

Length as strength: a new account of Raddoppiamento Fonosintattico

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Nutshell Raddoppiamento Fonosintattico (RF; Loporcaro 1997) is a word-boundary gemination process of Standard Italian. Previous accounts of RF fail to consider the quality of RF-geminates, which are shorter than inherent geminates, and ignore cases of non-application. I propose a new analysis of RF-segments in the framework of *Gradient Symbolic Representations* and argue that phonetic length is a correlate of phonological strength. This approach not only has broader empirical coverage but also the potential for further implementation (e.g. Gorgia Toscana (Marotta 2008): lenition as weakening).

Data In Tuscan and Standard Italian, the initial consonant of WORD₂ in the string WORD₁-WORD₂ is lengthened if WORD₁ is:

- | | |
|--|---|
| (1) an item of a <u>closed lexical class</u> : | (2) <u>stressed on the final syllable</u> : |
| <i>a, da, e, o, ma, né, tra, come, dove, qualche</i> | /par'lo/ /molto/ → [par'lo'm'olto] |
| 'to, from, and, or, but, nor, between, how, where, some' | 's/he talked a lot' |
| /kome/ /va/ → ['ko:me'v'a] 'how are you?' | |

RF is in complementary distribution with Gorgia, a lenition process that affects consonants in postvocalic position. If the initial consonant of WORD₂ is a plosive, it is realized as such only in isolation: /kaza/ → [kaza]. When WORD₁ is not a trigger for RF, the segment is lenited:

- (3) a. RF: /a/ /kaza/ → [a'k'a:za] 'at home'
b. Gorgia: /la/ /kaza/ → [la'χa:za] 'the house'

Lexical RF (1) is due to a final consonant in the historically earlier form of WORD₁ (Lat. *ad* > It. *a*, Lat. *quomodoet* > It. *come*). Stress-driven RF (2) is a phonologically predictable stress-triggered 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).

Theoretical Background In *Gradient Symbolic Representations* (Smolensky & Goldrick 2016; Faust & Smolensky 2017; Zimmermann 2018), continuous, numerical gradience expresses the degree of activity, or presence, of a linguistic symbol. I also adopt the framework of *Autosegmental Phonology* (Goldsmith 1976), where phonological elements occupy positions on independent tiers and have hierarchical organization.

Proposal I suggest that (i) *Strength* is represented as an autosegmental element higher than the root node tier and lower than moraic and syllabic tiers. (ii) Strength nodes can be linked to each other through *lateral association* (Trommer 2017); laterally associated nodes are interpreted by the phonetics as a single node whose activity equals the sum of activities of the individual nodes. (iii) The gradient activity of output strength nodes can be greater than 1. (iv) Phonological strength affects the phonetic length of segments. If a segment is associated to a strength node whose activity is greater than 1, then it is interpreted as long by the phonetics. RF-geminates are non-moraic consonants associated to a strength node 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. (v) Stress (the strong position in a foot) brings in phonologically derived extra activity. In open non-final syllables this results in vowel lengthening: /ka.za/ → [ka.za]. In final syllables, this activity associates to the following consonant, resulting in stress-driven RF (2). (vi) Triggers of lexical RF (1) end in a root node dominated by a weak strength node, which can also associate to the following consonant.

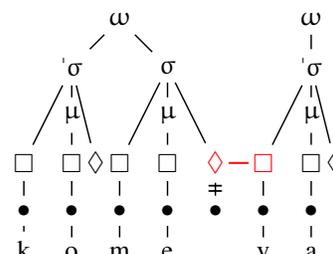
Analysis Constraints ASSOCIATE: 'Assign z violation for every x strength that is present in the input and is not associated to a root node in the output ($z = x$)'; *LAT-ASSOC: 'Assign a violation mark for each output lateral association edge without an input correspondent'; ONE: 'Assign z violation for every segment associated with a strength $y > 1$ in the output ($z = y - 1$)'; ONE-V# is a more specific version referring to a word-final vowel. The constraints are weighted, not ranked. Gradient violations are represented by the

degree of penalty, whereas each discrete violation counts as 1.

Derivations In lexical RF (1), the final root node (●) of WORD₁ corresponds to the final etymological consonant. The corresponding strength node ◇ (weak: 0.5, due to diachronic reasons) is associated to this root node by means of invisible association line (i.e., it is not associated).

(4) /kome^{0.5}/ /va/ → /kome^v_{1.5}a/ → [ko:me^va]

/kome ^{0.5} va/	ASSOCIATE	ONE-V#	*LAT-ASSOC	ONE	H
<i>weight</i>	w = -20	w = -12	w = -6	w = -3	
a. kome ^{0.5} va	0.5				-10
b. kome _{1.5} va		0.5	1	0.5	-13.5
c. kome ^v _{1.5} a			1	0.5	-7.5

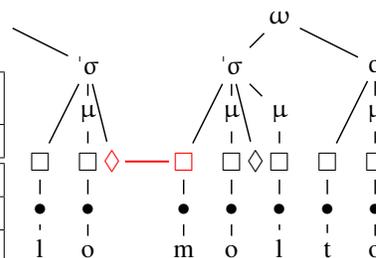


In (4c), a lateral association is inserted between the strength nodes. A derived strength node of value 1.5 dominates the output consonant /v/, which is then interpreted by the phonetics as long [vː].

In stress-triggered RF (2), the extra-strength brought by the stress is re-associated to the initial consonant of WORD₂. The final stressed vowel cannot be stronger than 1, as in (5b), because of ONE-V#, therefore the RF candidate (5c) is preferred.

(5) /par'lo^{0.5}/ /molto/ → /par'lo^m_{1.5}olto/ → [par'lo^molto]

/par'lo ^{0.5} molto/	ASSOCIATE	ONE-V#	*LAT-ASSOC	ONE	H
<i>weight</i>	w = -20	w = -12	w = -6	w = -3	
a. par'lo ^{0.5} molto	0.5				-10
b. par'lo _{1.5} molto		0.5	1	0.5	-13.5
c. par'lo ^m _{1.5} olto			1	0.5	-7.5



Beyond RF This model can also explain RF blocking contexts (Absalom et al. 2002). For example, RF does not apply when there is a glide in the final coda of WORD₁: /fa'raj bene/ → [fa'raj βe:ne]. Instead, the consonant is lenited. RF is expected, given that it depends on the stress itself and not on the stressed vowel. In addition, RF is blocked even after glide deletion: /fa'ra bene/ → [fa'ra βe:ne]. The initial consonant of WORD₂/b/ is not adjacent to the stressed vowel /a/. The strength node associated with the glide /j/ intervenes and a locality constraint penalizes RF. Further implementations involve (i) the diachronic variation of RF as change of strength, (ii) backwards gemination as STRENGTH-BY-POSITION and (iii) Gorgia Toscana as weakening (the lenited allophones of plosives are defective segments associated with strength nodes < 1).

Conclusion RF-gemination arises by associating extra strength to a segment; it is therefore related to the phonological representation of linguistic elements. This account can explain the articulatory difference between RF-segments and inherent geminates and the cases of non-application of RF, offering a better understanding of synchronic and diachronic variation and of the division between phonetics and phonology.

References Absalom, M., M. Stevens & J. Hajek. 2002. A typology of spreading, insertion and deletion or what you weren't told about Raddoppiamento Sintattico in Italian. *Proceedings of the 2002 Conference of the Australian Linguistic Society*. • 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. • Payne, E. 2006. Non-durational indices in Italian geminate consonants. *Journal of the International Phonetic Association* 36. 83–95. • Smolensky, P. & M. Goldrick. 2016. Gradient symbolic representations in grammar: The case of French liaison. Ms. Johns Hopkins University and Northwestern University. • Trommer, J. 2017. Opaque boundary tones in Jumjum. Talk given at the Frankfurt Phonology Colloquium. • Zimmermann, E. 2018. Exceptional non-triggers are weak: The case of Molinos Mixtec. Talk given at OCP 15.