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The impact of information and prosodic structure on the phonetic implementation of vowel length in Ligurian

Abstract. In this paper, we investigate experimentally the impact of prosodic and information structure on the duration of stress vowels and post-stress consonants, as the main phonetic correlates of vowel length, in two closely related Italo-Romance varieties: Genoese and Portorino, both belonging to the Ligurian group. First, our study confirms that vowel length is phonetically represented in both varieties and the differences between them in this respect are less dramatic than expected on the basis of prior research. Secondly, by comparing different experiments which involve utterance-final lengthening and corrective focalization, it is shown that these contextual effects have a significant impact on the phonetic implementation of vowel length in both varieties. Our results call for a high methodological awareness in studying languages which present vowel length, especially with regard to the design of production experiments and the assessment of its phonetic correlates.

Keywords: Italo-Romance varieties, Ligurian dialects, vowel length, phonetics and phonology, information structure

1. An introduction: vowel duration in a peripheral northern Italo-Romance variety

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It is a (possibly not too) well-known fact that many northern Italian dialects have contrastive vowel length:

(1) a. West Lombard (Novate Mezzola, Province of Sondrio):
/gyːs/ 'squirrels' ~ /gys/ '(nut)shells' (Bonfadini 1997: 590-591)
b. Eastern Emilian (Bologna):
/ˈtaːja/ 'size, reward' ~ /ˈtaja / 'pan, baking tray' (Coco 1970: 116)

The emergence of these contrasts has been caused by the rephonologization of allophonic durational differences of stressed vowels due to Proto-Romance[2] open syllable lengthening (short vowels in closed syllables and long vowels in open syllables), a phenomenon which put an end to the phonological history of Latin by allowing short vowels in open syllables to become longer, cf. 2(a) (versus 2(b), in which a former long vowel in Latin is shortened because of its occurrence in a closed syllable):

(2) a. Latin PĬRA 'pear' /ˈpi$ra/ > Proto-Romance [ˈpeː$ra] (/ˈpera/) > Northern Italian ⌜/ˈpeːra/⌝
b. Latin MĪLLE 'thousand' /ˈmiːl$le/ > Proto-Romance [ˈmil$le] (/ˈmilːe/) > N. It. ⌜/ˈmil(e)/⌝

In some varieties, the complete loss of post-stress long consonants allows for the new vowel contrasts to be phonetically transparent. This is the case of paroxytone disyllables in the Eastern Emilian variety spoken in Benedello (Pavullo nel Frignano, Province of Modena), measured by Uguzzoni & Busà (1995: 10):

(3) Stressed V/Vː quantity ratio = 0.52; post-stress C/Cː ratio = 1.03

In other varieties there are some allophonic remnants of post-stress gemination (protonic gemination has completely disappeared everywhere). This is the case, for example, of the dialect of Lizzano in Belvedere, another Eastern Emilian variety, spoken in the Bolognese Apennine,

[2] Or at least Central Romance, which anyway includes the dialects of Northern Italy (cf. Lüdtke 1956, Weinreich 1958, Loporcaro 2011 and 2015, Filipponio 2012).

about 20km south of Benedello. According to an old claim by Malagoli (1930: 130-131 [2011: 20-21]), based only on acoustic impression,[3] Lizzanese post-stress long consonants are still present, albeit being merely allophonic, as confirmed by the fieldwork data collected by Loporcaro et al. (2006: 508), which show median values between ca. 50 and 80 ms for post-stress singletons and 120 and 150 ms for geminates. The data collected by Filipponio (2012: 247) during another fieldwork research in the same area, however, show less dramatic differences between the median values of post-stress singletons and geminates, which, respectively, are about 55 and 75 ms. In other words, geminates seem to be "less geminate" than the ones in Loporcaro et al. (2006).

It is worth observing that this variability can be interpreted as a good indicator of the allophonic status of consonant durations. Nevertheless, one could wonder why two datasets gathered from the same village during the same years provide such different results. The answer lies in the different strategies used for the elicitation of the data: while Loporcaro et al. (2006) collected a list of words pronounced in isolation by the informants, Filipponio (2012) put the target words in internal-sentence position (thus avoiding to elicit data in the utterance-final position).

In studying vowel (and consonant) duration in peripheral northern Italo-Romance varieties, the degree of 'artificiality' inherent to different elicitation methods certainly plays an important role – in a sense, researchers cannot avoid a certain degree of artificiality. The main question of concern here, however, is not how to avoid it, but rather how to assess the impact of different elicitation strategies on the results of phonetic analyses.

Taking this fact into consideration means adding a new factor to an already complex (i.e., multifactorial) picture: given the phonemic relevance of vowel length, the phonetic duration of stressed vowels and post-stress consonants may depend, for example, on vowel quality (low vowels are inherently longer than high ones), the type of consonants (obstruent vs. sonorant, stop vs. fricative, voiceless vs. voiced, and so on), and word structure.[4] Moreover, the persistence (of

[3] "Lizzano tiene una via di mezzo fra la Toscana e l'Emilia: la differenza tra la cns. breve e la lunga vi è ben sentita [...], quantunque il grado di forza dell'una e dell'altra cominci a essere qui minore che nella Toscana: si può dire che la cns. lunga lizzanese suona come una consonante e mezzo toscana" ['the situation of Lizzano is halfway between the ones of Tuscany and Emilia: the difference between short and long consonants is clear […] even if their strength is lower than in Tuscany: one can say that long consonants in Lizzano are equivalent to a consonant and a half in Tuscany'].

[4] For example, the situation displayed by the dialect of Benedello above in (3) becomes quite different if we also consider monosyllables ending with consonants (a word structure caused by the apocope of all final unstressed vowels except -*a*). In this case, while the V/V: ratio remains the same, the C/C: ratio is 0.78 (Uguzzoni & Busà 1995: 10).

remnants) of post-stress consonant duration without phonological relevance can be a relatively stable feature of a system.

During the last decades, a growing literature (see below §2) has considered other relevant factors, which overlap with the others mentioned above, such as the prosodic contexts associated with different syntactic positions (for example, non-final vs. final position in the sentence) and different communicative contexts. Elicitation strategies are usually biased towards one or more of these sources of variation in the phonetic realization, so that the experiment design should be considered a relevant variable in the evaluation of the results.

In this light, the aim of this paper is to present an example of the impact of different contexts on the phonetic realization of vowel length contrasts. In order to do that, we have chosen two northern Italo-Romance varieties belonging to the system of Ligurian dialects, which present contrastive vowel length both in oxytones and paroxytones but slightly diverge in its phonetic implementation (cf. Garassino et al. 2017): the dialect of Genoa (henceforth, Genoese or GE), the capital town of the region of Liguria, and that of Porto Maurizio (henceforth, Portorino or PM), a small harbor on the west coast of the region (which together with Oneglia forms the town of Imperia).[5]

2. Vowel duration in context: a brief introduction

Vowel duration is the main phonetic cue in the study of vowel length from an experimental perspective. However, in actual speech vowel duration can be influenced by multifarious factors, some of them intrinsic, such as vowel height, others external, such as age, gender and speech rate. Moreover, the communicative context (and therefore the chosen production tests) can also play a role, as shown in the previous paragraph.

Since our main goal in this paper is foremost methodological (cf. §1), we aim at comparing different prosodic contexts, represented by different production tests, in order to assess their possible effects on duration (cf. below §3 for a detailed description of the production experiments). The contexts that we consider are the utterance-final position and discourse focus.

The utterance-final position can be conceived as prominent in the prosodic structure of the sentence, due to its important function of signaling a strong prosodic boundary. Its main and more

[5] The fact that Genoese shows vowel quantity contrasts also in unstressed vowels (due to secondary compensation lengthening, see Forner 1988: 458) is not relevant here.

consistent effect across languages is durational expansion (also known as phrase-final or preboundary lengthening, cf. Cho 2016: 124), which also seems to be modulated by language-specific phonological properties, such as stress and vowel length (cf., among many others, Berkovits 1994 and Nakai et al. 2009).

Discourse focus has also been extensively studied, especially at the phonetics/phonology interface (cf. de Jong 2004) and in the literature on intonation. Its effects are usually described as a complex interaction of suprasegmental features such as F0 contour, duration and intensity (cf. Ladd 2008 [1996]). Focus can be a rather 'elusive' phenomenon to study experimentally due to its high context sensitivity (as is reflected by the different pragmatic types of focus described in the literature, cf., among many others, Krifka & Musan 2012; Riester & Baumann 2013) that tends to correlate with different phonetic properties. In certain languages, for instance, contrastive focus is associated with different prosodic features compared to information focus, not to mention the degrees of variation observed even in closely related varieties (cf. Poletto & Bocci 2016 for an overview on Romance languages and Frota & Prieto 2015 for a detailed investigation of many Romance varieties based on intonational phonology). Moreover, although intonation certainly plays a key role in the manifestation of focus in many languages,[6] few attempts have been made so far at disentangling the effects of other cues such as duration and intensity (cf. Kügler 2008 on German). In the light of this situation, we intend to contribute to the study of duration as an acoustic cue for focus marking, independently from other suprasegmental features.[7]

3. The empirical and quantitative analysis

3.1. Data collection

3.1.1 Target items and speakers

The target items used in this study are the following (sub-)minimal pairs, all made up of disyllabic words:

[6] In certain languages the shape of the F0 contour can be the only prominent cue for focalization, as in Japanese (Maekawa 1997). However, in many other languages, F0 is used as an acoustic cue together with duration and intensity, as it is the case, for instance, of English, German and the Romance languages (cf. Kügler 2008: 591).

[7] This is obviously not to say that intonation and intensity do not play a role in our varieties or are not interesting phenomena to analyze – quite the contrary. A characterization of the intonational profiles of these dialects will be the subject of a future study.

Table 1: (Sub)minimal pairs used in this study

(sub)minimal pair	Genoese	Portorino
/ˈfiːtu/ ~ /ˈfitu/ 'soon ~ rent'	√	
/ˈfryːtu/ ~ /ˈbrytu/ 'fruit ~ ugly, dirty'	√	√
/ˈpuːsu/ ~ /ˈpusu/ 'wrist ~ pit'	√	
/(re)ˈpɔːsu/ ~ /ˈpɔsu/ or /ˈpɔʃu/ '(I) rest ~ (I) can'	√	√
/ˈduːse/ ~ /ˈduze/ 'sweet ~ twelve'	√	√
/ˈnaːzu/ ~ /ˈmazu/ 'nose ~ may'	√	√
/ˈpeːzu/ ~ /ˈpezu/ 'weight ~ worse'		√
/ˈseːne/ ~ /ˈsene/ 'meals ~ ash'		√

There are a few things to observe. First, the segmental and phonetic contexts of these (sub)minimal pairs are unfortunately not homogenous and, secondly, some of them lack an equivalent in the other dialect. The first issue is hardly solvable, since it reflects the difficulty in finding segmentally comparable items in a dialectal situation characterized by an increasingly lower number of available (sub)minimal pairs (especially in Portorino). The second issue is not really problematic, since our goal is not to compare directly the (sub)minimal pairs across the two varieties.[8]

The target items were presented to ten Genoese and Portorino (native) speakers. The age of the Genoese speakers varies from 19 to 66 (mean = 45.6; sd = 20.10. Only one informant is female), while in the case of Portorino, the speakers' age is between 38 and 77 (mean = 64.2; sd = 15.12. Two informants are female).

3.1.2 Production tests

In order to gather the data concerning the contexts described in §2, we have relied on two production tests in which the (sub-)minimal pairs presented in Table 1 occurred as target items:

(4) SVX sentence-reading
*Maria preparava **il dolce***
'Maria prepared the dessert'

[8] For a discussion on the empirical challenges faced in the analysis of (sub)minimal pairs in these non-standard Romance varieties, the reader is referred to Filipponio & Garassino (2019).

(5) Contrastive carrier sentences[9]
*Ho detto **DOLCE**, non **dodici***
'I have said DESSERT, not twelve'[10]

The SVX sentences were read aloud in Italian by the experimenter, one at a time, and then the informants were asked to translate them into their own dialect. The contrastive carrier sentences were presented one at a time in Italian on the screen of a laptop; as in the case of the SVX sentences, subjects were asked to translate each sentence into Genoese or Portorino.[11]
In order to control for possible (and expected) differences due to the presence of a final prosodic boundary, the target words were inserted in two different positions within the SVX sentences:

(6) a. *Il ragazzo ha preso un **frutto** da portare a casa* (utterance-internal position)
'The boy picked a fruit to take home'
b. *Il ragazzo ha preso un **frutto*** (utterance-final position)
'The boy picked a fruit'

Furthermore, the target words were also inserted in two different positions (focalized *vs*. non-focalized) in the contrastive carrier sentences:

(7) a. *Ho detto **FRUTTO**, non **brutto**, stavolta* (focalized position for *frutto*)[12]
'I have said fruit, not ugly this time'
b. *Ho detto **BRUTTO**, non **frutto**, stavolta* (focalized position for *brutto*)
'I have said ugly, not fruit this time'

Besides the two tests, we will also consider the results of an experiment (cf. Garassino et al. 2017) conducted by means of a simpler sentence design:

[9] This type of contrastive-corrective focus is also known in the phonetics/phonology literature as phonological focus (de Jong & Zawaydeh 2002; de Jong 2004).
[10] The actual forms are the (sub-)minimal-pairs /ˈduːse/ and /ˈduze/ in Genoese and Portorino.
[11] Since contrastive carrier sentences already required our informants to imagine a meta-communicative context (as triggered by the covert question in (5), *have you said X (or Y)?*), in order to avoid further cognitive effort we decided not to ask for an immediate translation. For this reason, we opted for the presentation of the stimuli on a screen.
[12] The target items in both dialects are /ˈfryːtu/ ~ /ˈbrytu/, 'fruit ~ ugly, dirty'.

(8) I have said X for the first / second / … time

Carrier sentences such as (8) can be perceived as less 'natural' than SVX sentences, but they have the advantage of presenting a stable prosodic environment (the position of the target item remains constant). Although there is not a perfect compatibility between the SVX sentences and the contrastive carrier sentences, on the one hand, and the "simpler" carrier sentences, on the other hand, since the data gathered for the latter were produced by (partly) different speakers and concern (partly) different target items, the overall structure of the three experiments makes it still possible to propose a tentative comparison. The carrier sentences will then be used as a "baseline" against which we can compare the results obtained from the other two experiments. From a methodological standpoint, we can summarize the principal features of each test as follows:

Table 2: Production experiments and their main features

Elicitation methods	Main features	
Carrier sentences (baseline)	Fixed prosodic structure	CS
SVX sentences	Utterance-internal position	INT
	Utterance-final position	FIN
Contrastive carrier sentences	Focalized position	FOC
	Non-focalized position	NF

3.2. Research questions

In our analysis, we will tackle the following main issues:

(i) Is there a significant difference in the phonetic implementation of vowel length in the two dialects of Genoa and Porto Maurizio?

(ii) How do the different contexts affect vowel duration in both dialects?

Regarding (i), in Garassino et al. (2017) (which, as said before, relied on carrier sentences) a different realization of vowel length in the two dialects emerged. If this difference is stable and consistent, we expect it to be found in the other two tests as well. Independently of the cross-dialectal differences, we expect to find a significant effect of prosodic- and discourse-induced lengthening on vowel (as well as consonant) duration in both varieties.

Finally, we do not expect post-stress consonants to necessarily differ in duration depending on the preceding vowel. As shown in Rohlfs (1966: §229) and also in §1 above, in many northern Italo-Romance varieties vowel length distinctions are not accompanied by compensation effects in the duration of the consonants.

3.3. The quantitative analysis: an overview

A fist overview of the data in the two dialects can be achieved by means of the ratios V to V: and (V:)C to (V)C (i.e., the ratio of post-stress consonants following long and short vowels):

Table 3: V/V: and (V:)C / (V)C ratios in Genoese and Portorino

Test Type	V/V:		(V:)C/(V)C	
	GE	**PM**	**GE**	**PM**
CS	.61	.72	.86	.76
INT	.69	.78	.94	.81
FIN	.71	.68	.83	.80
NF	.68	.67	.76	.82
FOC	.68	.72	.81	.66

These two ratios have been commonly used in Italian dialectology in the work of Uguzzoni (e.g., Uguzzoni 1975; Uguzzoni & Busà 1995) and have subsequently been exploited in many recent works, cf., among others, Loporcaro et al. (2006); Filipponio (2012); Bernardasci (2015), etc. The results can be a bit puzzling: with regards to the V to V: quantity ratio, the lower value of Genoese in our baseline (which indicates a larger difference in the phonetic implementation of short and long vowels) is not replicated in the other tests. Moreover, the only large difference between the two dialects seems restricted to the baseline. As for the (V:)C to (V)C ratio, the higher values found in Genoese indicate a very negligible difference between the post-stress consonant duration before or after long or short vowels. All in all, on the basis of this table, it is not an easy task to draw reliable conclusions on the phonetic implementation of vowel length in the two varieties (see below §5 for further considerations).

However, it seems safe to claim that different contexts have an effect on vowel (and consonant) duration. This impression is made more evident by the following figures, which depict the means

and standard errors of the (sub)minimal pairs attested in both varieties (vowels are displayed on the left side, while consonants are shown on the right side of the page).

The dark bars represent the duration of short vowels and consonants after short vowels, while the light ones display the duration of long vowels and consonants following long vowels. The contexts CS, INT, FIN, NF, FOC (cf. Table 2) are presented from left to right:

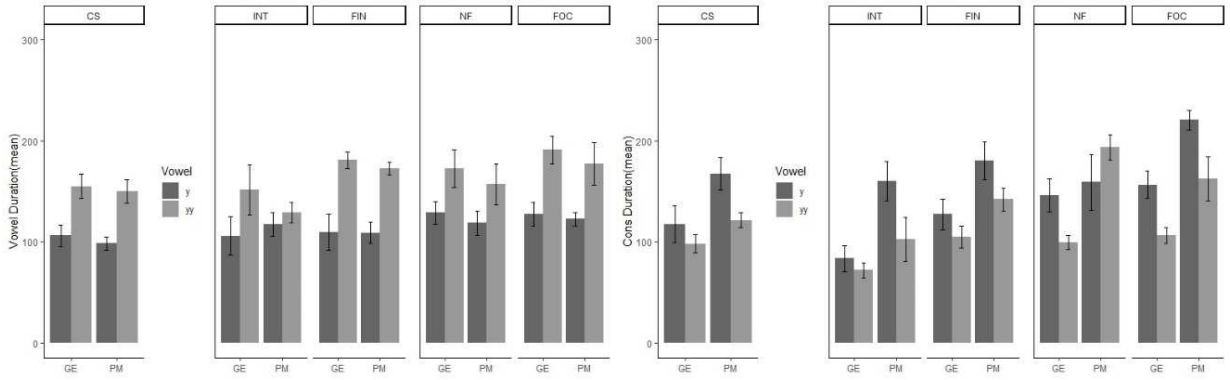

Figure 1. Distribution of vowel (left) and post-stress consonant (right) duration (/ˈfryːtu/ ~ /ˈbrytu/)

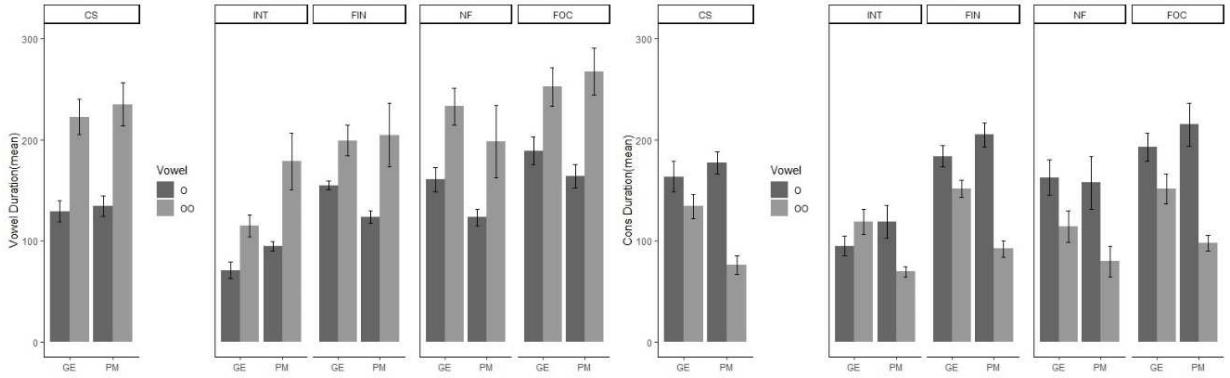

Figure 2. Distribution of vowel (left) and post-stress consonant (right) duration (/(re)ˈpɔːsu/ ~ /ˈpɔsu/ or /ˈpɔʃu/)

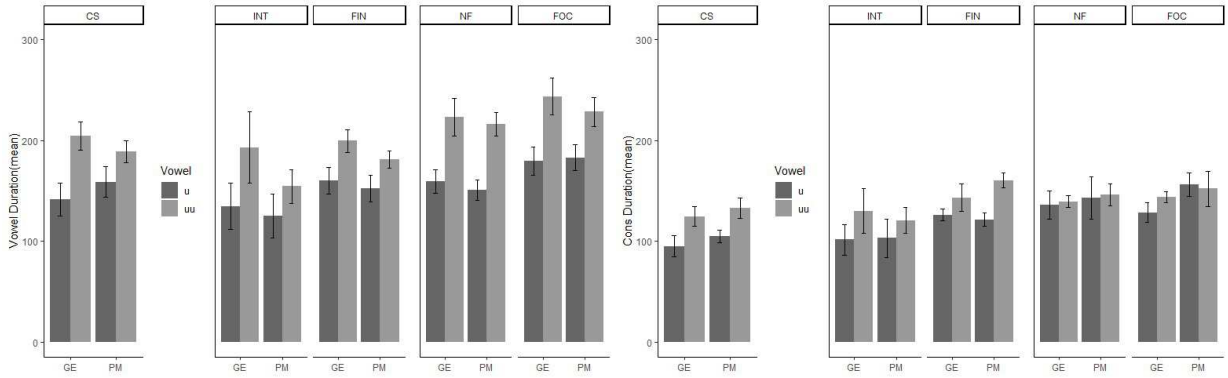

Figure 3. Distribution of vowel (left) and post-stress consonant (right) duration (/ˈduːse/ ~ /ˈduze/)

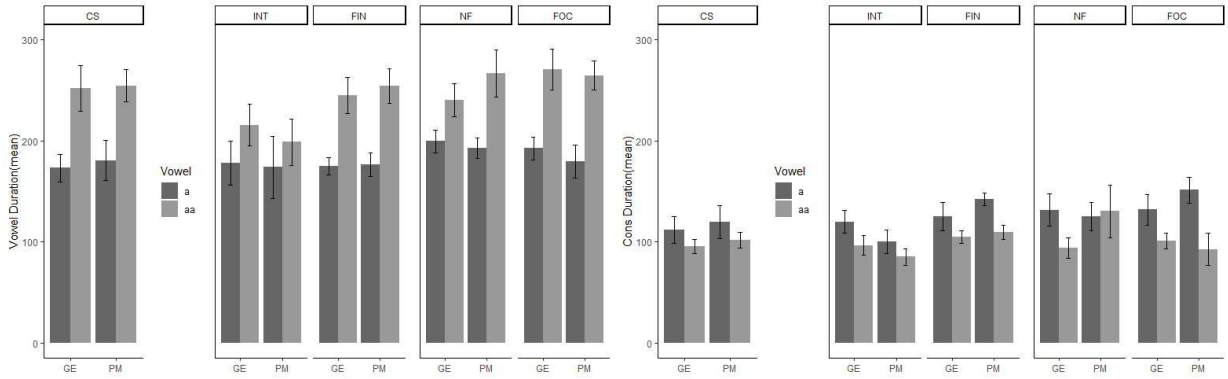

Figure 4. Distribution of vowel (left) and post-stress consonant (right) duration (/ˈnaːzu/ ~ /ˈmazu/)

In spite of the high degree of variation, one can observe that the differences in phonetic duration between phonological short and long vowels become overall clearer in the contexts FIN, NF, FOC than in INT. In the (sub)minimal pairs /ˈduːse/ ~ /ˈduze/ and /ˈnaːzu/ ~ /ˈmazu/ the differences between consonants are less remarkable than in the other two pairs, even if the V/Vː ratio here substantially differs from the clear picture shown above in (3).

However, this is but a first impression: to better understand the data, in the next section we will carry out an in-depth quantitative analysis.

4. Statistical analysis

The statistical analysis is based on linear mixed models (cf., among others, Winter 2013 and Levshina 2015).[13] The dependent variable is either absolute vowel or post-stress consonant

[13] The analysis was performed by using *R* (R Development Team 2017) and the package *lmer4* (Bates et al. 2015).

duration in ms. Moreover, as a cross-check, besides the absolute duration of vowels and consonants, we also use the relative V / (V+C) measure, also known as proportional vowel duration (henceforth, PVD). PVD has mostly been employed to test "a complementary distribution of vowels and consonants" (Moosmüller & Brandstätter 2014) and has been used in studies concerning vowel and/or consonant length in German (Bavarian) dialects and Finnish (Jochim & Kleber 2017; Kleber 2018).

The independent variables (or fixed factors) used in the models are Dialect (with the levels: Genoese / Portorino), Vowel Length (short / long), Type of the post-stress consonant (stop / fricative / nasal), Position in SVX sentences (internal / final) and Position in contrastive carrier sentences (non-focalized / focalized). Speakers and Words (i.e., the target items) were inserted as random factors in each model.

The best models were selected based on the lowest values of the AIC (Akaike Information Criterion) and the BIC (Bayesian Information Criterion) goodness-of-fit measures (cf. Levshina 2015: 194) in comparison to the other models.

4.1. Carrier Sentences

Table 4:

Results provided by the best model (Vowel Duration (ms) ~ Vowel Length * Dialect + Speakers + Words)

V	β	ES	*t*	*p*
Intercept	133.72	12.31	10.86	< 0.001
Vowel Length (long)	83.47	10.38	8.04	< 0.001
Dialect (PM)	5.06	15.08	0.34	-
Vowel Length (long) * Dialect (PM)	-20.92	9.14	-2.29	< 0.05

Table 5:

Results provided by the best model (Consonant Duration (ms) ~ Vowel Length + Dialect + Type of Consonant + Speakers + Words)

C	β	ES	*t*	*p*
Intercept	127.70	9.80	13.02	< .001
Vowel Length (long)	-27.32	7.79	-3.51	< .01
Dialect (PM)	13.19	10.88	1.21	0.24
ConsType (nasal)	-33.52	9.84	-3.41	< .01

ConsType (stop)	11.01	9.10	1.21	0.2

The results of these models reveal that in Portorino long vowels are significantly shorter than in Genoese, which can be interpreted as a sign that the difference between short and long vowels is less robust in this variety compared to Genoese. From this information, one may infer that vowel length distinctions are altogether more stable in the dialect of Genoa. On the other hand, post-stress consonants are significantly affected by the phonological status of the preceding vowel (in particular, consonants following long vowels are shorter than consonants following short vowels) in both varieties, thus showing a complementation effect (cf. Hajek 1994 on Bolognese), and by their Type (nasal consonants being significantly shorter than fricative consonants). In this case, no significant interaction between the variables Vowel Length and Dialect has been observed. The use of a relative measure as the dependent variable (PVD) partly confirms the results shown in Tables 4 and 5. The most striking difference is the absence of a significant interaction term. The factor Dialect, however, has a main effect on the dependent variable (in particular, the level Portorino has a negative impact on the value of this ratio):

Table 6:

Results provided by the best model (V/(V+C) ~ Vowel Length + Dialect + Type of Consonant + Speakers + Words)

V/(V+C)	β	ES	*t*	*p*
Intercept	0.54	.020	23.54	< .001
Vowel Length (long)	0.17	.026	6.55	< .001
Dialect (PM)	-0.03	.016	-2.20	< .05
ConsType (stop)	-0.09	.024	-3.54	< .001
ConsType (nasal)	0.05	.025	2.01	< .05

4.2. SVX Sentences

Table 7:

Results provided by the best model (Vowel Duration (ms) ~ Vowel Length + Position in the sentence + Speakers + Words)

V	β	ES	*t*	*p*
Intercept	121	11.27	10.73	< .0001
Vowel Length (long)	44.21	10.71	4.12	< .001

Position (final)	29.92	4.13	7	< .0001

Table 8:

Results provided by the best model (Consonant Duration (ms) ~ Vowel Length + Position in the sentence + Speakers + Words)

C	β	ES	*t*	*p*
Intercept	113.45	9.70	11.69	< .001
Vowel Length (long)	-19.31	10.83	-1.78	.09
Position (final)	31.98	3.84	8.32	< .001

As expected, the utterance-final position has a significant lengthening effect in comparison to the internal position in both dialects. Moreover, in both positions and dialects, the difference in duration between short and long vowels is significant. Finally, no significant interactions between the factors have been detected. Post-stress consonants are also affected by the proximity to the final boundary. However, unlike the previous context (cf. above § 4.1), they do not show a significant complementation effect. The PVD measure confirms the results obtained for the absolute durations, although at a lower level of significance:

Table 9:

Results provided by the best model (V/(V+C) ~ Vowel Length + Position in the sentence + Speakers + Words)

V/(V+C)	β	ES	*t*	*p*
Intercept	0.53	.023	22.05	< .0001
Vowel Length (long)	.093	.028	3.21	< .01
Position (final)	-0.01	.009	-1.98	< .05

4.3. Contrastive carrier sentences

Table 10:

Results provided by the best model (Vowel Duration (ms) ~ Vowel Length + Position in the sentence + Speakers + Words)

V	β	ES	*t*	*p*
Intercept	143.98	12.61	11.84	< 0.001
Vowel Length (long)	74.70	13.61	5.49	< 0.001
Position (focalization)	17.99	3.77	4.77	< 0.001

Table 11:

Results provided by the best model (Consonant Duration (ms) ~ Vowel Length + Position in the sentence + Speakers + Words)

C	β	ES	*t*	*p*
Intercept	156.19	11.33	13.97	< 0.001
Vowel Length (long)	-42.37	12.90	-3.28	< .01
Position (focalization)	8.21	4.05	2.03	< .05

Focalization has a significant main effect on vowel duration and a significant but certainly weaker effect also on the duration of consonants. Again, the consonant duration is sensitive to the previous vowel: short consonants tend to follow long stressed vowels and long consonants tend to be preceded by short stressed vowels.

Quite interestingly, the focalization effect is not confirmed by using PVD as a dependent variable (focalized position, β = .02, ES = .016, *p* = .21). A possible explanation could be that, at the segmental level, the focus-induced lengthening of vowels is not substantially stronger than the lengthening of post-stress consonants compared to the non-focalized position, thus resulting in a non-significant value. The main effect of vowel length (with long vowels significantly longer than short vowels) has been confirmed.

Table 12:

Results provided by the best model (V/(V+C) ~ Vowel Length + Speakers + Words)

V/(V+C)	β	ES	*t*	*p*
Intercept	0.48	0.028	17.21	< 0.001
Vowel Length (long)	0.17	.038	4.62	< 0.001

4.4. Discussion

With regard to our research question (i), whether there is a significant difference in the phonetic implementation of vowel length in the two varieties of Genoa and Porto Maurizio (see above §3.2), we found out that vowel length contrasts are attested in both Genoese and Portorino, independently of the context. As a secondary cue, we have observed the relative stability of the complementation effect shown by consonants: their duration seems to be predictable based on vowel length. Thus, we were not able to confirm the hypothesis of a different phonetic implementation of vowel length

in the two varieties (put forward by Garassino et al. 2017 on the basis of a carrier sentence test, which has been reproduced here) for each of the contexts that we have examined. This fact suggests indeed that different production tests matter and a double-check relying on different experiments is strongly advised (cf. also the methodological discussion in §1).

Regarding (ii), whether and how the different contexts may affect vowel duration in both dialects, both prosodic and information structural conditions have a significant impact on vowel and consonant duration, although in different ways and to varying degrees. The utterance-final position is a strong lengthening trigger for both stressed vowels and post-stress consonants: its strong impact at the segmental level is not a surprise, being an incremental factor that enhances the temporal expansion of elements adjacent to the prosodic boundary (cf., among others, Berkovits 1994; Nakai et al. 2009; Cho et al. 2011). Moreover, focalized vowels are significantly longer than non-focalized ones (but cf. the PVD results), thus confirming the effect of contrastive-corrective focalization on vowel and, to a more limited extent, consonant duration.

Finally, in comparing Tables 7-8 and 10-11, one might wonder about the proportionally milder lengthening effect of focalization (i.e., from non-focal to focal position) compared to final lengthening (from utterance-internal to final position) on both vowel and consonant duration.[14] This can be explained by the fact that temporal expansion is just one, and probably not even the most relevant, among other prosodic correlates of focalization (F0 and intensity) in these varieties.

5. Concluding remarks (with the aid of median values)

If we now put together all median values of vowel and consonant duration for the contexts INT, FIN, NF, FOC (V = short vowel; VV = long vowel; C = post-stress consonant), splitting them by dialect, we obtain a striking similar picture for Portorino and Genoese.

[14] For a more detailed phonological explanations of the effects of both final prosodic boundary and discourse focus, we refer to Filipponio & Garassino (2019).

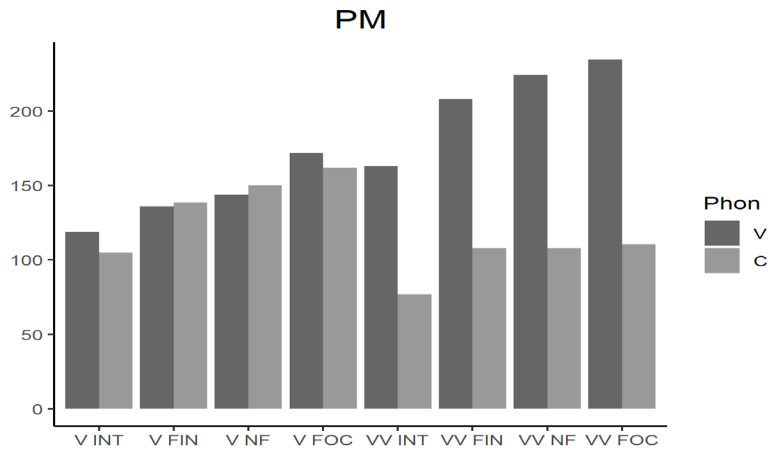

Figure 5. Median values of stressed vowels and post-stress consonants in Portorino

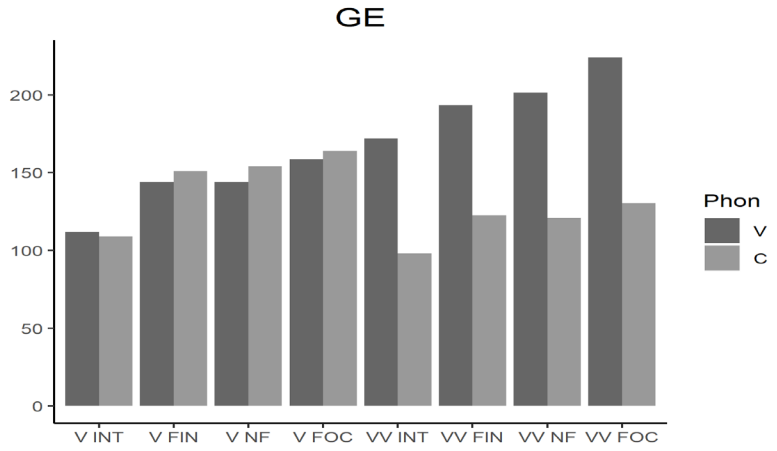

Figure 6. Median values of stressed vowels and post-stress consonants in Genoese

Moving from INT, i.e., the most neutral context, towards FOC, the phonetic duration of both short and long vowels shows an upward trend.[15] In both varieties, the duration of short vowels in FOC is very similar to that of long vowels in INT (GE) or even higher (PM). Furthermore, post-stress consonants after short vowels increase in a similar way as the vowels, while those following long vowels remain stable, with a clear difference between the non-marked configuration INT and the others. By observing the context-sensitivity of consonant duration, one could conclude that these

[15] Observe that this is not incompatible with what we have observed in §4.4 regarding the milder lengthening effect of focalization. While vowel duration is overall greater in the Contrastive carrier sentences than in the SVX sentences (which leads to the upward trend visible in Figures 5 and 6), the lengthening effects of focus and the final position, however, differ within the two tests (the latter being on average stronger), as is particularly evident in the case of long vowels in Portorino (Figure 5).

dialects show a similar behavior as Lizzanese (see above §1).[16] In any case, the synopsis of the median values shows that the V/C ratio is a solid parameter for discriminating between short and long vowels (see Filipponio 2012).

Nevertheless, if one considers (following de Jong 2004) the tendency for contrastive-corrective focus to emphasize only phonologically relevant features, these data confirm the phonemic value of vowel length, as already seen in the previous chapter. By combining the statistical analysis with the visualization of the median values, the difference between utterance-final and focal position is made more evident, at least in the case of long vowels: in the first context, vowel and consonant durations increase in parallel, while in the second one the increase of vowel duration is more relevant (but cf. also the discussion in §4.3 concerning the different results based on absolute durations and PVD). The latter effect is due to linguistic reasons, as already mentioned, while one could consider the former effect as mostly 'mechanical' and prosody-driven.

More generally, our study confirms the impact of different contexts on the phonetic realization of vowel length contrasts and highlights the centrality of this parameter both for the conception of production tests and for the typological evaluation of linguistic systems that present vowel length oppositions.

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[16] However, the diachronic reasons behind this superficial similarity are possibly very different (for a thorough discussion, see Filipponio et al. 2019).

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