT

A number of 'non-AGREE' analyses have also recently been developed from within OT, which seek to model assimilations without using direct AGREEment constraints, such as Beckman (2004), Uffmann (2005), Moren (to appear). Some of these, at least, go some way to addressing the core problems identified here. These models work in a variety of ways...

- using featural markedness constraints
- using constraints which force the overlap of morphemes

These present but it remains to be seen if they can account for all of the types of assimilation discussed here and avoid the problems identified above...

\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

\*\*\*\*\*\*\*\*\*\*\*\*\*\*

\*\*\*\*\*

\*

# 4. Conclusions

The above has demonstrated that...

- an OT grammar which includes constraints of a AGREE family, interacting with the relevant faithfulness constraints such as IDENT(**N**) and IDENT(**I**), seems to *predict* – thanks to the requirements of factorial typology – that 'impossible' assimilations should occur in languages, just as often as those of the attested types discussed on **2**.
- on this approach, the idea of privativity is in fact meaningless, and we run the danger that phonological theory is going back to where it was in terms of subsegmental theory before the whole representational turn
- these are both serious problems for the approach

Two conclusions seem possible from these realisations...

- *either* (a) the OT approach to such phonological phenomena is flawed
- *or* (b) serious attention must be paid to the types of constraints allowed in phonological OT

---

The intuitively appealing notion of the pre-and non-OT 'spreading' approach to assimilation is that...
- it succeeds in modelling how one segment affects a neighbouring segment
- it results in the segments formally **sharing** specifications, which can have other consequences in phonology (see Honeybone 2005b)
- it is impossible to formulate a derivational process to spread something that doesn't exist or to formulate a constraint which forces surface segments to share something that doesn't exist
- non-OT models clearly *are* compatible with privativity
- and models which combine sharing and priviativity lack the problems of the model discussed on **3**

---

It may be that such success can be incorporated into OT through the use of constraints which enforce SHARING, rather than AGREEMENT, because, while it is possible to agree in having or not having something, it is only possible to share those things that we have

- this is a competing model in OT; for example, Yip (2004) uses...
- SHARE-F – a cover term for the entire family of constraints that enforce feature sharing

If we assume the following constraint, the problem from (11) disappears...
- SHARE(**N**) – in a VC sequence, the two segments must share a specification for nasality

| (11) / man / | AGREE(**N**) | IDENT(**N**)$_{vowels}$ | IDENT(**N**)$_{nasals}$ | | (12) / man / | SHARE(**N**) | IDENT(**N**)$_{vowels}$ | IDENT(**N**)$_{nasa}$ |
|---|---|---|---|---|---|---|---|---|
| .     man | *! | | | | a.    man | *! | | |
| .     mãn | | *! | | | b.☞ mãn | | * | |
| .☞ mad | | | * | | c.    mad | *! | | * |

However, this has problematic results in other areas, in that, in a grammar with SHARE(**N**) ranked high, as in (12), all VC sequences will surface sharing nasality, as in (13)...

| (13) / mad / | SHARE(**N**) | IDENT(**N**)$_{vowels}$ | IDENT(**N**)$_{stops}$ |
|---|---|---|---|
| a.     man | *! | | * |
| b.☞ mãn | | * | * |
| c.     mad | *! | | |

This does not occur in a non-OT sharing model, as the compulsion to share nasality can only arise if it exists underlyingly; this places a heavy load on underlying representations, which fits uneasily with OT.

So, it seems from the above that: either (i) the OT approach is wrong, or at least (ii) OT with AGREE is wrong.

# References

Al-Ahmadi Al-Harbi, A. A. (2005) English Voicing Assimilation: Input-to-Output [±voice] and Output-to-Input [±voice]. *Journal of King Abdulaziz University* (Arts and Humanities) 13. ROA 723-0305.

Anderson, J. & Ewen, C. (1987) *Principles of Dependency Phonology*. Cambridge: CUP Avery & Idsardi (2001)

Anderson, J. & Jones, C. (1974) 'Three theses concerning phonological representations' *Journal of Linguistics* 10, 1-26.

Bakovic, E. (1999) Assimilation to the Unmarked. *Penn Working Papers in Linguistics* 6.1. ROA 340.

Bakovic, E. & Wilson, C. (2000) Transparency, strict locality, and targeted constraints. *Proceedings of the West Coast Conference on Formal Linguistics* 19: 43-56. ROA 340-0899.

Beckman, J. (1998) *Positional Faithfulness*. PhD dissertation, University of Massachusetts at Amherst.

Beckmann, J. (2004) 'On the Status of CODACOND in Phonology' *International Journal of English Studies* 4, 105-134.

Borowsky, Toni (2000) 'Word-faithfulness and the Direction of Assimilations'. *The Linguistic Review* 17, 1-28.

Botma, B. (2005) 'On the phonological interpretation of laryngeally modified nasals'. In van Oostendorp, M. and van de Weijer, J. (eds) *The Internal Organization of Phonological Segments*. Berlin: Mouton de Gruyter.

Browman, P. & Goldstein, L. (1989) 'Articulatory gestures as phonological units' *Phonology* 6, 219-52.

Browman, P. & Goldstein, L. (1992) 'Articulatory Phonology: an overview' *Phonetica* 49, 155-180.

Harris, J. (1990) 'Segmental complexity and phonological government' *Phonology* 7, 255-300.

Harris, J. (1994) *English Sound Structure.* Oxford: Blackwell.

Honeybone, P. (2005a) 'Diachronic evidence in segmental phonology: the case of obstruent laryngeal specifications.' In van Oostendorp, M. and van de Weijer, J. (eds) *The Internal Organization of Phonological Segments*. Berlin: Mouton de Gruyter.

Honeybone, P. (2005b) 'Sharing makes us stronger: process inhibition and segmental structure' In Carr, P., Durand, J. & Ewen, C.J. (eds) *Headhood, Elements, Specification and Contrastivity: Phonological Papers in Honour of John Anderson*. Amsterdam: John Benjamins.

Iverson, G. & Salmons, J. (1995) 'Aspiration and laryngeal representation in Germanic'. *Phonology* 12.369-396.

Iverson, G. & Salmons, J. (1999) 'Glottal spreading bias in Germanic'. *Linguistische Berichte* 178.135-151.

Kaye, J., Lowenstamm, J. & Vergnaud, J.-R. (1985) 'The internal structure of phonological representations: a theory of charm and government' *Phonology Yearbook* 2, 305-328.

Kaye, J., Lowenstamm, J. & Vergnaud, J.-R. (1990). 'Constituent structure and government in phonology' *Phonology* 7, 193-231.

Kenstowicz, M. (1994) *Phonology in Generative Grammar*. Oxford: Blackwell.

Kiparsky, P. 1995. The Phonological Basis of Sound Change. In Goldsmith, J. (ed.), T*he Handbook of Phonological Theory*. Cambridge, MA & Oxford: Blackwell.

Lombardi, L. (1991) *Laryngeal Features and Laryngeal Neutralisation*. PhD. University of Massachusetts at Amherst. Published (1994), New York: Garland.

Lombardi, L. (1996) 'Positional faithfulness and voicing assimilation in Optimality Theory'. Ms., University of Maryland, College Park.

Lombardi, L. (1999) 'Positional faithfulness and voicing assimilation in Optimality Theory'. *Natural Language and Linguistic Theory* 17: 267-302.

McCarthy, J. (2002) *A Thematic Guide to Optimality Theory*. Cambridge University Press.

Morén, B. (2003) 'Affricates, Palatals and Iotization in Serbian: Representational Solutions to Longstanding Puzzles'. In Erik Egeberg and Tore Nesset (eds.), *Poljarnyj Vestnik* 6, pp. 46-70. Tromsø, Norway.

Morén, B. (to appear) 'Consonant-Vowel Interactions in Serbian: Features, Representations and Constraint Interactions'. To appear in *Lingua*.

Piggott, G. (1992) 'Variability in Feature Dependency: the Case of Nasality'. *Natural Language and Linguistic Theory* 10, 33-78.

Popović, I. (1960) *Geschichte der serbokroatischen Sprache*. Wiesbaden: Harrassowitz.

Prince, A & Smolensky, P. (1993). *Optimality Theory. Constraint Interaction in Generative Grammar*. Rutgers University & University of Colorado. Published (2004) Malden: Blackwell.

Pulleyblank, D. (1997) 'Optimality Theory and Features' In Archangeli, D. & Langendoen, T. (eds.) *Optimality Theory: an Overview*. Oxford: Blackwell.

Schane, S. (1984) 'The Fundamentals of Particle Phonology' *Phonology Yearbook* 1, 129-155.

Schane, S. (2005) 'Theory Aperture Particle |a|: its Role and Functions' In Carr, P., Durand, J. & Ewen, C.J. (eds) Headhood, Elements, Specification and Contrastivity: Phonological Papers in Honour of John Anderson. Amsterdam: John Benjamins.

Scheer, T. (2004) *A Lateral Theory of Phonology*. Volume 1. Berlin: Mouton de Gruyter.

Steriade, D. (1995) 'Underspecification and markedness'. In: Goldsmith, J. (ed.) *The Handbook of Phonological Theory*. Cambridge, MA & Oxford: Blackwell.

Striedter-Temps, H. (1958) *Deutsche Lehnwörter im Serbokroatischen*. Wiesbaden: Harrassowitz.

Szigetvári, P. (1999) *VC Phonology: a Theory of Consonant Lenition and Phonotactics*. Unpublished Ph.D. Dissertation, Eötvös Loránd University/Hungarian Academy of Sciences.

Uffmann, C. (2005) 'Optimal Geometries'. In van Oostendorp, M. and van de Weijer, J. (eds) *The Internal Organization of Phonological Segments*. Berlin: Mouton de Gruyter.

Yip, M. (2004) 'Lateral Survival: an OT Account'. *International Journal of English Studies* 4, 25-51.