Predicting exceptional prosodification effects in Gradient Harmonic Grammar

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1. Introduction

In apparent ***exceptional prosodification effects***:

- Individual morphemes pattern as if they have a different prosodic representation than expected from morpho-syntactic properties.
- Prior prosodic prespecification accounts: Some morphemes select a non-default prosodic representation (Inkelas 1989; Zec 2005).

Main claim: Such patterns are better accounted for in *Gradient Harmonic Grammar* (Smolensky & Goldrick 2016).

The effects result from interaction of two influences on harmony:

[1] *Scaling of constraint violations by prosodic context* (Hsu & Jesney 2016)

[2] *Gradient activity of underlying representations* (Smolensky & Goldrick 2016)

Case study: Restrictions on segments that follow nasal vowels in Standard French ([ɛ̃], [ɔ̃], [ɑ̃]): *possible ṼX sequences*.

2. Restrictions on ṼX in French

Sensitive to ***morpho-syntactic constituency***: The size of juncture between Ṽ and X.

[1] In stems: Ṽ before obstruents only (highly underattested before sonorants (b), unattested before glides or vowels (c)).

(1) a. [ɔ̃d] 'wave' [dɑ̃s] 'dance' [lɛ̃ʒ] 'laundry'
b. [ʒɑ̃ʁ] 'genre' [ɑ̃nɥi] 'boredom'
c. *[kɑ̃ju] *[ɔ̃œʁ]

[2] Across affix boundaries: Ṽ before consonants only.

Allomorph selection of prefixes *non-* 'non-', *bien-* 'well-':

(2) [nɔ̃n-inisje] 'uninitiated' [bjɛ̃n-ɛme] 'well-liked'
[nɔ̃-ʁœspe] 'non-respect' [bjɛ̃-ʒwe] 'well-played'

[3] Across word boundaries: Ṽ before all segments.

Prenominal Adjs before V-initial words:

(3) [miɲɔ̃] 'cute' + [ɔbʒe] 'object' → [miɲɔ̃ ɔbʒe]
[malɛ̃] 'clever' + [ɛspwaʁ] 'hope' → [malɛ̃ ɛspwaʁ]

Subject to ***lexical exceptions***: Class-specific restrictions on ṼX

- *Commun*-class prenominal Adjs: final [Ṽn] before V-initial word

(4) [kɔmɛ̃] 'common' + [ɔbʒe] 'object' → [kɔmɛ̃ **n**ɔbʒe]

- *Bon*-class prenominal Adjs: final [Vn] before V-initial word

(5) [bɔ̃] 'good' + [ɔbʒe] 'object' → [bɔ **n**ɔbʒe]

3. An exceptional prosodification effect

Generalization: Only three basic patterns describe permitted ṼX sequences in Standard French ([1], [2], [3] in Sec. 2)

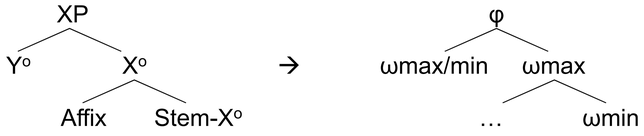
Each exceptional restriction on ṼX resembles a regular restriction that applies across a ***smaller*** juncture.

- *Commun*-class Adjs replicate regular prefix boundary pattern [2] (Ṽ before consonants only)
- *Bon*-class Adjs replicate the regular stem-internal pattern [1] (Ṽ before sonorants only)

4. Scalar domain span constraints

Domains of phonological restrictions defined in terms of prosodic constituent structure (Selkirk 1980; Nespor and Vogel 1986; Flack 2009)

- Relevant domains: phonological phrase (φ), recursive prosodic word (ω) spans



Claim: More restrictions hold on ṼX contained within smaller PCats

- Across word boundary: ṼX contained in φ
  (((…Ṽ)ωmin)ωmax ((X…)ωmin)ωmax)φ
- Across prefix boundary: ṼX contained in ωmax
  ((… Ṽ (X …)ωmin)ωmax)φ
- Within stem: ṼX contained in ωmin
  ((…ṼX…)ωmin/max)φ

Harmonic Grammar analysis: Markedness constraints are *scaled* according to the ***smallest prosodic constituent containing ṼX***.

Ex. *ṼV
For any nasal vowel + vowel sequence fully contained in a domain ∈ (φ=0, ωmax=1, ωmin=2), assign a weighted violation score of $w + (s \times d)$,

Where w is the weight of *ṼV
s is the scaling factor of *ṼV
d is the candidate's value along a scale (0,1,2)

Two scalar markedness constraints account for the regular pattern: ***ṼV*** and ***Ṽ[SON,CONS]*** (violated by nasal vowel + sonorant seq).

Sample *ṼV penalty calcs.: w = 3, s = 2, (φ=0, ωmax=1, ωmin=2)

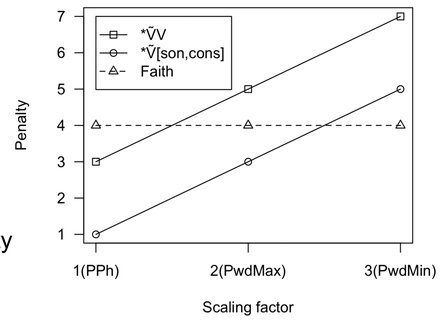
$w + s(\varphi) = 3 + (2 \times 0) = 3$
$w + s(\omega\text{max}) = 3 + (2 \times 1) = 5$
$w + s(\omega\text{min}) = 3 + (2 \times 2) = 7$

Schematic example: Regular sensitivity to prosodic structure

Simplifying assumptions:

- Non-faithful candidates violate one FAITH constraint.
- Vowels are nasalized underlyingly.
- Linking [n] is epenthesized.

Y-axis = (scaled) constraint penalty
X-axis = smallest PCat that fully contains ṼX.



5. Interaction of scaling and gradient activity

In Gradient Harmonic Grammar, phonological symbols can have gradient activity (0 to 1.0) in URs (Smolensky & Goldrick 2016).

- The penalty of a constraint violation is proportional to the activity of the structure that incurs the violation.
- All symbols in output candidates have activity of 1 (cf. Zimmermann 2017); Gradience affects evaluation of faithfulness constraints.

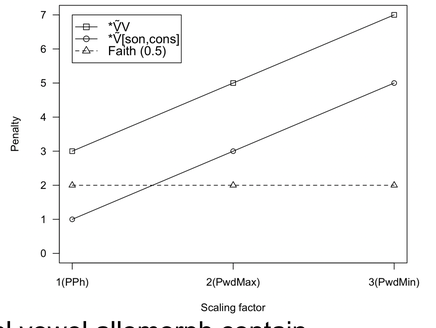
/p$_1$a$_1$k$_{0.75}$/	DEP w=2	MAX w=4	NOCODA w=1	*H*
☞ pak	-0.25(k)		-1(k)	-1.5
pa		-0.75(k)		-3

/p$_1$a$_1$k$_{0.25}$/	DEP w=2	MAX w=4	NOCODA w=1	*H*
pak	-0.75(k)		-1(k)	-2.5
☞ pa		-0.25(k)		-1

Main claim: Because gradient activity and scaling both contribute to total harmony, contrasts in gradient activity can replicate the effects of scaling in exceptional patterns.

Schematic ex.: exceptional pattern 1 (*commun*-class Adjs)

- Gradient activity of 0.5 proportionally lowers FAITH penalty.
- At φ level of scaling, this alters relative constraint penalties to resemble the regular pattern (1.0 activity) at ωmax.



Proposal: All items with a nasal vowel allomorph contain underlying gradiently active /Ṽn/. Exceptional items vary in:

[1] Underlying activity of the vowel's [NASAL] feature.
[2] Underlying activity of the nasal consonant's root node.

The GHG analysis accounts for the French pattern with two desiderata that have eluded previous approaches (Tranel 1981; 1995):

- Uniform UR segments for lexical items with a Ṽ allomorph
- Uniform syntax-prosody mapping w/o prosodic prespecification