

# Why we need a separate perception grammar

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## §1 INTRODUCTION

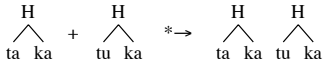
### §1.1 The OCP

The Obligatory Contour Principle (OCP) was originally introduced in autosegmental phonology as an inviolable constraint on representations. It says “adjacent identical elements are forbidden”.<sup>1</sup> This means, for instance, that the tones in the phonetic form [jévéšè] are never represented as HHL, but always as HL:

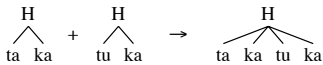


### §1.2 One OCP effect: merger

Consider two morphemes that surface as [táká] and [túká]. Underlyingly, they both carry a single H tone: |H-taka| and |H-tuka|. Now concatenate the two, giving an underlying form |H-taka + H-tuka|. The OCP says that the result cannot be the simple concatenation:

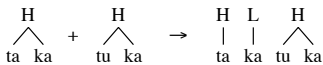


If the phonetic form is simply [tákátúká], it must be represented with a single H:



### §1.3 Another OCP effect: epenthesis

The drawback of the common merger is that one of the underlying H is lost. In some languages, therefore, the result will be [tákátúká], with a HLH sequence:



The intervening low tone causes satisfaction of the OCP, because it causes the two high tones to be non-adjacent. The advantage is that both underlying tones are present on the surface; the drawback is that the surface contains a non-underlying low tone.

### §1.4 The OCP in OT

In Optimality Theory (OT), the OCP has been proposed as being one of the many constraints in a grammar consisting of strictly ranked constraints:<sup>2,3</sup>

H-taka + H-tuka	OCP	DONTDELETE (H)	DONTINSERT (L)
$\begin{array}{c} H & & H \\ / & & / \\ ta & ka & tu & ka \end{array}$	*!		
$\begin{array}{c} & & H & & \\ & & / & & / \\ ta & ka & tu & ka & \end{array}$		*!	
$\begin{array}{c} H & L & H \\   &   & / \\ ta & ka & tu & ka \end{array}$			*

This neatly shows how the language ranks the disadvantages of the various solutions.

## ABSTRACT

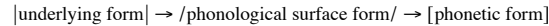
In defence of a grammar model that distinguishes between a production grammar and a perception grammar, I show that a logical contradiction arises if, as several people have proposed, the OCP is seen as a violable constraint in the production grammar. I conclude that the OCP must reside in the perception grammar.

## §2 THE PROBLEM

### §2.1 The structuralist assumption:

“Within a given language, every phonetic output form has only one phonological surface representation.”

This non-neutralizing property of phonetic implementation has been the main criterion for identifying the intermediate representation in the structuralist grammar model:



The first arrow is “phonology”, the second arrow “phonetic implementation”.

### §2.2 The violable OCP allows adjacent identical elements

In Optimality Theory, the OCP must be *violable* like all constraints. This means that it must be logically possible that OCP is ranked below the faithfulness constraints DONTDELETE (H) and DONTINSERT (L):

H-ta + H-pa	DONTDELETE (H)	OCP
$\begin{array}{c} H & H \\   &   \\ ta & pa \end{array}$		*
$\begin{array}{c} H \\ / \\ ta & pa \end{array}$	*!	

### §2.3 The violable OCP also forces merger

With the same grammar, however, underlying |H-tapa| will surface as  $\begin{array}{c} H \\ / \\ ta & pa \end{array}$ :

H-tapa	DONTDELETE (H)	OCP
$\begin{array}{c} H & H \\   &   \\ ta & pa \end{array}$		*!
$\begin{array}{c} H \\ / \\ ta & pa \end{array}$		

### §2.4 Conclusion

The phonetic form [tápá] has two phonological surface representations,

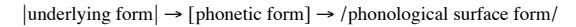
namely  $\begin{array}{c} H & H \\ | & | \\ ta & pa \end{array}$  and  $\begin{array}{c} H \\ / \\ ta & pa \end{array}$ , depending on the underlying form.

This neutralization violates the structuralist assumption. Therefore, the existence of a violable OCP in the production grammar is incompatible with the structuralist assumption.

## §3 A SOLUTION

### §3.1 Functional grammar model<sup>4</sup>

The order of the two surface representations has to be reversed with respect to the structuralist grammar model, so that the production grammar looks like:



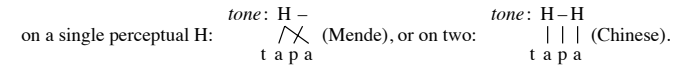
The first arrow is “phonology & phonetics”, the second arrow “perception grammar”. The structuralist assumption is satisfied *trivially*.

### §3.2 The OCP in functional phonology: perceptual aggregation<sup>4</sup>

The OCP is a constraint in the perception grammar. It says: “a sequence of two acoustic cues (e.g. high-toned vowels) should be perceived as a single feature value (e.g. H), *despite* some intervening material (e.g. a consonant).”

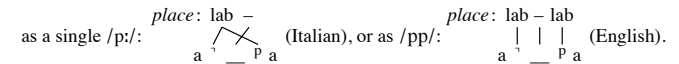
The OCP is in conflict with a Line-Crossing Constraint (LCC), which says: “a sequence of two acoustic cues (e.g. high-toned vowels) should be perceived as two separate feature values (e.g. HH), *because of* the intervening material.”

• Depending on the ranking of OCP (tone: H | cons | H) and LCC (tone: H | cons | H), the perception grammar will map the high tones of [tápá] either:

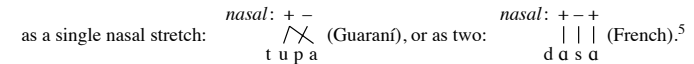


### §3.3 Other examples

• Long plosives [a<sup>h</sup>\_Pa] (C = labial transition, \_ = silence, P = lab. burst) are perceived:



• Nasalized vowels in consecutive syllables are perceived:



## §4 ENQUIRY: YOUR OPINION

Any of the following standpoints may account for the data. You are invited to mark the one that matches your opinion:

- ... “I agree that the OCP is a constraint in the perception grammar”
- ... “The OCP does not exist”
- ... “The OCP is part of GEN (i.e. is inviolable)”
- ... “Perception is universal, not language-specific”
- ... “I don’t accept the structuralist assumption”
- ... “Boersma’s reasoning contains a flaw”

## References

- <sup>1</sup> John McCarthy (1988): Feature geometry and dependency: a review. *Phonetica* 45: 84–108.
- <sup>2</sup> Scott Myers (1994): *OCP effects in Optimality Theory*. <http://ruccs.rutgers.edu/roa.html> 6
- <sup>3</sup> Suzanne Urbanczyk (1995): *Double reduplications in parallel*. [ruccs.rutgers.edu/roa.html](http://ruccs.rutgers.edu/roa.html) 73
- <sup>4</sup> Paul Boersma (1998): *Functional phonology*. The Hague: Holland Academic Graphics.
- <sup>5</sup> Paul Boersma (to appear): *Nasal harmony in functional phonology*. Paper presented at HILP 4.