



Syllable Typology and the Rhythm Class Hypothesis: Evidence from Italo-Romance dialects

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Research questions

- Is it possible to classify Italo-romance dialects on the basis of 'rhythmic' properties?
- If yes, are these properties phonological or phonetic in nature?
- Is there a correlation between phonotactic constraints and temporal features of the speech signal?
- Is there an areal distribution of 'rhythm classes'?



Outline

Rhythm-oriented typology in the New Millenium

- The failure (?) of the Pikean dichotomy
- From isochrony to phonological domains (Auer 1993):
towards a prototypical, multiparametric typology
- New rhythm metrics (%V/ΔC, VarCo; PVI, CCI)

Syllables and Rhythm in Italo-Romance

- Some issues in the phonology of standard Italian
- Italian dialects: a typological proposal (Mayerthaler 1996)
- Syllable structures in some Italo-romance dialects
- Applying the new metrics to dialectal data



The failure of isochrony ...

Two remarks about Spanish

1. Is River Plate Spanish like Peninsular Spanish?
(Borzone Manrique & Signorini 1983)
2. Duration of unstressed syllables (Delattre 1966)

			English	German	Spanish	French
Final	Closed		40.81	36.15	32.13	34.12
	Open		33.45	29.75	24.50	24.57
Stressed						
Non-final	Closed		25.88	24.56	25.88	
	Open		19.19	19.72	20.23	
Final	Closed		25.62	27.81	23.03	
	Open		21.24	17.69	18.52	
Unstressed						
Non-final	Closed		15.50	17.51	19.27	19.19
	Open		12.02	13.22	18.16	13.74

Standard Italian

'Syllabic blood' (Bertinetto 1977)

- Stable vowel system: 7 stressed, 5 unstressed (4 word-finally)
- Syllable-based allomorphy: def.art. *il padre*, *l'amico*, *lo stivale*
- Geminates (both in stressed and unstressed syllables):
ammiro "I admire"

Bimoric constraint for stressed syllables

V → V: / ____ \$ [ˈpa:ne]
[+stress]

C → C: / V[+stress] # ____ [ˈfa ˈm:a:le]

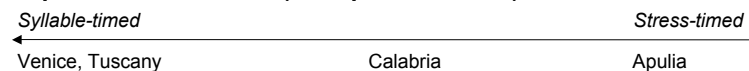
Doubts on regional varieties

Vayra/Fowler (1987), Romito/Trumper (1989), Barry/Russo (2004)

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Italian dialects

A phonetic continuum (Trumper et al. 1991)



A phonological continuum (Mayerthaler 1996)

Simple syllable structure ————— *Complex syllable structure*

Southern	Central-southern	Central	Northern
Sicily Salento Southern Calabria	Apulia, Abruzzi Basilicata Campania	Tuscany Umbria Marche	Piedmont Romagna

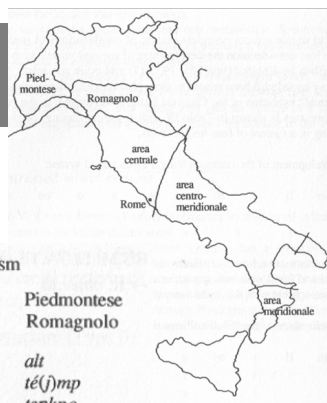
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Eva Mayerthaler (1996)

Diachronic phonological processes

Table III. Divergent development of syllable structure and vocalism

Vulgar Latin	area meridionale	area centro-meridionale	area centrale	Piedmontese Romagnolo
ALTU	gávutu	γávutə	alto	alt
TEMPU	t(i)émpu	tíəmbə	tempo	té(j)mp teŋkpo
PORCU	p(w)órku	p(w)órk	porko	pork
VENITIS	viníti	vənítə	venite	vní
STOMACU	stómmaku	stómməkə	stomaco	stamg
GENERU	jénniru	jénnəɾə	dgenero	džénər



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10 dialects

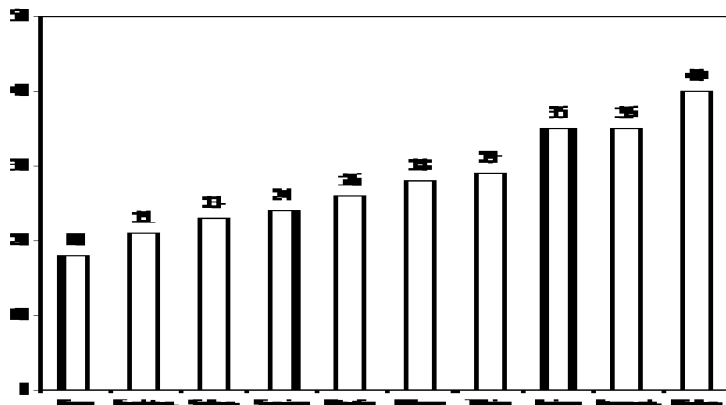
Friuli
Venezia
Feltre
Lombardia (Milano)
Piemontese (Torino)
Romagna
Toscana (Pisa)
Puglia (Bitonto)
Napoli
Sicilia

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Possible syllable types

CV, V, CVC, CCV, CGC, CCVC, etc. (Schmid 1996, 1997, 1998, 2000)



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Phonotactic markedness

Segments allowed in coda positions

Syllable-based dialects: sonorants, mostly word-internal

Stress-based dialects: obstruents, clusters word-finally

Adherence to the sonority scale

Syllable-based dialects: +

Stress-based dialects: ±

„In a stress-timed language ... clusters do not necessarily obey the universal sonority hierarchy“ (Auer 1993: 7)

cf. Szczepaniak (2007: 52)

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Consonant clusters I

Syllable-based dialects

	Word-initial			Word-final		
Tuscan, Venitian	CC	Plos / f + r Obs + glide	it. <i>trota</i> , <i>fratello</i> it. <i>piano</i> , <i>fuoco</i>			
	sC		it. <i>spada</i> , <i>smacco</i>			
	sCC		it. <i>strada</i>			

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Consonant clusters II

Word-based dialects

	Word-initial			Word-final		
Milanese, Feltrino	(s)CC	Obs + r	<i>trop</i> , <i>strak</i>	CC	Son + Obs	<i>fort</i> , <i>grant</i>
Friulian	(s)CC	Obs + l	<i>Glesie</i> , <i>sclop</i>	CC(s)	Son + Obs	<i>fuart</i> , <i>omp</i> , <i>foncs</i>
Romagnolo Turinese	CC	Obs + l Obs + N Plos + Fric Plos + Plos Plos + Affr Fric + Fric Fric + Plos	<i>tlè</i> , <i>slè</i> <i>pnèl</i> , <i>fnocc</i> , <i>dman</i> <i>dvent</i> , <i>bsogn</i> <i>pkè</i> <i>pcit</i> <i>vsen</i> <i>vdend</i>	CC	Son + Obs r + N Obs + Obs	<i>camp</i> , <i>calm</i> <i>ciorgn</i> <i>sambadg</i>
	CCC	s + N + N s + Plos + Plos Plos + s + Plos Plos + Affr + N	<i>smnussè</i> <i>sbdèl</i> <i>pskè</i> <i>pznèn</i>		N + Plos + s	<i>ends</i>
	CCCC	Fric + s + CC Plos + s + CC	<i>vspre</i> <i>pstren</i>			

Speech data



Profilo dei dialetti italiani (Pacini)



Friulano Tarcento (UD)



Veneziano Venezia (VE)



Feltrino Menin di Cesiomaggiore (BL)



Milanese Milano (MI)



Piemontese Torino (TO)



Pisano Fauglia (PI)



Bitontino Bitonto (BA)



Other sources



Napoletano Mugnano (NA) Dip. Sociologia, UniNA



Siciliano Enna (EN) Ruffino (1997)

Romagnolo —

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Rhythm metrics

Some algorithms

%V, ΔC , ΔV

Ramus *et al.* (1999)

Pairwise Variability Index (PVI)

Grabe & Low (2002)

VarCo

Dellwo (2006)

Control & Compensation Index (CCI)

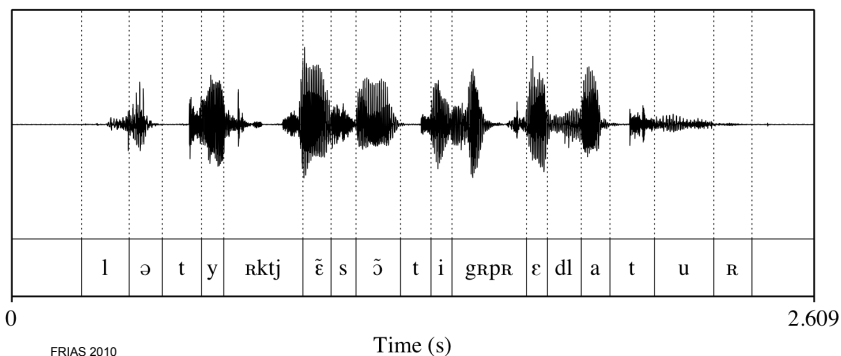
Bertinetto & Bertini (2008)

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Ramus et al. (1999)

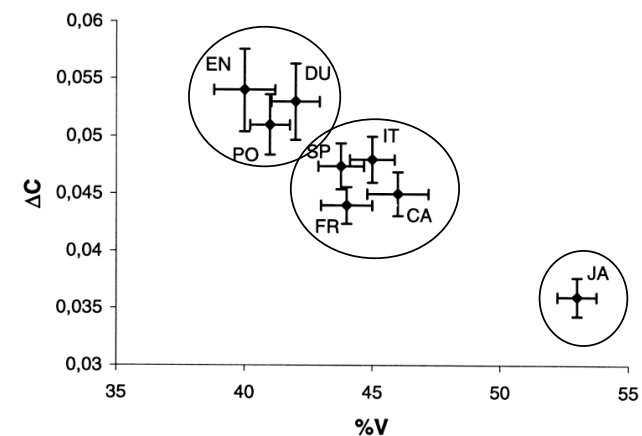
Measurements and variables

- 8 languages (4 speakers), 5 sentences (read speech)
- Vocalic and consonantal intervals
- %V, ΔC , ΔV



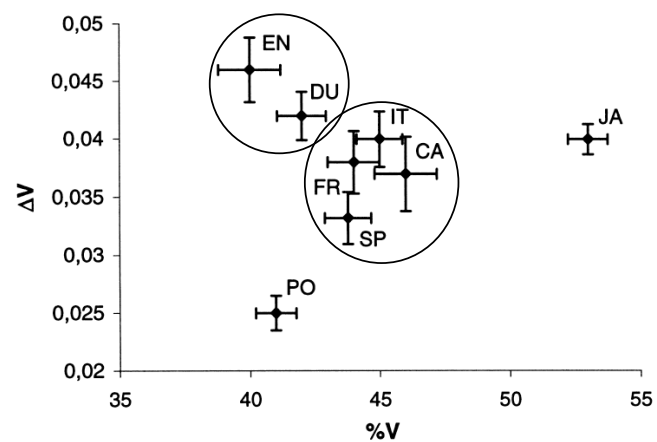
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%V e ΔC



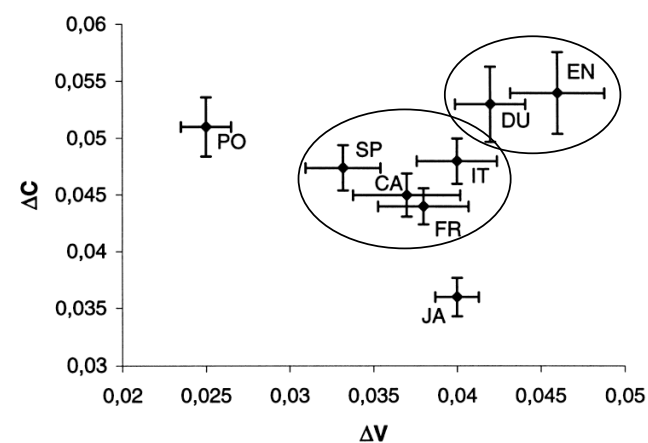
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%V e ΔV



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ΔV e ΔC



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The Italo-romance corpus

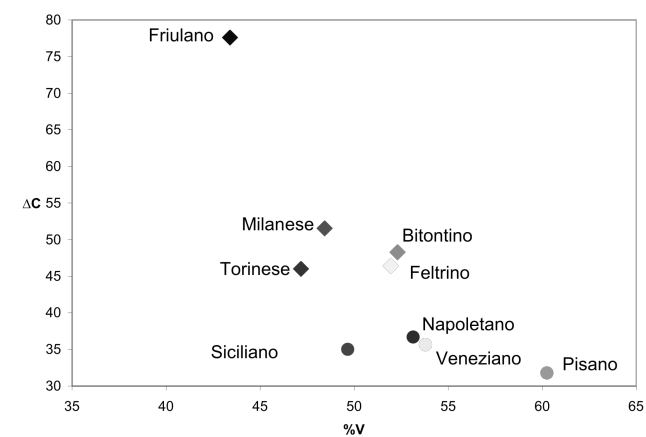
Semi-spontaneous speech ('Ethnotexts')

10 utterances per dialect

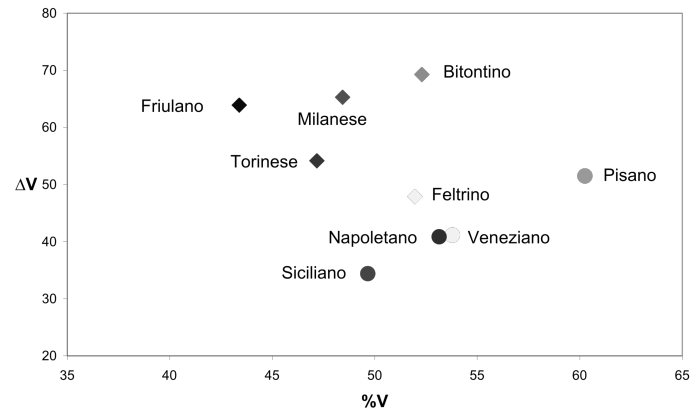
Dialetto	Intervalli vocalici	Intervalli consonantici
Friulano	185	185
Veneziano	194	191
Feltrino	185	176
Milanese	143	143
Torinese	138	141
Pisano	131	125
Napoletano	122	122
Bitontino	141	154
Siciliano	207	198

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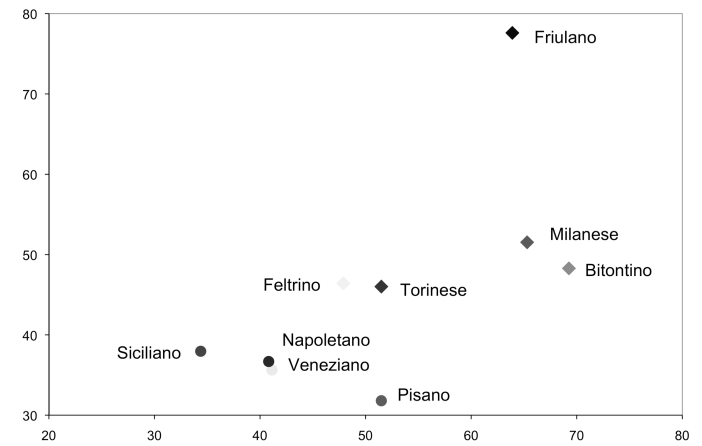
%V / ΔC



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$\%V / \Delta V$


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 $\Delta V / \Delta C$


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VarCo

(Dellwo 2006)

Data: *Bonn Tempo Korpus*

3 languages: German, English, French

 5 speech rates: *slow2*, *slow1*, *normal*, *fast1*, *fast2*

Empirical finding

 ΔC depends on speech rate

 slow: higher ΔC

 high: lower ΔC

Another algorithm

 not standard deviation (ΔC),

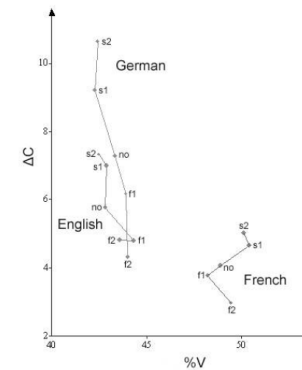
 but the variation coefficient (Varco ΔC)

(VarCo = st. dev. / mean)

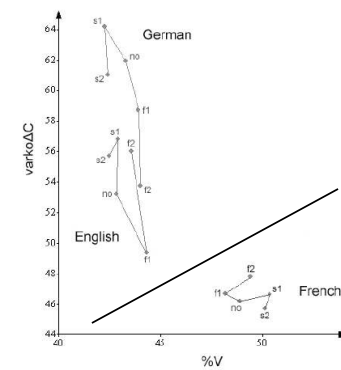
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 ΔC

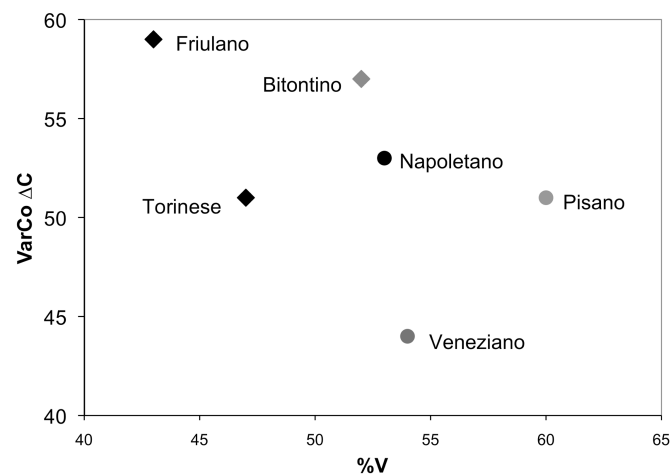
vs.

 Varco ΔC


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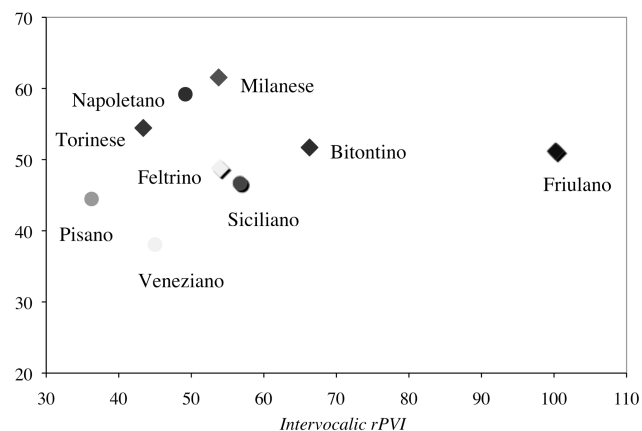


Varco ΔC



PVI

Vocalic nPVI



PVI

Pairwise Variability Index

(Grabe & Low 2002)

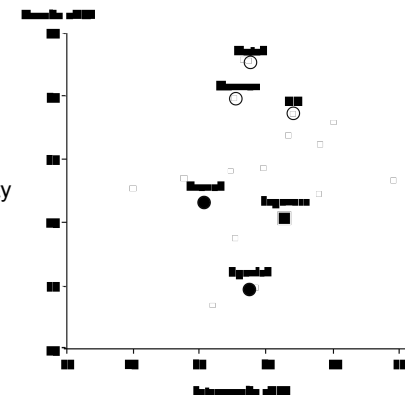
Against Ramus:

%V does not measure rhythm

PVI calculates the 'syntagmatic' variability of vocalic and consonantal intervals

$$rPVI = \sum_{k=1}^{m-1} |d_k - d_{k+1}| / (m-1)$$

Data: "Northwind and the sun"
(1 speaker per language)



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Conclusions

- Rhythm is a fundamental issue for the phonological/phonetic typology of Italo-romance dialect
- Different rhythm types result from syllable complexity and unstressed vowel reduction
- Adherence to the sonority scale is an important parameter
- The speech signal does reflect phonotactic constraints, but also other temporal features (allophonic rules, phonetic detail)
- Rhythm metrics (%V/ ΔC , VarCo; PVI) highlight different aspects, but produce similar representations of typological diversity
- Prosodic typology seems to be independent from areal distribution

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