Gradient Representations: a new insight into Gorgia and Raddoppiamento

Irene Amato (irene.amato@uni-leipzig.de)

UNIVERSITÄT LEIPZIG

GLOW 42 - Universitetet i Oslo

iGRA INTERACTION OF GRAMMATICAL BUILDING BLOCKS

1. Overview

❧ New analysis of *Gorgia Toscana* (1b) and *Raddoppiamento fonosintattico* (1c) in Florentine in the framework of *Gradient Symbolic Representations*.

(1) a. /in/ /'**k**asa/ 'in house' → [iŋ'**k**a:za]
b. /la/ /'**k**asa/ 'the house' → [la'**x**a:za]
c. /a/ /'**k**asa/ 'at home' → [a'**k:**a:za]
d. /a/ /'**k**asa/ 'at home' → *[a'**x:**a:za]

❧ Unified explanation (strengthening ∼ undershoot) for the different outcomes of a single underlying form: /k/ → [k], [k:], [x], *[x:].

❧ Crucial argument: complementary distribution between Gorgia and RF: /k/ → *[x:] (1d).

❧ Empirical adequacy: length of these derived segments (RF-allophones ≠ lexical geminates).

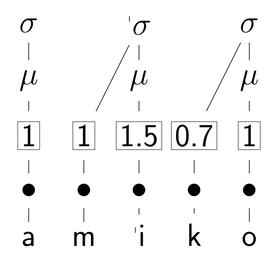
3. The framework

- Gradient Symbolic Representations: continuous, numerical weight ∼ degree of activity or presence of a symbol in a linguistic representation (Smolensky & Goldrick 2016).
- Numerical gradience associated to input and output elements (Faust & Smolensky 2017, Zimmermann 2018).
- The computation is couched in *Harmonic Grammar*: the constraints are weighted, not ranked.

4. The proposal

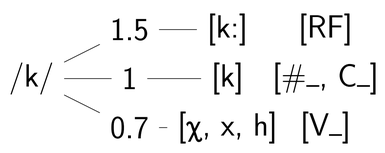
- Strength is an autosegmental object of the linguistics representation.

(4) /a'miko/ 'friend' → [a'mi:xo]



- The phonological strength is a correlate of the phonetic length.
- The gradient activity of the output segments can be other than 1.
- Stress brings into the representation some phonologically derived extra-activity that can be associated to a segment.

(5)



- **RF-geminates**: non-moraic consonants associated to a strength value greater than 1 ("more present" in the representation) → interpreted by the phonetics as long.
- **Lenited allophones**: defective segments, weaker than default ("not canonically present" in the representation) → interpreted by the phonetics as non-occlusive and, consequently, as short.

7. References

• R. Campos-Astorkiza (2014) *Lengthening and prosody in Tuscan Italian*. International Journal of Basque Linguistics and Philology XLVI-1. • N. Faust and P. Smolensky (2017) *Activity as an alternative to autosegmental association*. Talk given at mfm 25. • R. Kirchner (2000) *Geminate inalterability and lenition*. Language. • M. Loporcaro (1997) *Lengthening and raddoppiamento fonosintattico*. The dialects of Italy, London-New York, Routledge. • G. Marotta (2008) *Lenition in Tuscan Italian (Gorgia Toscana)*. Lenition and fortition. • E. M. Payne (2006) *Non-durational indices in Italian geminate consonants*. Journal of the International Phonetic Association 36.1. • P. Smolensky & M. Goldrick (2016) *Gradient symbolic representations in grammar: The case of French liaison*. Ms. Johns Hopkins University and Northwestern University. • P. Sorianello (2002) *I suoni fricativi dell'italiano fiorentino*. Quaderni del Laboratorio di Linguistica 3. • P. Sorianello, M.J. Solé, D. Recasens & J. Romero (2003) *Spectral characteristics of voiceless fricative consonants in Florentine Italian*. Proceedings of the 15th International Congress of Phonetic Sciences. • E. Zimmermann (2018) *Exceptional non-triggers are weak: The case of Molinos Mixtec*. Talk given at OCP 15.

2. The phenomena (Tuscan, Florentine)

Raddoppiamento fonosintattico (RF) (Chierchia 1983-86, Loporcaro 1997, Passino 2013)

Sandhi process, where the initial consonant of the word$_2$ in the string word$_1$-word$_2$ is lengthened if:

(2) a. word$_1$ is an oxytone:
/ʧi'tːa//'kara/ 'dear town' → [ʧi'tːa'**kː**ara] **Stress-driven RF**
b. word$_1$ is an item of a closed lexical class, whose historically earlier form has a consonant in final position:
a, da, e, o, ma, né, tra, come, dove, qualche 'to, from, and, or, but, nor, between, how, where, some'
/'kome//'va/ 'how are you?' → ['koːme'**vː**a] **Lexical RF**

Gorgia ('Tuscan throat') (Kirchner 2000, Marotta 2006, 2008, Rammsammy 2017)

- Postvocalic consonant lenition: gradient, continuous phenomenon, with areal and style-dependent variability.
- It targets primarily stops, but all consonants; word-internally and across word boundaries (intervocalic position or branching onset):

(3) a. /la/ /'koːsa/ [la'kɔːsa] 'the thing' → [la'hɔːsa]
b. /la/ /'kreːma/ [la'krɛːma] 'the cream' → [la'xrɛːma]

❋ Asymmetry: word-internally, Gorgia is independent from stress; across word-boundary, it is only possible after non-stressed vowels. Why no lenition in (2a) *[ʧi'tːa'**x**ara]? ✓ Gorgia is in complementary distribution with RF.

The derived segments: evidence for strength

- RF-geminates are shorter than lexical geminates (47% vs 200% longer than the singletons) (Campos-Astorkiza 2014) and resemble singletons (Payne 2006) → strengthening
- Allophonic fricatives are: shorter than phonematic fricatives ([ɸ]= 51 ms vs [f]= 83 ms) (Sorianello 2002) + shorter than non-lenited stops ([h]= 44 ms vs [k]= 88 ms) (Sorianello et al. 2003) → weakening

5. The analysis

The constraints

☞ Weak!-C-V_V: Assign z violation for every intervocalic consonant with strength y in the output (z=y).

☞ *Float: assign z violation for every output activity (x) that is not linked to an output segment (z=y).

☞ One!: Assign z violation for every segment that has strength y>1 in the output (z=y-1).

☞ One!-V#: Assign z violation for every final vowel that has strength y>1 in the output (z=y-1).

☞ Max(str): Assign z violation for every activity (x) that is present in the input but not in the output (y) (z=y-x).

☞ *Weak: Assign z violation for every segment that is present in the output with a strength (y) lower than 0.6 (z=1-y).

☞ Unif(str): Assign z violation for each output activity (y) that corresponds to the fusion of more than 1 input activity (z=y).

The derivations

(6) **Gorgia**: *la casa* /la '**k$_{0.7}$**asa/ → [la '**x**a:za]

/la'k$_1$asa/	Weak!-C-V_V	*Weak	Max(str)	H
weight	-7	-3	-3	
a. lak$_1$asa	1			-7
☞ b. lak$_{0.7}$asa	0.7		0.3	-5.8
c. lak$_{0.6}$asa	0.6	0.4	0.4	-6.6

(7) **Stress-driven RF**: *città cara* /ʧi't:a '**k$_{1.5}$**ara/ → [ʧi'tːa**kː**a:ra]

/ʧit'ta$_1$ $^{0.5}$ k$_1$ara/	*Float	One!-V#	Weak!-C-V_V	Max(str)	One!	Unif(str)	H
weight	-17	-13	-7	-3	-1	-1	
a. ʧi'tːa$_1$ $^{0.5}$ k$_1$ara	0.5		1				-15.5
☞ b. ʧi'tːa$_1$ k$_{1.5}$ara			1.5		0.5	1.5	-12.5
c. ʧi'tːa$_{1.5}$ k$_1$ara		0.5	1		0.5	1.5	-15.5
d. ʧi'tːa$_{1.5}$ k$_{0.7}$ara		0.5	0.7	0.3	0.5	1.5	-14.3
e. ʧi'tːa$_1$ $^{0.5}$ k$_{0.7}$ara	0.5		0.7	0.3			-14.3

❋ The realization of strength overcomes the need for weak consonants: *[ʧi'tːa'**x**ara].

(8) **Lexical RF**: *come va* /'kome '**v$_{1.5}$**a/ → ['koːme '**vː**a]

/'kome$_1$ $^{0.5}$ 'v$_1$a/	*Float	One!-V#	Weak!-C-V_V	Max(str)	One!	Unif(str)	H
weight	-17	-13	-7	-3	-1	-1	
a. 'kome$_1$ $^{0.5}$ v$_1$a	0.5		1				-15.5
☞ b. 'kome$_1$ v$_{1.5}$a			1.5		0.5	1.5	-12.5
c. 'kome$_{1.5}$ v$_1$a		0.5	1		0.5	1.5	-15.5
d. 'kome$_{1.5}$ v$_{0.7}$		0.5	0.7	0.3	0.5	1.5	-14.3
e. 'kome$_1$ $^{0.5}$ v$_{0.7}$a	0.5		0.7	0.3			-14.3

❋ The representation of word$_1$ contains some floating strength (corresponding to a final etymological consonant).
❋ RF-gemination is caused by associating to a segment some extra-strength that is either brought in by stress (7) or originally associated to another segment (8).

6. Concluding remarks

❧ RF arises by associating extra strength to a segment; it is therefore related to the phonological representation of linguistic elements and its sole trigger is *Float.

❧ Gorgia is a weakening process of postvocalic lenition that involves a decrease of strength. Lenited allophones are phonologically defective segments.

❧ What is new: (i) the competition between these two phenomena and their competitioncomplementary distribution, (ii) the representation of the derived segments based on the concept of phonological strength with a broader empirical adequacy than other approaches, (iii) a new contribution to the understanding of the division between phonetics and phonology.

❧ Possible further implementations: stressed vowel lengthening, the diachronic development of weak segments, synchronic variability of Gorgia, backward gemination, vowel deletion...