



# Rhotic degemination in Rome Italian

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## ABSTRACT

In this paper we analyse if, and how, Rome speakers produce rhotics degemination in Rome Italian (RI). Ten speakers from Rome participated in a sentence-reading task, with 70 sentences of equal length and controlled prosodic contour, containing one token with a singleton and/or geminate /r/, in a stressed and/or unstressed condition. Seven hundred tokens were annotated classifying rhotics as either taps, trills, approximants or fricatives according to their spectrogram realization. For quantitative analysis, we relied on preceding vowel and consonant duration to test the consonant gemination. Results show that geminated rhotics were longer than singleton rhotics, whereas vowels preceding geminates are considerably shorter than when preceding a singleton rhotic. Qualitative analysis shows, furthermore, a more complex picture. Intervocalic geminate rhotics seem to allow a greater range of possibilities: they can be realized mainly as trills, but approximants, fricatives, taps, and combined realizations (trill or tap with a fricative appendix) are found too. However, a great within-speaker variation has also been observed.

KEYWORDS: rhotics, gemination, Rome Italian, quantitative analysis, qualitative analysis.

## 1. Introduction

This paper aims to investigate rhotic degemination in the production of Rome Italian speakers. We focused on rhotic degemination, because it is considered a clear sociolinguistic marker of *romanesco* and it is overtly associated with rudeness, low status speakers and informal communicative situations. Given the particular status of the R variable (Scobbie, 2006) in conveying socio-indexical information, we analyse if, and how, young Rome speakers produce degemination of the rhotic phoneme. The paper is structured as follows: in this section we present an overview of the studies concerning both rhotic degemination in Rome and, from a more general perspective, the acoustic correlates of rhotic gemination; in § 2 we

provide three experimental hypotheses, to be tested in an *ad hoc* sample, built and annotated as explained in §§ 2.1 and 2.2, respectively. As stated, the analysis is divided into a qualitative section (§ 3.1) and a quantitative one (§ 3.2). Finally, in § 4 we discuss the main results of our study, before moving to some preliminary conclusions (§ 5) and opening up new research perspectives.

### 1.1. *Rhotic degemination in Rome*

In the linguistic descriptions of Romanesco and Rome Italian (see, for example, Bernhard, 1992; D'Achille and Giovanardi, 1995; 2001; Trifone, 2008; Loporcaro, 2009; Canepari, 2018), rhotic degemination appears to be a peculiar feature. According to Rohlfs (1966), degemination of the intervocalic rhotic is attested in Northern Italy (where degemination is generalized to the whole consonantal system, cf. Payne, 2005), but it appears to spread toward southern areas, such as in Tuscany (Lucca, Mugello, Siena, Livorno province), Marche, Umbria and «in misura particolarmente forte a Roma e nel Lazio meridionale» (Rohlfs, 1966: 313).

Nevertheless, rhotic degemination in Rome seems to date back to no earlier than the 18th century, perhaps due to migration of speakers from Umbria, Marche and Tuscany, thus being a more recent phenomenon than Northern Italy degemination (Trifone, 1992). According to Trifone (2017), the phenomenon is definitely attested in the 20th century. In Giuseppe Gioacchino Belli (19th century) degemination appears only in stressed syllables (*terina*, It. *terrina*, but *terra*, It. *terra*), whereas in Cesare Pascarella (20th century) it appears in post-stressed syllables too (*tera*, It. *terra*). Trifone (2017) hypothesizes a morphological trigger: the widespread distribution of the rhotic singleton in the Italian future tense and conditional mood *amerò / amerei* should have functioned as a pattern for attracting the corresponding forms *vorrò, vorrei*. The feature appears to be a strong sociolinguistic marker of Rome speakers (Stefinlongo, 1999; D'Achille, 2012). It correlates both to speech style and to social groups, and it seems to have reached the status of a stereotype (Labov, 1972). For D'Achille and Giovanardi (1995) it can be found in informal, colloquial style too, and for Stefinlongo (1985: 30) «la pronuncia scempia di /rr/ in un contesto formale viene avvertita come una grave violazione sociolinguistica e produce un notevole senso di disorientamento e imbarazzo fra gli interlocutori». According to D'Achille (1995) the stigmatized value seems to be confined to degemination in a

stressed syllable (like *orore*, It. *orrorre*), whereas degemination in a pre-stress position (es. *arivare*, It. *arrivare*) can be found in informal speech style. In conclusion, rhotic degemination appears to be a recent phenomenon, dating back to the 18th century. Furthermore, this feature seems to have a low-prestige value, thus pointing to a possible change from below, spreading in low-educated classes, despite being overtly stigmatized in formal situations and by highly-educated speakers.

To our knowledge, no phonetic studies specifically addressed /r/ realization and /r:/ degemination in Rome Italian<sup>1</sup>. Only Marotta (2005) addresses Rome consonantal system and degemination, by analysing a dialogue between two university students, speaking regional Rome Italian, from the CLIPS corpus (Albano Leoni, 2006). In her data, rhotics show different realizations. Trills seem to be preferred in prominent words, fricatives appear in the *-sCr-* clusters, taps and approximants in intervocalic position and after voiceless stops, whereas segment deletion appears in the functional word *allora* (Marotta, 2005: 14). Interestingly, geminate rhotics show a duration of 86 ms.; thus, degemination does not seem to appear in an unstressed syllable in the speech of the two young Rome speakers. Conversely, singleton consonants show half – or less – the duration (see Table 1, adapted from Marotta, 2005: 15).

/r:/	Singleton trill	Singleton tap	Singleton fricative	Singleton approximant
86 ms.	46 ms. (10)	24 ms. (8)	41 ms. (16)	27 ms. (11)

Table 1. *Rhotic sounds duration in Rome Italian according to Marotta (2005).*

Even though conducted with a small sample dataset (only two tokens with /r:/, both in unstressed position, i.e. *terra*), Marotta (2005) offers a first phonetic sketch of rhotic realization in Rome Italian. Furthermore, her results suggest that, at least for the two analysed subjects, young speakers from Rome do not produce rhotic degemination, therefore confirming its low status and its possible disappearing in the production of highly educated speakers.

<sup>1</sup> Here, and in the rest of the paper, we indicate the geminated phoneme as /r:/ in order to highlight the phonological value assumed by gemination in Italian phonology.

### 1.2. *Acoustic correlates of rhotic gemination*

Research on Standard Italian has shown that the rhotic phoneme is usually realized as a trill [r]. Besides this unmarked realization, speakers show a great amount of individual variation, thus realizing the rhotic sound as a uvular, alveolar or labio-dental approximant (Bertinetto and Loporcaro, 2009). The apico-alveolar phoneme /r/ contrasts in intervocalic position with the corresponding geminate /r:/. The two apical trills are said to differ in the number of linguo-palatal contacts, with singleton rhotics articulated with a single contact, although this contrast can be conveyed by different phonetic realizations related to regional variation and underlying dialectal system (Bertinetto and Loporcaro, 2009; Romano, 2013: 211).

In general, studies devoted to the investigation of Italian geminated consonants have demonstrated that different acoustic cues are involved in conveying gemination. For Italian stop consonants, studies have analysed closure and VOT durations (Payne, 2005), degree of constriction (Hualde and Nadeau, 2011), burst energy, formant tracks of the preceding vowel (Esposito and Di Benedetto, 1999), and the presence of preaspiration (Stevens and Reubold, 2014); for the whole set of consonants, the roles of energy transition, consonant amplitude, segment duration, and preceding vowel duration were also investigated (Romano, 2003). More generally, results are consistent in indicating that gemination is conveyed by consonant and vowel durational parameters. Perceptual data appears to confirm this result (Bertinetto and Vivalda, 1978). In particular, the most robust cue for gemination seems to be the consonantal lengthening, in association with a shortening of the preceding vowel. Vowels preceding geminates are thus considerably shorter than when preceding a singleton consonant (e.g., [ˈtut:a] “all” vs [ˈtu:ta] “tracksuit”). In their study on the effect of speaking rate on the production and perception of gemination in Italian dental and labial stops, Pickett *et al.* (1999) showed that the ratio between consonant closure duration and preceding vowel duration is another robust cue for consonantal length, because it discriminates between singletons and geminates – even across different speaking rates, both in perception and production.

For rhotics, Argiolas *et al.* (1995) found that gemination is conveyed primarily through preceding vowel shortening and, also, through consonantal lengthening. In addition to durational parameters, qualitative dimension plays a role. Payne (2005), indeed, notes that contrast between singleton and

geminate rhotic is usually realized as a contrast between a tap and a trill. As highlighted by Kawahara (2005), and Kawahara and Pangilinan (2017: 20), rhotic gemination also involves a great degree of speech motor control: lengthening a tap or a flap would instead cause a physiological qualitative change into a trill, in order to maintain the percept of rhoticity (Solé, 2002). Following Dispersion Theory (Flemming, 1995; 2002), Bradley (2006) posits the explicit correlation ‘trill-as-a-geminate’ within an Optimality Theory framework. For many scholars these observations have led them to interpret the trill as the result of a tap gemination, namely /rr/ (cf. Harris, 2002; Núñez Cedeño, 1994). Conversely, others assume that both tap and trill have phonological status (see, for example, Colina, 2010), because, at least in Spanish, the two segments are contrastive in intervocalic position (es. /pero/ *pero* “but” vs /pero/ *perro* “dog”, Hualde, 2005; Willis and Bradley, 2008). On another position, Shelton (2013) assumes a continuum of possible realizations: based on experimental evidence, he shows that the transition from tap to trill is governed by a series of factors, such as stress position, syllable structure, or lexical status. According to Celata *et al.* (2019), at least in Tuscan Italian taps and trills are not contrastive in intervocalic position; differently from Spanish, single-constriction rhotics, like taps, fricatives, and approximants, can be lengthened to convey gemination. Furthermore, data from Celata *et al.* (2019) indicates a possible role of vowel quality in shaping different realizations of singleton and geminate rhotics, in particular when the consonant is preceded or followed by a front vowel.

For the aforementioned reasons, we decided to investigate Rome rhotic degemination both quantitatively and qualitatively. Namely, we rely on durational measurements (preceding vowel and consonant duration) to test if the consonant is realized as a geminate or a singleton. Additionally, the visual inspection of the spectrogram is used for a qualitative investigation of rhotic realization, in order to analyse if rhotic degemination can be conveyed by shortening in duration, or if it is associated with the use of particular variants, like taps or approximants.

## *2. Experimental hypothesis*

Inspired by the results of Marotta (2005), the current study has the aims of starting an investigation of rhotic degemination in Rome Italian. We attempt to answer three specific questions:

- i. Given that rhotic degemination seems overtly stigmatized, do young Rome speakers still realize it? Do they show it in more controlled sociolinguistic speech events, like a sentence-reading task?
- ii. Assuming the maintenance of rhotic degemination in the speech of Rome speakers, how is degemination realized?
  - Namely, if we assume that the phenomenon is still maintained, do geminate rhotics show the same duration in ms. as the singleton ones?
  - Are degeminated rhotics realized differently from singleton rhotics, not only from a quantitative perspective, but also qualitatively?
- iii. Furthermore, do other phonetic factors have a role in triggering degemination, as the observations about the role of stress, with degemination being favoured in unstressed syllables?

From the picture sketched in § 1.2, we decided to narrow our investigations to young speakers, by selecting highly educated subjects from different districts of Rome. Our work aims thus to verify the presence of rhotic degemination by addressing three different levels of analysis and three hypotheses.

- i. From a sociolinguistic point of view, we assume that the presence of rhotic degemination could be interpreted as a signal of affiliation to a low-prestige variant, commonly associated with low socioeconomic status.
- ii. From a phonetic perspective, if we assume that (de)gemination is disappearing, we expect to find that gemination will be signalled by a series of durational and non-durational cues. We presume that geminated rhotics will show longer duration, in opposition to their preceding vowels, that will be shorter than vowels preceding singleton rhotics (Argiolas, 1995). We also expect to find an effect of the surrounding vowels, with a more nuanced difference between singleton and geminate rhotics when preceded or followed by a front vowel (Celata *et al.*, 2019).
- iii. Phonologically speaking, we expect to find a difference in the type of rhotics in the two phonological contexts, namely lexical singleton and geminated. Additionally, we aim to verify if the strong association between the V-rr-V context and approximant and fricative realizations found in Tuscan Italian by Celata *et al.* (2019) holds also for Rome Italian production.

### 2.1. *Materials and methodology*

Our sample consists of 10 speakers from Rome (5 males and 5 females): 7 out of 10 speakers come from eastern Rome, whereas the remaining 3 come from southern Rome. Their ages span from 25 to 30 years old, and their education ranges from high school diploma to PhD degree. Since it is known that in urban areas standardization and de-standardization processes are distributed according to extra-linguistic variables such as residential quarters, education, etc. (Sobrero, 1994), we narrowed our investigation to this population because we wanted to test if speakers from these areas, with these social characteristics, may use a low-status phenomenon in order to signal their affiliation to the working class.

Speakers participated in a sentence-reading task. We chose a reading task instead of a more spontaneous approach in order to have a controlled set of tokens equally distributed across our participants. Indeed, our contribution was intended as a controlled experiment. However, in order to achieve a less controlled production, sentences were constructed in order to resemble informal, everyday communication. For this reason, we did not insert our word into a standard frame, like ‘Say X again’, but we constructed realistic, informal sentences, with swear words and regional terms, too (e.g., *Non si sgarra co l’amici*). The first author, a native Rome speaker, constructed the stimuli, based on her linguistic competence.

The list consisted of 70 sentences of equal length and controlled prosodic contour. Each sentence contained one token with a singleton and/or geminate /r/, in stressed and/or unstressed syllables (e.g., *Carrara, barrare*). Tokens with /r/ in -sCr- clusters were included too, but they are left for further investigation. We selected minimal pairs too, in order to test if minimal pair neighbours affect the acoustic realization of rhotic degemination: indeed, Baese-Berk and Goldrick (2009) and Goldrick *et al.* (2013) have shown that words with low neighbourhood density, as well as the lack of specific contrasts, may reduce the effects of phonetic reductions as observed, in the aforementioned studies, for VOT in voicing contrasts or between vowels (see also Clopper and Tamati, 2014). For Italian, similar results were observed in plosives gemination in a preliminary work by Dmitrieva *et al.* (2018). In selecting our target stimuli, we tried our best to construct sentences that were plausible with both words (i.e. *A Torino / Al Torrino* [a Rome neighbourhood] *costa caro*). Each rhotic could be preceded or followed by any of the seven vowels.

The total dataset consisted of 741 tokens. For the present analysis we will rely on 731 tokens, excluding all the occurrences of /r/ in -sCr- clusters.

## 2.2. Data treatment

Following the annotation protocol presented in Celata *et al.* (2016), we considered rhotics as sequences of gestures of constrictions and apertures, thus classifying them by rhotic type and the type and number of gestures involved in their production, distinguishing between monophasic rhotics (e.g. intervocalic taps) and bi- or multiphasic rhotics involving more than one constriction gesture. As for rhotic type, the first label of the annotation distinguishes among taps (T), trills (R), approximants (A), and fricatives (F). The second label contains the indication of the gesture, either a constriction (c) or an aperture (a). The third label specifies the sequential number of the gesture performed, whereas the fourth and last label indicates if there are other phases in the production of the rhotic. In line with Ladefoged and Maddieson (1996) each rhotic that shows more than one phase of vibration (i.e., two or more constriction phases) is considered a trill. In Figures 1-4 we present four cases of rhotics from our corpus to exemplify this annotation procedure.

Figure 1 presents the typical realization of an intervocalic tap, consisting in a single closing gesture as in the word *mora* “blackberry”; according to Celata *et al.* (2016) this is the most frequent realization of singleton intervocalic rhotics.

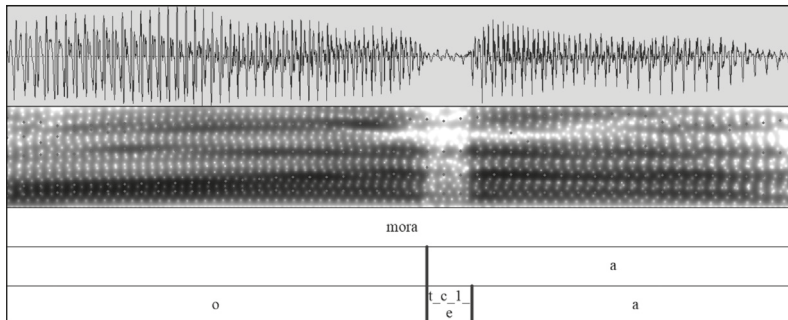


Figure 1. *A monophasic tap, with only one phase of closure, in the word mora “blackberry”.*

Figure 2 presents an example of a rhotic realized as a tap when occurring after an occlusive consonant: in this case, the tap is structured as a sequence of an aperture and a closure as in the word *dolciastro* “sugary”. Articulatorily, this means that between the stop and the closure of the tap there is a



pseudo-vocoid or *svarabhakti* vowel (Baltazani and Nicolaidis, 2013). It goes without saying that this vocoid will be found after the tap closure phase in cases where the rhotic precedes an occlusive consonant.

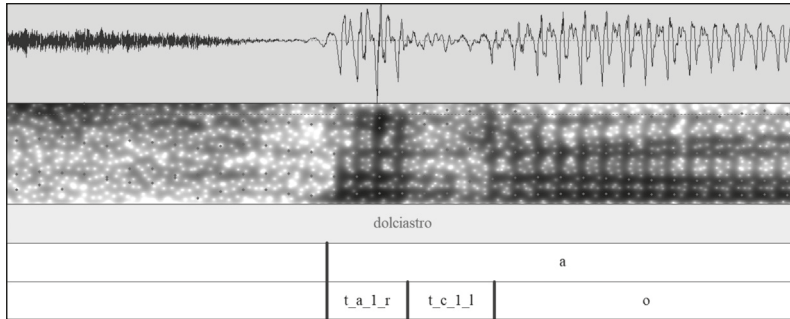


Figure 2. *A biphasic tap, with an opening phase followed by a closure, in the word dolciastro “sugary”.*

Figure 3 shows the typical articulation of trills, which are characterized as having at least 3 phases, two closures intertwined with an aperture; it is worth noting that Italian rhotics as present in our corpus may also show up to 7 phases in the realization of a trill.

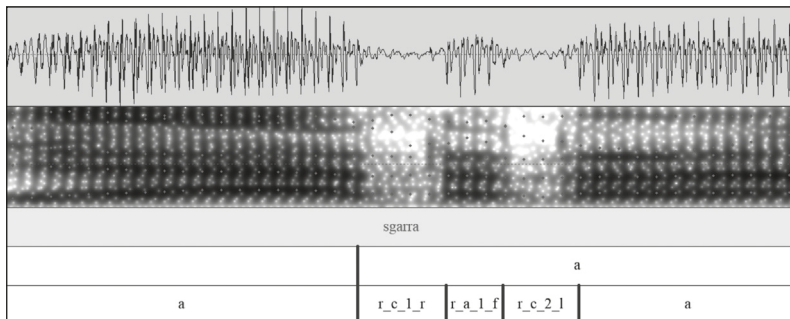


Figure 3. *A multiphasic trill, with two closures and one opening phase, in the word sgarra “he/she messes up”.*

Figure 4 shows approximant realizations. Usually approximants have two phases, a closure and an aperture, but most frequently they show a single-phase gesture which, following the protocol in Celata *et al.* (2016), has been labelled as closure.

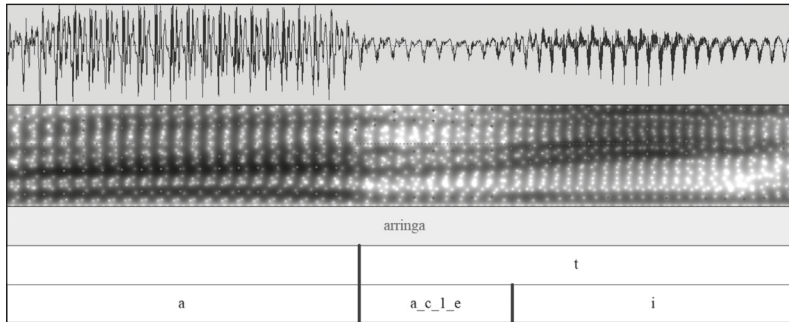


Figure 4. *A geminate rhotic realized as an approximant in the word arringa “he/she addresses”.*

Another possible realization, especially in intervocalic geminated contexts, is the so-called tap and fricative (Figure 5), i.e., a sequence of two closures with the first one realized with a typical tap constriction and the second one with a more fricative constriction resulting in aperiodicity and frication noise. This variant has been firstly identified for Italian and Sicilian rhotics by Celata *et al.* (2016: 8), who argue that the fricative constriction could result from a reduction of the trill and the loss of periodicity of the *svarabhakti* vowel between two constriction phases. Similar realizations are attested, with different labels, also in Spanish (cf. Blecua *et al.*, 2014).

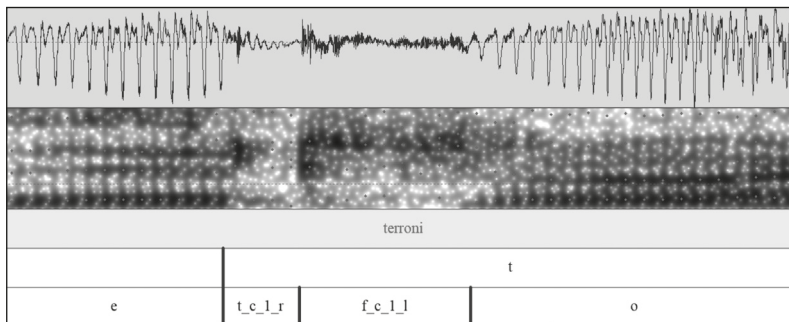


Figure 5. *An intervocalic geminate rhotic in our corpus realized as a sequence of two closures and labelled as tap and fricative.*

In our corpus, 15 instances across 733 total tokens of a tap and fricative realization were found. Our data shows also one instance of a trill which maintained its characteristic three phases but showed a reduction to a frication noise of the remaining phases, thus being labelled as a trill plus fricative

(Figure 6). As stated, this is the only case of a trill plus fricative in our data, but it could be interpreted as part of a continuum between the proper multiphasic trill and the monophasic fricative, which also occurs very rarely in our data (2 cases across 733 tokens).

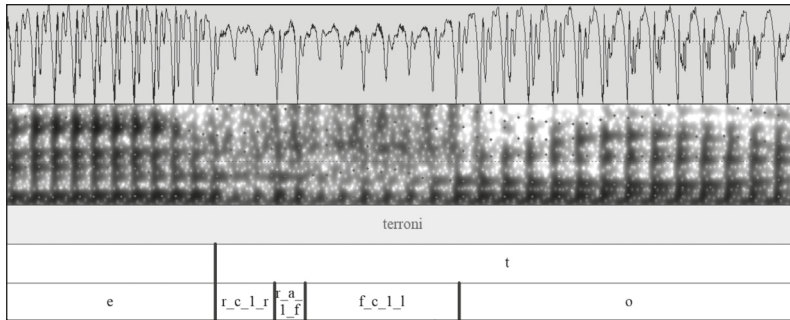


Figure 6. *An intervocalic geminate rhotic in our corpus realized as a sequence of a trill with a fricative release.*

Finally, another phenomenon we highlighted in our data was the presence of a non-prototypical transition. This transition goes from the final phase of the rhotic, i.e. a constriction according to our protocol, to the beginning of the following vowel, as characterized by the stabilization of the first two formants, as shown in Figure 7. Apart from the formants' trajectory, a secondary cue in the identification of this lag between the rhotic and the following vowel was that the vowel was more intense than the preceding segment. In Figure 7 it is possible to identify the lag as composed of two different moments, that can be interpreted as two phases (one constriction and one aperture) which underwent reduction.

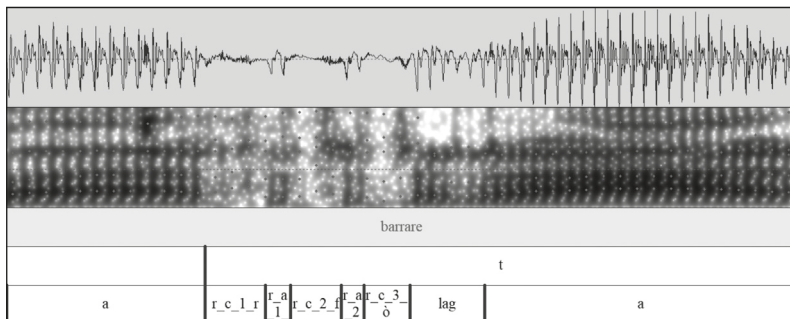


Figure 7. *An interval labelled as 'lag' between the last phase of the rhotic and the beginning of the following vowel.*

This lag appears quite rarely in our data (56 cases out of 733), but it is more frequently associated with trills (41 cases) followed by monophasic taps (12 cases, 10 of which in geminate position). With respect to the phonological context, it is worth noting that the lag appears in 54 cases (out of 56) in geminate position, thus being another possible correlate in the reduction of multiple-phase rhotics, similar to some extent to the fricative realization we mentioned above. Its presence seems to be particularly correlated with two speakers (Sp\_04, Sp\_10), which tend to show it in geminate position in association with trills. For this paper we only report the presence of this lag and we do not consider it for rhotic duration analysis.

### 3. *Analysis*

In this section we present the results of the analysis. First, we offer a qualitative investigation of our corpus and we detail the individual variation shown by each of the ten subjects involved in this experiment. Then, the quantitative analysis will highlight common patterns in the degemination of rhotic consonants in Rome Italian.

#### 3.1. *Qualitative analysis: Distribution of rhotics across speakers and conditions*

In our corpus, rhotics are more frequently realized as taps (55.4% of the cases), followed by trills (31%) and approximants (11.2%); as mentioned before, other realizations are quite rare and they include taps followed by fricative (2%), fricatives (0.3%) and the single instance of a trill followed by a friction noise (0.1%). It could be said that fricative realizations, both as proper fricative and as part of a multiphase rhotic, are not characteristic of our data. All the instances of taps and approximants are single-phase rhotics, as well as the two instances of fricative realizations, whereas trills, taps and fricatives, and trills and fricatives are multi-phase sounds. In the case of a single-phase realization, the phase is a constriction. Multiple-phase rhotics also show multiple constrictions, as expected. We did not find occurrences of multiphase taps with a single constriction, because our taps were all in intervocalic position.

Moreover, multiple-phase with multiple-constriction rhotics are found only in geminated contexts: trills are the most frequent realization (93.4%), followed by the 15 cases of tap and fricative and the single occurrence of a

trill and fricative. Conversely, rhotics with only one constriction could be found in both phonological contexts.

	Singleton	Geminate
Trill+Fricative	-	0.3%
Trill	-	61.2%
Tap+Fricative	-	4%
Tap	80.4%	31%
Fricative	-	0.5%
Approximant	19.6%	3%
Total	100%	100%

Table 2. *The distribution of rhotic types in the two phonological contexts, singleton and geminate* ( $\chi^2(5)=365.143$ ,  $p=.001$ , Cramer's  $V=.706$ ).

From Table 2 it is possible to appreciate how rhotics are differently distributed in the two phonological contexts under investigation, and how gemination is differently realized. Singleton rhotics occur either as taps (80.4%) or as approximants (19.6%), as expected. Distribution of rhotic types in the geminate context offers a more complex picture, with a high degree of variability. Trills are still the most frequent variant (61.2%), but gemination is also conveyed by taps (31%) and approximants (3%). The other variants previously described are attested too, and in particular the tap and fricative variant (15 cases, 4%). A Pearson chi-square, with rhotic type as categorical variable, showed that the phonological context (i.e., singleton vs geminate) was statistically significant ( $\chi^2(5)=365.143$ ,  $p=.001$ , Cramer's  $V=.706$ ).

We also checked the effect of stress and sex. However, these two variables show no significant effect in shaping the variation of rhotic type in both singleton and geminate phonological contexts ( $p>0.05$ ). Finally, we checked the possible role played by the preceding and following vowels in determining the realization of the rhotic in both phonological contexts. For vowel quality, it should be noted that our corpus was not created for the precise purpose of investigating the relationship between vowels and rhotic (de)gemination, thus resulting in slightly unbalanced contexts (e.g., we have an opposition between *ara* and *arra*, but not an equivalent singleton context for *irri*). For this reason, we split the vowel variables into three variants: front vowels (/e/ and /i/), low vowel (/a/) and back vowel (/o/ and /u/) in

order to achieve a major balance in our data. However, the results of the chi-square test are not statistically significant, either for preceding or for following vowels. Thus, there is apparently no role played by vowel quality – at least in relation to the typology of the rhotic.

### 3.1.1. *Interspeaker variability*

As previous studies have pointed out (e.g., Scobbie, 2006; Celata *et al.*, 2019), rhotics show a high degree of variability between speakers, and our data clearly confirms this tendency (Table 3). If taps are the most frequent rhotic variant among all speakers, for some speakers (e.g., speakers 3 and 7) taps are found almost exclusively in both contexts.

Speakers show a continuum of realizations that range from approximant variants to a combination of a tap or a trill with a fricative appendix. Even though, as expected, geminated rhotics are frequently produced as trills, many speakers show a sharp tendency for single-phase variants as the approximant allophone. This is confirmed by data in Table 3, where it is possible to notice the speakers that realized geminated rhotics as approximants or taps. In particular, approximants in geminated position are frequently used by speaker 5 (45.5%) and speaker 6 (27.3%), whereas taps appear in all speakers, but in particular in speaker 7 production (27.8%), speaker 3 (18.3%) and, again, speaker 5 and speaker 1 (14.8% each).

	Approximant		Tap		Trill
	Singleton	Geminate	Singleton	Geminate	Geminate
Sp_1 (F)	12.7%	9.1%	10%	14.8%	9.3%
Sp_2 (F)	7%	-	10.7%	7%	10.1%
Sp_3 (M)	5.6%	-	11.3%	18.3%	7%
Sp_4 (M)	5.6%	-	11%	3.5%	12.8%
Sp_5 (F)	14.1%	45.5%	8.6%	14.8%	4.8%
Sp_6 (M)	18.3%	27.3%	8.2%	3.5%	12.3%
Sp_7 (M)	7%	9.1%	11.3%	27.8%	3.1%
Sp_8 (M)	11.3%	9.1%	9.3%	7.8%	11%
Sp_9 (F)	12.7%	-	9.3%	1.7%	14%
Sp_10 (F)	5.6%	-	10.3%	0.9%	15.4%

Table 3. *The distribution of approximants and taps in singleton and geminate contexts, compared with trills, in the different speakers (speaker's sex is indicated between brackets).*

In Table 4 it is possible to notice how speakers show different habits for conveying gemination. Only two speakers (Sp\_09F and Sp\_10F) seem to show a sharp contrast in intervocalic position, realizing their geminates (near) always as a trill, and their singleton (near) always as a tap. Other speakers instead lie on the opposite end of the continuum. Sp\_01F and Sp\_03M, for example, realize half their geminates as a tap and half as a trill, whereas Sp\_05F and Sp\_07M are even more categorical in choosing taps over trills. Finally, the remaining four speakers show a preference for the geminate trills, albeit showing approximants, taps and tap plus fricative variants. In conclusion, the subjects tend to realize their geminates not only with a trill, indeed showing realizations that include approximants, taps, taps plus fricatives and fricative ones. Moreover, some speakers seem to be more systematic in realizing their geminates with lenited variants; in any case, this confirms that the geminate context is subject to major variability, and that at least some of this variability could be speaker-dependent, as we will further argue in the following quantitative analysis.

### 3.2. *Quantitative analysis: Rhotic duration across speakers and conditions*

As for durational cues, data shows that fricatives are monophasic realizations with a mean duration of 47 ms., whereas taps plus fricatives have a mean duration of 64 ms., with the tap lasting 22 ms. and the fricative 42 ms. As for our corpus, taps are only realized as monophasic, with only one constriction gesture, as expected from the fact of all being in intervocalic position, with a mean value of 22 ms. Approximants are also realized as monophasic, with a mean value of 22 ms. Conversely, trills have a mean duration of 74 ms., with the first closure phase lasting 25 ms.; as for the number of contacts, that is of closure phases, 164 trills out of 227 total tokens are realized with two closures, 57 with three closures, and 6 with 4 closures, thus resulting in 7-phase trills (4 closures and 3 apertures). The mean value of the second closure is 20 ms., whereas the eventual third and fourth closures last 16 and 17 ms., respectively.

Table 5 contains summary data describing the dataset. It appears that there is a difference in the duration of singletons and geminated rhotics, whereas the preceding vowel does not seem to be affected by gemination. Vowels preceding geminates show almost the same duration than when preceding a singleton consonant (but see also Figure 9).

	Geminate						Singleton		
	Trill + Fric.	Trill	Tap + Fric.	Tap	Fricative	Approx.	Tap	Approx.	
Sp_1 (F)	-	53.8%	-	43.6%	-	2.6%	76.9%	23.1%	
Sp_2 (F)	-	65.7%	11.4%	22.9%	-	-	86.5%	13.5%	
Sp_3 (M)	-	43.2%	-	56.8%	-	-	89.5%	10.5%	
Sp_4 (M)	2.8%	80.6%	5.6%	11.1%	-	-	89.2%	10.8%	
Sp_5 (F)	-	30.6%	5.6%	47.2%	2.8%	13.9%	72.2%	27.8%	
Sp_6 (M)	-	80%	-	11.4%	-	8.6%	64.9%	35.1%	
Sp_7 (M)	-	15.9%	9.1%	72.7%	-	2.3%	87.2%	12.8%	
Sp_8 (M)	-	67.6%	5.4%	24.3%	-	2.7%	77.8%	22.2%	
Sp_9 (F)	-	88.9%	2.8%	5.6%	2.8%	-	75.7%	24.3%	
Sp_10 (F)	-	97.2%	-	2.8%	-	-	88.2%	11.8%	

Table 4. *Inter-speaker variability in the realization of geminated and singleton rhotics.*

Syllable type	CV			CCV			Total
	n	mean V dur (s.d.)	mean C dur (s.d.)	n	mean V dur (s.d.)	mean C dur (s.d.)	
Stressed e.g. [to'ri:no] / [to'r:ino]	178	78 ms. (19)	21 ms. (9)	192	77 ms. (23)	59 ms. (29)	-
Unstressed e.g. ['ba:ra] / ['bar:a]	182	117 ms. (39)	21 ms. (9)	179	112 ms. (28)	54 ms. (26)	-
Total	360	-	-	371	-	-	731

Table 5. *Mean vowel duration and mean rhotic duration across phonotactic condition and syllable stress.*



As expected, stressed vowels (i.e., those preceding the unstressed syllable in the table) last longer than unstressed vowels. On the other hand, syllable stress seems to have no effect in determining the duration of the rhotic, both in singleton and in geminate condition. Even if we assume different speech rates between speakers, the geminate-to-singleton ratio confirms the results: for C:CC the ratio is 2.6 (for both stressed and unstressed syllables), whereas for the Vc:Vcc the ratio is 0.95<sup>2</sup>.

Interestingly, if we look at the results in Table 6 and the C:CC ratio for each rhotic type, we will notice that this difference between singleton and geminate rhotics disappears if we consider approximant and tap realizations. Indeed, in these two cases, the C:CC ratio shows that there is no difference in duration in the two contexts.

	Approximant	Fricative	Tap	Tap + Fric.	Trill	Trill + Fric.
Geminate rhotic	26 ms.	47 ms.	24 ms.	64 ms.	74 ms.	100 ms.
Singleton rhotic	21 ms.	-	21 ms.	-	-	-
C:CC ratio	1.2	-	1.1	-	-	-

Table 6. Mean rhotic duration and C:CC ratio for rhotic type.

### 3.2.1. Interspeaker variability

As for qualitative analysis, the observation of individuals' speech habits gives a more detailed picture. When considering duration alone, data in Table 7 shows that some speakers clearly maintain the distinction between singletons and geminates (e.g., Sp\_09F, Sp\_10F), whereas other speakers show a less sharp distinction, as for example Sp\_05F, Sp\_03M, Sp\_07M. Again, preceding vowel duration does not seem to play a role in conveying gemination.

According to this picture, it seems that, at least for some speakers, the difference between geminated and singleton rhotics is obscured if we consider durational cues only. Moreover, when realized as approximants or taps, lexical geminated rhotics show the same duration as their singleton counterpart: this observation could be another clue in showing the variable nature of the rhotic degemination in the speech of Rome speakers.

In the next section, we verify if these results are statistically significant.

<sup>2</sup> Remember that a ratio of 1 means that there is no difference between singleton and geminate consonants (and vowels), whereas a ratio of 2 shows that geminates are longer than singleton ones.

Speaker	Geminated rhotics (s.d.)	Singleton rhotics (s.d.)	C:CC ratio	Vrr (s.d.)	Vr (s.d.)	Vc:Vcc ratio
Sp_01 (F)	50 (28)	21 (9)	2.3	103 (37)	115 (41)	0.9
Sp_02 (F)	64 (22)	22 (6)	2.9	85 (23)	89 (20)	1
Sp_03 (M)	49 (29)	24 (10)	2	81 (26)	84 (36)	1
Sp_04 (M)	82 (26)	28 (9)	2.9	112 (34)	122 (42)	0.9
Sp_05 (F)	38 (25)	20 (13)	1.9	100 (31)	108 (47)	0.9
Sp_06 (M)	59 (18)	22 (7)	2.6	96 (32)	109 (38)	0.9
Sp_07 (M)	34 (27)	20 (7)	1.7	116 (25)	111 (29)	1
Sp_08 (M)	64 (27)	22 (7)	2.9	80 (20)	80 (18)	1
Sp_09 (F)	59 (12)	20 (8)	2.9	77 (19)	78 (17)	1
Sp_10 (F)	69 (18)	15 (5)	4	87 (29)	79 (28)	1.1

Table 7. Mean rhotic and vowel duration in ms. for each speaker in both conditions, with C:CC and V:VV ratio.

### 3.2.2. *Statistical analysis*

For statistical analysis, we used mixed-effects linear regression models in R (version 3.4.3; R Core Team, 2017) and *lme4* package (Bates *et al.*, 2015). The raw dataset consisted of 731 tokens. According to the bibliography reported in § 1.2, for durational measurements we decided to analyse three different independent variables, namely: (i) rhotic duration; (ii) preceding vowel duration; (iii) duration of the first phase of constriction. For each variable we ran linear mixed models (Bates *et al.*, 2015) that included six different fixed variables and their corresponding interactions: (i) speakers' sex (male, female); (ii) gemination (tokens with lexical geminated rhotic, e.g., *barra*, tokens with lexical singleton rhotic, e.g., *bara*); (iii) syllable stress (stressed, unstressed); (iv) and (v) preceding and following vowel quality (front, back, low, see § 3.1); (vi) lexical competitor (the presence, or not, of a minimal pair neighbour, e.g., *bara* vs *barra*). Speakers and words were entered as a random factor. After this preliminary exploration, we discarded 13 tokens with values more than 2.5 SD from the mean, corresponding to 1.7% of the whole dataset. The trimmed dataset comprised 718 tokens.

We decided to find the model that best fitted the data, using the step function of the *lmerTest* package (Kuznetsova *et al.*, 2017); it performs automatic elimination of all non-significant effects by comparing the AIC (Akaike Information Criterion) improvements from dropping each candidate variable, and adding each candidate variable between the upper and lower bound regressor sets supplied by the model, and by dropping or adding the variable that gives the best AIC improvement. Starting from an initial model including all variables, elimination of all non-significant effects proceeds one variable at a time. Elimination of the random part is performed first, followed by elimination of the fixed part. Elimination of the random part is done by using the likelihood ratio test; if a correlation is present between the slope and the intercept, then the simplified model will retain just the intercept.

Linear mixed models were fit by REML (residual maximum likelihood) tests; the p-values for the fixed effects were calculated from F tests based on Satterthwaite's approximation, whereas the p-values for the random effects were based on the likelihood ratio test.

The best-fitting linear mixed model for rhotic duration is reported in Table 8.

	Estimate	Std. Error	t value	Pr(> t )	
Intercept	50.5760	4.1739	12.117	2.91e-08	***
Gemination (Singleton)	-30.7087	2.0963	-14.649	< 2e-16	***
Lexical competitor (Yes)	18.4089	3.2761	5.619	2.11e-07	***
Sex (M)*Syllable stress (Stressed)	5.2317	2.3460	2.230	0.026089	*
Gemination (Singleton)* Lexical competitor (Yes)	-16.1695	4.6184	-3.501	0.000725	***

Table 8. *Results of the best-fitting linear mixed model for rhotic duration (significant effect and interactions only; number of observations: 718, subjects: 10).*

The results show that gemination and the lexical competitor were statistically significant: geminated rhotics were longer than singleton rhotics, and words with a minimal pair neighbour were significantly longer than words without a corresponding minimal pair. We have seen how this durational difference corresponds also to a quality difference among rhotic types (cf. § 3.1).

Sex, syllable stress and vowel quality were not significant: males and females show the same values for rhotic duration, and this is also true for stressed and unstressed syllables, indifferent to the quality of the preceding and following vowel. However, sex and syllable stress were found to interact, with males showing longer durations for rhotics in stressed syllables, in contrast to females that show the opposite picture. The interaction between gemination and a lexical competitor showed that tokens with a minimal pair neighbour maximized the contrast between singleton and geminated rhotics, whereas tokens with no minimal pair neighbour tend to show a less sharp contrast between singleton and geminated ones. Figure 8 shows the plot with the significant main effects and interactions.

Table 9 reports the best-fitting linear mixed model for preceding vowel duration.

For preceding vowel duration, the picture is simpler than for rhotic duration. Only lexical gemination and stress are statistically significant. As shown in Figure 9, vowels preceding a geminated rhotic are shorter than vowels preceding singleton rhotics. This difference is statistically significant, albeit being minimal in terms of ms. duration (cf. also Table 5), so the question remains as to the actual role played by preceding vowel duration in shaping gemination. Moreover, as expected, stressed vowels (those that precede an unstressed syllable containing a rhotic) are longer than unstressed vowels.

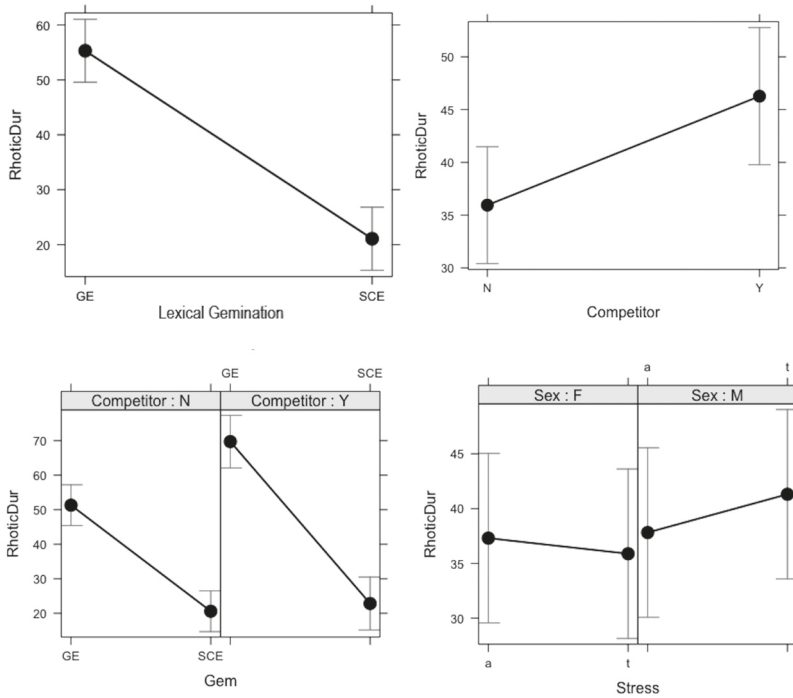


Figure 8. Plot of the main effects and interactions predicted by the model ( $n=718$ ).  
 GE=geminated rhotic, SCE=singleton rhotic, a=unstressed syllable,  
 t=stressed syllable.

	Estimate	Std. Error	t value	Pr(> t )	
Intercept	109.768	5.516	19.899	2.54e-12	***
Gemination (Singleton)	6.182	2.893	2.137	0.0348	*
Syllable Stress (Stressed)	-35.716	2.687	-13.290	< 2e-16	***

Table 9. Results of the best-fitting linear mixed model for preceding vowel duration (significant effects only; number of observations: 718, subjects: 10).

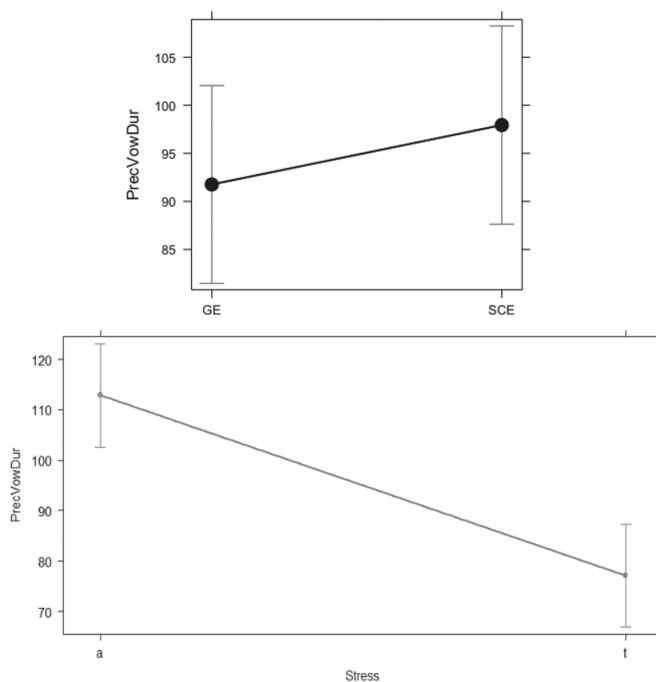


Figure 9. Plot of the main effects predicted by the model ( $n=718$ ).  
*GE=geminated rhotic, SCE=singleton rhotic, a=unstressed syllable,*  
*t=stressed syllable.*

Finally, in Table 10, the best-fitting linear mixed model for duration of the first phase of constriction is shown.

	Estimate	Std. Error	t value	Pr(> t )	
Intercept	25.60930	1.30958	19.555	6.06e-13	***
Gemination (Singleton)	-5.00573	0.92831	-5.392	7.53e-07	***
Syllable stress (Stressed)	-1.28797	0.49218	-2.617	0.01032	*
Gemination (Singleton)* Lexical competitor (Yes)	3.47592	1.17360	2.962	0.00412	**
Gemination (Singleton)* Preceding Vowel Quality (front)	3.76574	1.63675	2.301	0.02458	*

Table 10. Results of the best-fitting linear mixed model for duration of the first phase of constriction (significant effects and interactions only; number of observations: 718, subjects: 10).

Data shows that geminates show longer first constriction phases compared to singletons. The same holds for rhotics in unstressed syllables, which show longer constriction phases than in unstressed syllables. Finally, the interactions of the gemination with a lexical competitor and with the preceding vowel quality were found (see Figure 10).

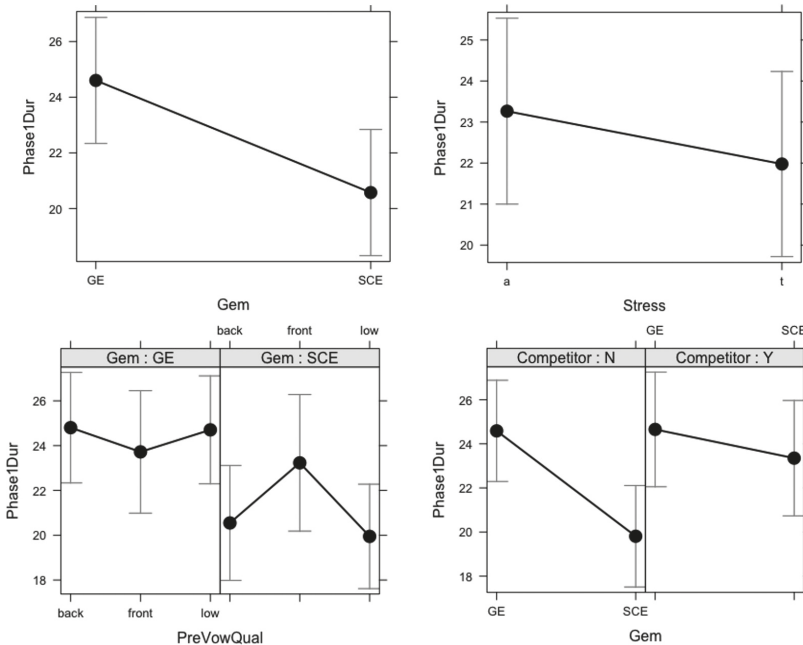


Figure 10. Plot of the main effects predicted by the model (n=718).  
*GE*=geminated rhotic, *SCE*=singleton rhotic, *a*=unstressed syllable,  
*t*=stressed syllable.

As the graphs show, during the first phase of constriction there is not a clear difference in duration that maximises the distance between singleton and geminated rhotics with a lexical competitor; on the contrary, words without a lexical competitor clearly distinguish between singleton and geminate consonants, also during the first phase of constriction. For vowel quality, it is worth noting that there is a difference between front vowels and back and low vowels. Preceding front vowels seem to obstruct the realization of a geminate rhotic differently from other vowel contexts.

## 4. Discussion

### 4.1. Sociolinguistic perspective

One of the goals of this current work was to shed light on the persistence of rhotic degemination in the speech of speakers from Rome. We have offered a multivariate approach in order to describe the extreme degree of variability that characterize rhotic sounds. It appears that rhotic degemination in Rome Italian is, as expected, a variable phenomenon; but also, that some speakers seem to produce it even in a more controlled task. The qualitative analysis, in accordance with quantitative analysis, permits us to notice that for some speakers rhotic degemination is conveyed by the tap variants that show the same duration, both in singleton and in geminate contexts. Moreover, geminated rhotics can be realized as approximants, again with the same duration in both phonological contexts, or as fricatives or some other variants that have been labelled as tap plus fricative. This variant, firstly recognized for Sicilian Italian by Celata *et al.* (2016), and detected for Spanish by Blecua (2016), is present in our data only in the geminated context and in the production of 5 speakers, and in particular, in the productions of speaker 2 and speaker 7 (cf. Table 4). Thus, it appears that the tap and fricative variant is not a peculiar characteristic either of a particular regional Italian (as for the Sicilian Italian), or of an idiosyncratic realization of a single speaker.

The data presented in Table 4, and then confirmed by the quantitative statistical analysis, has shown a great individual variation in the realization of rhotics, especially in the geminated context. This result is in line with all the extensive literature on rhotics produced to date on different languages, from both acoustic and articulatory perspectives (cf., for instance, Celata *et al.*, 2019). Albeit the individual has rarely been considered as a unit of linguistic analysis (Labov, 2014: 18), it appears that sociophonetic analysis of high variable sounds such as rhotics should cast attention on individual variation in order to highlight the emergence of possible phonetic features, different from those already attested in the literature. In our case, it has been noted that the difference between geminated and singleton rhotics is not only produced as a difference of duration of the consonant sound, but rather as a difference in rhotic type, and, possibly, in other secondary phonetic cues that, at the present state of the research, could be postulated rather than having been effectively demonstrated.



Moreover, even if we balanced our speakers by sex, this variable does not seem to play a significant role in shaping rhotic variability. A possible influence of speakers' sex has been noted only in relation to syllable stress (cf. Table 8): in stressed syllables, male speakers show longer durations than in unstressed syllables, whereas female speakers show a completely reversed picture. Based on this result, it seems legitimate to conclude that speakers' sex is not a significant variable in determining the realization of rhotic (de)gemination in Rome Italian. The only difference between males and females could be related, again, to individual variation rather than to a specific pattern of variation. Further research is recommended using a wider population sample in order to confirm the hypothesis.

Finally, as shown in § 1.1, previous scholars considered rhotic degemination in Rome Italian as an overtly stigmatized and low prestigious variant, which is gradually disappearing among newer generations. Conversely, our analysis has shown that this feature is still present in the speech of highly educated young speakers, even in a sentence reading task. The presence of rhotic degemination in our corpus could be related to the methodology that we adopted during the data collection. As stated in § 2.1, sentences have been built with the aim of sounding as similar as possible to spoken Rome Italian, even with the introduction of substandard features, and recordings have been performed by the first author, a native speaker of the same variety. It is possible that this methodology helped minimizing the famous observer's paradox (Labov, 1972), thus leading to the emergence of a characteristic feature, perhaps avoided in more formal research contexts. The possible covert prestige value (Trudgill, 1972) that is associated with rhotic degemination by both Rome speakers and speakers of other regional varieties (cf. § 5), is yet to be investigated. Nevertheless, it does not seem plausible to state that this feature is disappearing in Rome Italian or that its presence is limited to low-class, uneducated and old speakers.

#### 4.2. *Phonetic perspective*

Acoustic analysis has shown that in Rome Italian the most common realization of a trill shows an average duration of 74 ms., with two contacts. Trills with three to seven contacts are also encountered, as already observed for Standard Italian by Ladefoged and Maddieson (1996). Differently from Celata *et al.* (2019), no occurrence of trills in singleton position was found. Our trills seem to be in line with data from Spanish or Catalan (Recasens

and Pallarès, 1999; Recasens and Espinosa, 2007), with trills appearing only in geminated position, with more than two phases, and up to seven. Conversely, intervocalic taps show an average duration of 22 ms., in line with results from Spanish varieties (Quilis, 1993; Blecua, 2001), whereas for other varieties longer taps are found (Bradley and Willis, 2012; Celata *et al.*, 2019). Thus, from an articulatory point of view, our data seems to confirm the short ballistic gesture involved in the realization of a tap that prevents its lengthening (Blecua, 2011, but for different results see Celata *et al.*, 2019). However, even if this picture reflects the complementary distribution of some Romance languages, that contrast short taps with long trills (Colina, 2010; Hualde, 2005; Willis and Bradley, 2008), for some speakers there is a neutralization. Both in singleton and geminate position speakers show tap or approximant variants, with no differences in duration. A similar picture is observed in Judeo-Spanish varieties, where the trill variant is lost in favour of the tap one (Quintana, 2006), or in Tuscan Italian (Celata *et al.*, 2019), where the distinction between taps and trills is blurred. For Rome Italian, we can say that these cases can prove the persistence of rhotic degemination, differently from Marotta (2008). It is worth noting that duration alone is not sufficient *per se* in describing patterns of degemination. If we look at duration alone, we find that geminate rhotics show longer duration than their singleton counterparts. Only a picture that considers duration and qualitative analysis can illustrate the complex patterns of variation.

Results from preceding vowel duration seem to confirm the secondary role of the vowel in signalling gemination cues. Even if statistically significant, the differences between vowels preceding singleton and geminate rhotics are small. Similar results are found in perceptual tests (Bertinetto and Vivalda, 1978), and mixed results were found, for example, by Mairano and De Iacovo (2018) for Northern, Central and Southern Italian speakers. Additionally, this result could be caused by the presence of short duration rhotics even in a geminated context, thus proving again the presence, for some speakers, of rhotic degemination. Moreover, there does not seem to be a relationship between vowel duration and rhotic type. Finally, these results could also point towards a different nature of rhotic gemination as compared to stops or fricatives. Bibliographical references that take into account the role of preceding vowel duration in conveying gemination are based on results coming from consonants, as stops, or fricatives (see, for example, Esposito and Di Benedetto, 1999; Payne, 2005). Additional analysis is needed in order to give a more precise account of the nature of gemination in rhotics.

Previous studies have shown different coordination strategies in the production of long and short consonants, as well as in the kinematics of tongue movement (Löfqvist, 2006; 2017, and, for rhotics, Celata *et al.*, 2019).

The influence of vowel quality in determining the duration of rhotics seems to confirm the particular status of front vowels in reducing the contrast between singletons and geminates. From an articulatory point of view, the realization of a trill after a front high vowel requires an antagonistic gesture, i.e., the lowering and backing of the tongue dorsum after a vowel that requires anterodorsum raising gestures (Recasens and Pallarès, 1999; Solé, 2002; Recasens and Espinosa, 2007; Celata *et al.*, 2016; Celata *et al.*, 2019). In our data the clash of two antagonistic gestures is clearly observed during the first constriction phase of the rhotic. In this case, indeed, we observe a preference for short variants in the geminated context. Remember that in our corpus longer duration is commonly associated with trills, whereas shorter durations are found for taps, approximants and fricatives. Therefore, the presence of a preceding front vowel influences the articulation of the following rhotic, favouring the loss of the trilled variants. The same pattern is found in one of the speakers of Celata *et al.* (2019), which shows only single-constriction variants in the /i/ context. It must be noted that our corpus was not balanced for analysing vowel effects. Future analysis will take into account symmetric contexts, as /ir:i/ vs /ar:a/; moreover, an analysis of formants' transition may reveal patterns of coarticulation.

Results on lexical competitor partially confirm the previous literature. As Dmitrieva *et al.* (2018) have shown, words with a lexical competitor tend to maximise the distance between their singleton counterpart, being hyperarticulated. This is not surprising, given that Italian listeners seem to rely on large consonantal durational difference for detecting the phonemic contrasts between singleton and geminate consonants (Tagliapietra and McQueen, 2010). Data shows that vowel duration does not seem to play a role in enhancing the distance between words with a lexical competitor, differently from consonantal duration. Moreover, it is worth noting that when it comes to gemination, a lexical competitor seems to affect the rhotic. Indeed, results seem to indicate that words with a lexical competitor do not maximise the distance during the first phase on constriction. This could lead us to interpret that the speakers prevent ambiguity by maximising the distance between a lexical competitor through manipulation of the whole consonant duration. It might also be that, given that the sentence-reading task was designed in order to have natural context, speakers do not need to hyperarticulate as in tasks with minimal pair

words embedded in a sentence frame. Additional investigation is needed in order to disentangle the role of lexical competitors in sound change phenomena that undermine lexical recognition and create phonemic overlap, such as rhotic degemination or voicing of the intervocalic voiceless stops (see, for example, Hualde and Nadeau, 2011, specifically on Rome Italian).

Finally, it is worth considering what in § 2.2 was described as the presence of a lag. The presence of weakened phases of constrictions and apertures seems to be in line with the results from Veracruz Mexican Spanish found by Bradley and Willis (2012), where trills seem to preserve traces of their original phases, and interpreted as potential cues to maintain the contrast between singletons and geminates (Bradley and Willis, 2012: 48). In a similar fashion, the presence in our corpus of taps with fricative appendices could lead to the same conclusion. We posit that these gestures are to be interpreted as parts of the duration of the rhotic and a manifestation of weakened trill phases. For example, in Sicilian Italian taps with a fricative appendix show the same constriction location of the first constriction phases of a trill (cf. Celata *et al.*, 2016). The preference for lag and taps plus fricative variants among certain speakers (Sp\_04, Sp\_10) could be interpreted as a strategy to prevent rhotic degemination and to maintain the distinction between singletons and geminates. Further investigations will help in clarifying the nature of the lag and its belonging to the rhotic gesture.

### *5. Conclusions and further perspectives*

In this paper we have addressed the issue of rhotic degemination in Rome Italian by analysing a corpus of 741 tokens from a sentence-reading task specifically devoted to the comparison between singleton and geminate contexts, and with recordings coming from 10 Rome native speakers. Reviewing the research questions on which we based our work, we can positively answer to the first one. Indeed, our analysis has shown that rhotic degemination, although apparently stigmatized, is still present among young and educated speakers, even in a semi-formal task like the one conducted in this study. As for the phonetic cues associated with rhotic degemination in Rome Italian, the qualitative analysis has demonstrated that geminated rhotics could be realized with different variants, including the so-called tap and fricative (Celata *et al.*, 2016) and eventually with a lag (Bradley and Willis, 2012) between the last phase of the rhotic and the beginning of the fol-

lowing vowel. As far as rhotic duration is concerned, the analysis has proved that there is a difference between singleton and geminated rhotics, albeit there is no shortening of the preceding vowel before a geminated rhotic. Moreover, for some speakers, geminated rhotics realized as approximant or a tap show the same durational cues as the singleton ones. Finally, the last research question reaches a negative answer, since stress does not seem to play a role in favouring rhotic degemination.

In conclusion, our study has shown that rhotic degemination remains a characteristic feature of Italian spoken in Rome, and that the acoustic analysis of this phenomenon should take into account not only durational cues, but also how rhotic is realized in terms of variants and number of constrictions. In this respect, further investigation will address this topic also from a perceptive point of view, in order to disentangle the role of rhotic type from duration in determining the perception of a geminated or a singleton rhotic. Furthermore, it will be interesting to add spontaneous or semi-spontaneous speech to the analysis of this phenomenon, as well as to provide more in-depth phonetic investigations of acoustic elements emerging in the production of (de)geminated rhotic (e.g. the lag), in line with current studies on rhotics in other languages.

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