## Gorgia and Raddoppiamento Fonosintattico: when strength matters Irene Amato, University of Leipzig

**Overview** I propose a new analysis of *Raddoppiamento fonosintattico* (RF) and *Gorgia* as, respectively, strengthening and undershoot. The novelty of this approach consists in a unified explanation for the different outcomes of a single underlying form:

- (1) a. /la//'kasa/ 'the house'  $\rightarrow$  [la'xa:za]
  - b.  $/a//kasa/ at home \rightarrow [ak:a:za]$
  - c. /in//kasa/ 'in (the) house'  $\rightarrow$  [iŋ'ka:za]

Moreover, it has a higher empirical adequacy than previous accounts, since it considers the length of these derived segments as the result of phonological strength. Data comes from Florentine and the analysis is couched in the framework of *Gradient Symbolic Representations*.

**Raddoppiamento fonosintattico** RF (Loporcaro 1997) is a word-boundary gemination process of Standard Italian. The initial consonant of  $WORD_2$  in the string  $WORD_1$ - $WORD_2$  is lengthened if  $WORD_1$  is:

(2) an item of a closed lexical class: (3) stressed on the final syllable:

/'kome//'va/  $\rightarrow$  ['ko:me'v'a] 'how are you?' /'fji't:a//'kara/  $\rightarrow$  [ffi't:ak:a:ra] 'dear town' Lexical RF (1) is due to a final consonant in the historically earlier form of WORD<sub>1</sub>(Lat. *ad* > It. *a*, Lat. *quomodoet* > It. *come*). Stress-driven RF (2) is a phonologically predictable stresstriggered gemination. Importantly, RF-geminates are only 50% longer than singletons, in contrast to inherent geminates, which are 200% longer (as in ['pas:i] 'steps' vs. ['ba:zi] 'bases'; Campos-Astorkiza 2014: 101). Furthermore, the gesture profile of RF-geminates resembles singletons, while inherent geminates involve a higher degree of articulatory fortition (Payne 2006).

**Gorgia** (Marotta 2008) is a process of postvocalic consonant lenition, which targets all consonants, but primarily stops. It applies word-internally and across word boundaries:

- (4) a. /la//ko:sa/[la'k:sa] 'the thing'  $\rightarrow$  [la'h:sa]
  - b. /la//'kre:ma/ [la'kre:ma] 'the cream'  $\rightarrow$  [la'xre:ma]

Crucially, phonematic fricatives are longer than the allophonic fricatives (Sorianello 2002: 34). Moreover, non-lenited stops are longer than the lenited allophones (Sorianello et al. 2003).

Gorgia and RF are in complementary distribution, but there are contexts where both processes should be possible, as in (3), where Gorgia chould apply, but it does not.

**Theoretical Background** In *Gradient Symbolic Representations* (Smolensky & Goldrick 2016; Faust & Smolensky 2017; Zimmermann 2018), strength is a property of linguistic symbols. Numerical gradience expresses the degree of activity, or presence, of a linguistic item. I also adopt *undershoot* as the trigger for lenition, which is a process of promotion on a scale of consonant strength, corresponding to a reduction of constriction degree or duration (Kirchner 2000).

**Proposal** I suggest that (i) *phonetic length* is a correlate of *phonological strength*. (ii) The gradient activity of output segments can be different from 1. (iii) Phonological strength affects the phonetic length of segments. If a segment is associated to a strength value greater than 1, then it is interpreted as long by the phonetics. RF-geminates are non-moraic consonants associated to a strength value greater than 1. Consequently, they only differ from singletons in terms of strength. Inherent geminates, on the other hand, are represented as moraic consonants and are therefore structurally different from RF-geminates and singletons. On the other hand, lenited segments are associated to a strength value smaller than 1; they are defective segments due to undershoot, which result in reduction of the closure and reduction of the duration. (iv) Stress (the strong position in a

foot) brings in phonologically derived extra activity. In open non-final syllables this results in vowel lenghthening:  $/ka.za/ \rightarrow [/ka.za]$ . In final syllables, this activity associates to the following consonant, resulting in stress-driven RF (3). (v) Triggers of lexical RF (1) end in a weak root node, which can also fuse with the following consonant.

(5)

 $/k/ = 1.5 - [k] [RF] [#_, C]$  $0.8 - [\chi, x, h] [V_]$ 

**Analysis** <u>Constraints</u>: DEP[STR]: Assign z violation for every output segment that is associated with y strength and a corresponding input segment that is associated with x strength (z = y-x). MAX[STR]: Assign z reward for every activity (x) that is present in the input and is associated to a segment in the output (y) (z = y, with  $z \le x$ ) (Smolensky & Goldrick 2016). ONE!: Assign z violation for every segment that has strength y > 1 in the output (z = y-1). FULL!: Assign z violation for every final vowel that has strength y > 1 in the output (z = y-1). WEAK!-C-V\_: Assign z violation for every post-vocalic consonant with strength y in the output (z = y).

<u>Gorgia</u>: the markedness constrain WEAK!-C-V\_ favors an output gradient segment  $/k_{0.8}/$ . This is then realized by the phonetics as a lenited variant of  $/k/([\chi, x, h])$ , depending on the variety).

/laˈk <sub>1</sub> asa/	MAX[STR] <sup>1</sup>	DEP[STR]	ONE!	FULL!	ONE!-V#	WEAK!-C-V_	Н
weight	w=+20	w=-8	w=-3	w=-2	w=-6	w=-7	
a. lak <sub>1</sub> asa	1					1	13
IS b. lak <sub>0.8</sub> asa	0.8		0.2				15.4

Stress-triggered RF: the extra-strength brought by the stress is associated to the initial consonant of WORD<sub>2</sub>. The final stressed vowel cannot be stronger than 1, as in (c), because of ONE-V#, therefore the RF candidate (b) is preferred. Even though the context for Gorgia is actually met (d, e), the segmental realization of strength overcomes the need for weak consonants, bleeding Gorgia.

/tʃitˈta <sup>0.5</sup> kara/	MAX[STR]	DEP[STR]	ONE!	FULL!	ONE!-V#	WEAK!-C-V_	Η
weight	w=+20	w=-8	w=-3	w=-2	w=-6	w=-7	
a. tʃiˈt:a <sup>0.5</sup> kara	2					1	33
IS b. t∫i't:a k <sub>1.5</sub> ara	2.5	0.5		0.5		1	38
c. tʃiˈt:a <sub>1.5</sub> kara	2.5	0.5		0.5	1	1	32
d. t∫i′t:a <sub>1.5</sub> k <sub>0.8</sub> ara	2.3	0.5	0.2	0.5	1		34.4
e. $fi't:a^{0.5} k_{0.8}ara$	1.8		0.2				35.4

**Conclusion** RF-gemination and Gorgia are related to the phonological representation of linguistic elements. This account can explain the articulatory difference between phonematic and derived segments and has the potential for further implementations (synchronic and diachronic variation). **References** • Campos-Astorkiza, R. 2014. Lengthening and prosody in Tuscan Italian. *International Journal of Basque Linguistics and Philology* XLVI-1. • Faust, N. & P. Smolensky. 2017. Activity as an alternative to autosegmental association. Talk given at mfm25. • Loporcaro, M. 1997. Lengthening and raddoppiamento fonosintattico. *The dialects of Italy*. 41–51. • Marotta, G. 2008. Lenition in Tuscan Italian (gorgia toscana). *Lenition and fortition*. 235–270. • Sorianello, P. 2002. I suoni fricativi dell'italiano fiorentino. *Quaderni del Laboratorio di Linguistica* 3, 26–39. • Sorianello, P., M.J. Solè, D. Recasens & J. Romero 2003. Spectral characteristics of voiceless fricative consonants in Florentine Italian. *Proceedings of the 15th International Congress of Phonetic Sciences*, 3081–3084. • Smolensky, P. & M. Goldrick. 2016. Gradient symbolic representations in grammar: The case of French liaison. Ms. Johns Hopkins University and Northwestern University. • Zimmermann, E. 2018. Exceptional non-triggers are weak: The case of Molinos Mixtec. Talk given at OCP 15.