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# Phonetic details of coronal consonants in the Italian spoken by Italian-Australians from two areas of Veneto

The paper investigates the distribution and the phonetic details of a set of coronal obstruents in the speech of Veneto immigrants who arrived in Australia more than 50 years ago in order to understand how they negotiate the languages that form their linguistic repertoire. We focus on their L2-Veneto Regional Italian, with the aim of ascertaining whether it has crystallized at the stage it was at the time they left Italy; whether it shows signs of attrition due to replacement of features from the L1-dialect or from L3-English; or whether it shows signs of koinization due to the contact with other dialects and regional varieties of Italian. Results on coronal obstruent distribution based on narrow phonetic transcriptions and on their acoustic characteristics (spectral moments analysis) show a change in progress in the fricative set and a general maintenance of the stop consonants' phonetic features. Individual differences in language change are discussed in light of both internal (linguistic) and external (sociolinguistic) factors[1].

*Key words*: sociophonetics, Italian, language variation and change, heritage languages, Italian-Australian immigrants, koinization.

## 1. *Introduction*

The present study investigates the maintenance, attrition and/or convergence of language-specific phonetic features in the Regional Italian spoken as a second heritage language[2] by immigrants to Australia from two different dialectal subregions of Veneto centered on the towns of Belluno and Rovigo. The purpose of this research was to investigate how specific phonetic features of Italian may be affected by the native heritage language (i.e. regional dialect) in the context of learning and using a new, third language in the adoptive country (English). This study falls within the

[1] Authorship note: This paper is part of a larger project, designed and conducted in close collaboration by the first five authors. Main responsibility for this paper is divided as follows: § 1: Best, Avesani; § 1.1 Avesani, Di Biase; § 1.2 Avesani; § 1.3: Vayra, Avesani; § 2: Best, Avesani, Vayra; § 3: Galatà; § 4 and 5: Avesani, Galatà, Best, Vayra, Di Biase, Ardolino.

[2] We use the term "heritage language" in its broad connotation to refer to non societal and non majority languages spoken by immigrants and their children (Valdés, 2000; 2005; Montrul, 2013). The speakers we analyse in the present paper are first generation immigrants who arrived in the host country as adults. As they are early sequential bilinguals (local dialect and Regional Italian), we consider both their dialect and their variety of Regional Italian as heritage languages. Consequently, we refer to their L1 dialect as the native heritage language and to their L2 Regional Italian as the second heritage language.

scope of research of contact-induced change in the speech of bilingual (e.g., Major, 1992; De Leeuw, Schmid & Mennen, 2010; Nagy, Kochetov, 2013) and multilingual (Cabrelli Amaro, 2012) speakers.

We will specifically focus on a set of coronal consonants that exhibit interesting differences in the two Veneto's subregions. Coronals are especially useful for examining interlanguage effects in immigrant groups as they show a wide range of variation in fine-grained details across languages and regional accents and, relatedly, tend to undergo phonetic shifts over time and space.

Our phonetic-level findings complement and extend the more frequently investigated macro-structures of lexical, syntactic and morphological interactions among immigrants' languages. This study builds upon and complements our previous examination of the phonetic features of these speakers' first language, Veneto Dialect, produced during the same recording session (Avesani, Galatà, Vayra, Best, Di Biase, Tordini & Tisato, 2015). The findings offer new insights into the effects that long-term and long-distance migration to a country with a different dominant language may have on the speech properties of the heritage languages still used by members of the immigrant community.

We begin by positioning heritage language use by Italian-Australians in its broader historical context. From there we consider how that context has influenced use of Dialect and Italian in the English-dominant adoptive country, thus providing key sociolinguistic characteristics of the situation that could impinge on their speech patterns in their heritage languages decades after relocating to Australia.

### 1.1 Italians in Australia

Italians began to migrate to Australia at the end of nineteenth century, but it was only after World War II that they arrived in large waves to start a new life there[3]. In recognition of an urgent need to "populate or perish", soon after World War II the Australian government began negotiations with Britain and other European countries for assisted migration programs. In 1951 a bilateral agreement for assisted immigration was signed by the Australian government with Italy, that allowed 20,000 immigrants to relocate to the country each year (e.g., Campolo, 2009). By 1961 over 330,000 Italians had settled in Australia, their transport being subsidized by the Australian government (http://john.curtin.edu.au/1940s/populate/; Cavallaro, 2003; Campolo, 2009).

The result was that large Italian communities became established in the principal urban areas of mainland Australia, most rapidly soon after the war but continuing steadily through the late 1970's. This process formed the backbone of today's Italian-Australian community (Cavallaro, 2003)[4].

[3] By 1881 there were 521 Italians in New South Wales, with a sizable Italian community in Sydney of professionals, artists and importers. Among them, a group of 217 migrants from Veneto. (see http://www.migrationheritage.nsw.gov.au/exhibition/journey/pioneers/index.html).

[4] At the last comprehensive census (Australian Bureau of Statistics, 2011), 916,116 members of the population listed Italian ancestry (with at least one of the parents born in Italy), and more than

During that period, Italians left their homeland mainly from southern Italy, but also from two less industrialized regions in the north: Veneto and Friuli. They spread around Australia, usually creating multi-regional communities: people from regions whose local dialects could be mutually unintelligible lived side by side, and started using Italian as their vehicular language to understand each other. However, there was also much "chain" migration[5], in which Italians from a given town or region settled in specific towns in Australia. The latter process created regional nuclei of linguistically homogeneous communities such as, for example, the town of Griffith, in New South Wales, where more than 60% of the population is Italian (or of Italian descent). Among them, more than half originated from Veneto, mostly from Verona (Corazza, Grigoletti & Pellegrini, 2012). In the 1950s, when the Veneti accounted for 75% of Griffith's Italian residents, there was little need for them to learn either English or the dialects from other regions of Italy[6].

Generally, Veneto immigrants, the focus of this paper, originated from small villages with a rural economy with severely limited resources and only rudimentary formal education. The language they learned first and mastered best while in Italy was the local dialect, which served as the exclusive language of their daily communications. Italian, when acquired, was only learned from age 6, when they entered the elementary schools, and was used almost exclusively for formal occasions. From the 1951 census of the Italian National Institute of Statistics (ISTAT), we gather that between the late 1940s and early 1950s 61% of the Italian population spoke mainly dialect and two decades later, in 1974, 51.3% of the population still spoke only dialect (De Mauro, 2014). It is hardly surprising, then, that when those migrants embarked on the ships that brought them to the "other side of the world", only few of them had learned the language of their future land and that the vast majority of them acquired it only by immersion once in Australia[7].

The small group of Veneto immigrants who served as informants for the present study, coming from two different areas of the Veneto region (the North-eastern and the Center areas), left Italy between 1954 and 1961. They reflect the picture we sketched above: they were born in small rural villages, had the local dialect as L1, learned Italian at school as an L2, and did not know any English before arriving in Australia.

180,000 were actually born in Italy. In the Greater Sydney area, the Italian community is the sixth in size, with 4.3% of its residents declaring Italy as their birthplace or land of ancestry.

[5] Observations have shown that the migratory movement, especially to rural areas of Australia, has followed the pattern of a "chain migration", which creates "districts in which emigrants are bound together by shared kinship ties based on a specific village" (Tosi, 1991: 337).

[6] The president of the "Veronesi nel mondo" association acknowledges and reports that, after 25 years of residence in Griffith, she knew only few words of English, while her brother, like most other Italians who settled in Sydney, had to learn English as soon as he arrived (Corazza et al., 2012: 94).

[7] In some cases, classes of English were organized on board, as reported as a personal experience by one of our participants, to provide migrants with at least a basic English vocabulary.

### 1.2 The Italian language in Australia: Multiple regional origins

Apart from cases of homogeneous immigration such as Griffith, where immigrants could keep using only their local dialect for everyday communication, the picture was quite different. The Veneti in Australia usually found themselves immersed in communities where they lived not only with Italians from the same village/region, but also those from different regions, whose native language was the respective local dialect.

According to Tosi (1991), Italian immigrants who settled in urban areas tended to develop personal and social contacts with people from the same region, either within the original kinship network or within the local regional club. In such circumstances, alongside the development of English used for outside-group purposes, first generation Italians are likely to have used the village dialect in the home as well as outside with members of their heritage community. However, for communicating with other Italians from different regions, Italian was the primary language they used.

The different social conditions dictating the use of their heritage languages on the one hand and the acquisition of the official language of their new land on the other changed the dynamics of immigrants' original use of the local dialect versus the national language, and complicated the management of their multilingual repertoire.

The local dialect, spoken as L1 within the entire local community in Italy in both informal and formal circumstances[8], became restricted to use with family and friends who originated from the same geographical areas.

Italian, the national language learned at school as an L2 used near-exclusively for writing and formal contexts, widened its use in the new land to encompass oral exchanges with Italian-Australians from other regions in Italy. When immigrants left the country in the first half of the twentieth century, speakers of dialect in Italy were engaged in a process of group second language acquisition and the process of unilateral convergence[9] from dialects toward Italian had just started. The imperfect learning of Italian favoured the occurrence of dialect features in the varieties of the language spoken in the different regions and gave rise to Regional Italian (henceforth RI), varieties of the national language that carried different phonetic, phonological and morphosyntactic features as a result of substratum interferences[10]. Once in Australia, the linguistic standardization process continued in the new environment, initially at a slower pace compared to those who remained in Italy, and occurred concurrently with learning English (Tosi, 1991: 338). The need to address

[8] As it is still the case in small Veneto villages, dialect is the language of the communication with family, friends and also with the town's public officers.

[9] This process has been termed "advergence" to distinguish it from a bilateral convergence (e.g. Auer, 2005).

[10] "RI is also the outcome of a process of divergence of geographical varieties from the national language; it results from a so-called "dialectization of (varieties of) Italian" (Berruto, 2005: 83). "Far from determining linguistic unification, advergence has caused an increasing differentiation across the national linguistic repertoire" (Cerruti, 2011: 12).

each other and to educate their children in a language that allowed them to share common cultural and emotional experiences across diverse Italian roots favoured the convergence towards shared forms (Gallina, 2011). Since the studies of Rando (e.g., 1973), Bettoni (1981, 1985, 1985b) and Bettoni, Rubino (1996), a great deal of attention has been devoted to the characteristics of such "community language" called Italo-Australian. Its linguistic base is multifaceted (Tosi, 1991), provided by a mixture of Italian dialects, regional varieties of Italian and the so-called *Italiano popolare*[11] (De Mauro, 1972; Cortelazzo, 1972), while its main feature is the importation of English lexical items within an Italian morphological frame.

The third language of their repertoire, Australian English, that was learned in adulthood as an L3 by immersion or, more seldom, at school, varies the most with respect to its role in the speakers' linguistic repertoire. Its acquisition depended on input type, availability and frequency, on the need to use it in daily circumstances, and on the presence and connections with speakers of compatible dialects and regional varieties of Italian.

### 1.3 The Italian language in Italy: Veneto Regional Italian and Veneto dialects

The variety of Italian spoken by Veneto immigrants (and by our informants as well) is Veneto Regional Italian (henceforth VRI). It presents specific phonetic realizations of Standard Italian (SI) consonants, characterized by a pronunciation that Canepari (1984) defines as "morbida" (*soft*). This means that consonants tend to be lenited, with a simpler articulation or shortened duration, or voiceless ones produced as voiced. An illustrative case is the pronunciation of /r/, which in Standard Italian is a trill or single tap, but in Veneto Italian is instead a flap [ɾ] or an approximant [ɹ].

According to Canepari (1984: 102), who offers a general picture of how Italian is spoken in the region, the VRI alveolar fricative /s/ and /z/ are apical and/or have a more retracted place of articulation than in SI; this endows them with a quality he dubbed "scibilante", i.e. they sound perceptually similar to the postalveolar fricatives [ʃ] and [ʒ] (see also Mioni, 2001: 157). The VRI postalveolar affricates [ʧ] and [ʤ], in turn, usually lose the lip protrusion that is present in SI (Canepari, 1984: 99), therefore reducing the length of the front resonating cavity.

The alveolar affricates [ts] and [dz] of SI tend to become fricatives in Veneto Italian due to their absence in the phonology of Veneto dialects. According to Canepari, when produced as affricates they are similar in place of articulation to SI. However, their production as alveolars may not be as homogeneous in the whole Veneto territory as Canepari seems to imply: based on data we are currently collecting in the province of Rovigo, in specific areas close to the Po river (Polesine), [ts] is produced as more advanced with respect to SI and is perceptually similar to the lamino denti-alveolar fricative present in the local dialect spoken in the same

[11] Cortelazzo (1972: 11) defines *Italiano popolare* as the type of Italian imperfectly acquired by a speaker whose L1 is the local dialect.

areas. In addition, in VRI, as in all Northern Italian varieties, dental affricates in word-initial position are produced as voiced and if geminated in word medial position as in SI [ˈpɛtsːo] "pezzo" (*piece*), they are pronounced with a shorter duration (de-geminated).

The specific phonetic properties of VRI coronal obstruents originate in the properties of those consonants in the Veneto dialect. "Veneto", the dialect spoken in the Veneto region and named after it, is better described as a macro-dialect that shows intra-dialect differences among its five subsystems (Mioni, Trumper, 1977; Zamboni, 1974; 1988). Dental affricates are missing in four subsystems and are present only in the phonology of the most innovative dialect spoken in the area of Venice. In those four subsystems dental affricates are replaced by dental fricatives which, interestingly, differ in two of them: in the North-eastern system (trevigiano-feltrino-bellunese), centered on the towns of Belluno, Treviso and Feltre, and in the Central system (padovano-vicentino-polesano) centered on the towns of Padova, Vicenza and Rovigo (NeVen and CVen, respectively; Trumper, 1972; Mioni, Trumper, 1977; Zamboni, 1974; 1988).

In NeVen and CVen, words that in SI present /ts/ exhibit the (inter)dental fricative /θ/. However, in the southern part of the CVen system (province of Rovigo) the fricative that replaced the Old Italian /ts/ has further evolved to a somewhat more anterior lamino denti-alveolar fricative /s̪/, which is also present in the neighbouring dialect of Ferrara (Trumper, 1972; Zamboni, 1974; 1988). In both systems, the voiced counterpart [ð] also exists, that occurs as a lenited allophone of /d/ (Zamboni, 1988; Trumper, 1972)[12] together with a voiced dental approximant [ð̞] (Avesani et al., 2015). In Table 1 we present some examples.

Table 1 - *Correspondence of SI voiceless dental affricate in NeVen and CVen local dialects*

| | *Standard Italian* | *NeVen dialect* | *CVen dialect* |
|---|---|---|---|
| clogs | [ˈtsɔkːoli] | [ˈθɔkoj] | [ˈs̪ɔkoj] |
| halter | [kaˈvetsːa] | [kaˈvɛθa] | [kaˈvɛs̪a] |
| one hundred | [ˈʧento] | [ˈθento] | [ˈs̪ento] |
| nail | [ˈkjɔdo] | [ˈʧɔð̞o] | [ˈʧɔð̞o] |

In both local dialects, as well as in SI and VRI, coronal stops have a dental place of articulation[13].

[12] According to Trumper (1972: 25-27) and Zamboni (1988: 526-28) in dialectal systems that present apocopy (more in NeVen than in CVen) it is also possible to posit a morphophonemic contrast /d~ð/ as in [frˈeða] – [fret] vs [ˈmɛða] – [mɛθ].

[13] The classification of /t, d/ as dental is not fully agreed upon in the Italian phonetic literature. Most publications (9 out of 19 checked) indicate a dental place of articulation (e.g. Bertinetto, Loporcaro, 2005), some (4/19) indicate an alveolar place of articulation (e.g. Schmid, 1999), the remaining indicate both a dental and an alveolar place of articulation depending on speaker and following vocalic context (e.g. Tagliavini, 1963).

Comparing the phonetic properties and the distribution of coronal consonants in SI, local NeVen and CVen dialects and English, similarities and differences emerge. Stops are alveolar in English but dental in SI, VRI and in both NeVen and CVen dialects; moreover, they are aspirated in stressed syllable onset, but always unaspirated in SI and in Veneto dialects. The voiceless interdental fricative /θ/ is shared by English and by the NeVen dialect while SI lacks it and so does the CVen dialect. The voiced interdental fricative [ð] is a phone shared by English and by both local dialects while it does not occur in SI. Neither English nor SI nor the NeVen dialect has the lamino-denti-alveolar fricative [s̪] that is present in the CVen dialect of the Rovigo area. On the other hand, SI has dental affricates /ts, dz/ that do not occur in the two dialects nor in English and tend to be reduced to fricatives in VRI. Fricatives /s, z/ are alveolar in Australian English, but in Italian these are described as dental or (lamino-)alveolar according to several authors (Bertinetto, Loporcaro, 2005: 132; Mioni, 2001: 156). The voicelesss postalveolar fricative [ʃ] and voiced and voiceless postalveolar affricates [ʧ, ʤ] are shared by all systems. Table 2 summarises The crosslinguistic differences relevant for the present paper.

Considering the distribution of the coronals in the VRI productions of our speakers and by analysing their fine acoustic characteristics, we may be able to provide an index of the change in progress of L2-Italian in contact with L1-subregional dialect and/or with L3-English.

Table 2 - *Relevant differences in coronal obstruents*

| *SI* | *English* | *NeVen dialect* | *CVen dialect* |
|---|---|---|---|
| [t̪, d̪, ts, dz] | [t, d, θ, ð] | [t̪, d̪, θ, ð] | [t̪, d̪, s̪, ð] |

## *2. The present study: Italian by immigrants from two Veneto subregions*

In light of the dynamics among the different languages mastered by Italian immigrants to Australia, our interest lies in examining acoustic and phonetic evidence for maintenance, attrition/drift or convergence of specific phonetic features of VRI in relation to Veneto dialect, both spoken as heritage languages, and English. Our informants are immigrants who originated from North-eastern Veneto (Belluno) and from the southern part of Central Veneto (Rovigo).

We consider three possible scenarios for their spoken Italian:

a) *Maintenance.* Due to the reduced amount of Italian usage in Australia, the VRI as spoken by immigrants from the two subregions may have frozen (crystallized) in the linguistic state it was at the time they left Italy. If so, their Italian could be expected to display the same phonetic and phonological characteristics attested in their subregion of Veneto. For example, we can expect that the speakers of both subregions will reduce dental affricates to fricatives and that [ts], if produced at all, will have a more advanced place of articulation in the speech of

CVen speakers, a feature induced by the contact with the lamino denti-alveolar fricative present in the local dialect (see § 1.3; Zamboni, 1974; 1988).

b) *Attrition*. Language attrition can involve not only deletion of structural elements, but also the drift of those elements toward the features of another, more dominant language (more frequently and widely used) with which it is in contact (Schmid, 2011). In Australia, Italian is in contact with both the immigrants' native language, their subregional dialect, and with their third language, English. If drift occurs in their Italian, it could take two possible directions:
   1. given the shortage of exposure to Standard Italian, the immigrants' Italian may drift toward dialect features, giving rise to new dialectized forms. For example, speakers of NeVen regional Italian could produce SI [ˈtsɔk:oli] (*clogs*) as [ˈθɔkoli] drifting toward the local dialectal form [ˈθɔkoj]. This is the process of de-standardisation (Auer, 2005: 25), which reflects increasing tolerance of regional features, and complements the opposing process of dialect-to-standard *convergence* (see point c below);
   2. given the dominance of English in Australia, Italian may drift toward English phonetic features in the direction of English either/both qualitatively (for example, Italian dental voiceless unaspirated stop consonants could become alveolar; or they could become more aspirated in relevant phonotactic contexts) and/or quantitatively (e.g., the voice onset time (VOT) of voiceless stops could become lengthened).

c) *Convergence*. Italian may be used as the shared language for communication between speakers whose dialects are too divergent for full mutual intelligibility. In this case, their different regional varieties of Italian could converge toward a new variety that abandons the most locally-marked forms, i.e., an Australian variety. Koinization is the process by which contact between different varieties of the same language creates a new, convergent variety of that language (Kerswill, 2002): a koiné (Siegel, 2001)[14]. Prototypic koinization involves two distinct processes: first, interactions contain a mixture of features from different language varieties; secondly, those features that are similar enough to be mutually intelligible are levelled, i.e., locally marked features are deleted. The emergent Australian variety of Italian would be an immigrant koiné, a linguistic variety born in a new area where speakers of different varieties have relocated (Siegel, 1985; 2001)[15]. Under this hypothesis, we expect either that a local variety of VRI includes phonetic features that are typical of other local varieties of RI, including other varieties of VRI; and/or that a local variety looses its most locally

[14] A stabilized contact variety that arises from the mixing and subsequent levelling of local features of different varieties of the same language, fostered by increased interaction or integration among the respective speakers (Siegel, 2001: 175).

[15] Siegel (1985, 2001) distinguishes between a *regional koiné*, which develops in the area historically occupied by the original varieties, and an *immigrant koiné*, which is born in a new area where speakers of different varieties have resettled.

marked forms of VRI (for example, CVen speakers could loose their lamino denti-alevolar pronunciation of [ts] and converge toward a dental pronunciation).

To evaluate these three possible paths for variation and change in the speech properties of an immigrant community's heritage language, the current paper examines the phonetic and acoustic properties of coronal obstruents in the Italian of first generation Italian-Australian immigrants from two dialectally differing subregions of Veneto. Specifically, we focus on the phonetic and acoustic properties of coronal obstruents in their spoken Italian ([t, d, ts, dz, s, z, ʃ, ʧ, ʤ]).

## 3. *Materials and methods*

### 3.1 Speakers

The speakers selected for the present study are four first generation Veneto immigrants from the Italian Roots in Australian Soil (IRIAS) corpus that we collected between 2011-2016 (http://irias.filefaustralia.org/; Galatà, Avesani, Best, Di Biase & Vayra, in preparation; Avesani et al., 2015, which was designed to investigate regionally-differing speech features in the dialect, Italian and English of first and second generation Italian-Australians from linguistically diverse regions of Italy. We will compare the properties of their Italian coronals with previous findings on coronals in dialect as spoken by the same four speakers (Avesani et al., 2015). In relation to the three scenarios described above, we will examine whether their coronals in Veneto Regional Italian (VRI) have maintained the fine phonetic features of their places of origin in Veneto which reflect the properties of coronals in their local substrate dialect, have drifted toward English, or have converged with other varieties of Italian through contact with the broader Italian community in Australia.

The speakers are two males and two females born and raised in two different linguistic subregions of the Veneto region: one male (GP) and one female (CZ) from the North-eastern area (NeVen) that includes the provinces and towns of Treviso, Belluno and Feltre; one male (JF) and one female (AM) from the southern part of the Central area (CVen) that includes the provinces and towns of Padua, Vicenza and Rovigo. CZ and GP were born in the NeVen province of Belluno. Both are native speakers of a Bellunese dialectal variety (BL). Speakers AM and JF are from the CVen province of Rovigo and their mother tongue is a Rodigino dialectal variety (RO). All speakers acquired the local dialect as L1, learned Italian as L2 when they entered elementary school in Italy, and learned English as L3 upon their arrival in Australia between 1929 and 1947, as adults or adolescents. None had been exposed to English before arriving in Australia. At the time of recording, their age range was 64-82 (see Table 3).

Table 3 - *Informants' sociolinguistic information: Age rec = age at time of recording; LOR = Length of Residence in Australia; AOA = age of arrival and onset of acquisition of English; RO = Rovigo dialect; BL = Belluno dialect; FI = formal instruction; SI = spontaneous immersion. All ages and time periods are shown in years*

| *ID* | *Gender* | *Age rec.* | *AOA* | *LOR* | *L1 (dialect)* | *L2* | *L3* | *Highest education* | *Occupation* | *Years of education in Italian* |
|---|---|---|---|---|---|---|---|---|---|---|
| AM | F | 64 | 14 | 50 | RO | Italian | English FI | university | judge | 8 |
| JF | M | 81 | 26 | 55 | RO | Italian & Ferrarese dialect | English FI | primary school | storekeeper | 5 |
| CZ | F | 74 | 17 | 57 | BL | Italian | English SI | primary school | housewife | 5 |
| GP | M | 82 | 29 | 53 | BL | Italian | English SI | primary school | tradesman | 5 |

The speakers are comparable for two sociolinguistic parameters (see Table 3): length of residence in Australia (LOR), which exceeds fifty years for all of them (range: 50-57 years); and age of acquisition of Italian as L2, which started at age 6 for all of them, when they entered primary school in Italy. They differ in age (females are younger than males) and age of arrival in Australia, which corresponds as well to their age of acquisition of English (AOA in Table 3). The females arrived in Australia 12 years on average before males during their adolescence, which gives them a longer period of acquisition and practice of English as L3. They also differ in the number of years of education they received in Italy, which gives them 5 years of education in Italian if they attended only primary school or 8 years if they attended also middle school.

### 3.2 Target coronals

The data selected for the present analysis were extracted for each speaker from the IRIAS corpus[16], in which a set of 46 target words were presented to the speaker in a picture naming task. The speakers spontaneously named the object depicted, described the target pictures in Italian and often commented at length. From the speech material collected in such (semi-)spontaneous condition a total of 619 tokens of coronal obstruents were selected. All speech samples were recorded at 96 kHz-24 bit mono in a quiet location at the participants' home or at MARCS

[16] The IRIAS corpus is a multilingual corpus of semi-spontaneous and spontaneous speech. Dialect, Italian and English productions, in that order, are elicited first in spontaneous conversations with an interviewer, then in a picture naming task in which a set of images are presented to the speaker on a computer screen. Objects depicted refer to words that contain a set of target coronal consonants that occur in the three languages. Readers are referred to Avesani et al. (2015) for details on the specific interview protocol adopted within the broader project.

Institute (Western Sydney University), using a MatLab recording tool (*SyncRec* developed by G. Tisato at the Institute of Cognitive Sciences and Technologies of the Italian National Research Council [ISTC-CNR], Padova).

The 46 target words analysed for the present study contain one or more target coronals in specific word positions: word-initially and word-medially, in intervocalic position or following a liquid or a nasal consonant. The amount of collected tokens is different for each speaker and varies from 96 to 191 occurrences[17]: this is an expected outcome of our eliciting procedure.

Our target sounds are the following set of coronal obstruents: [t, d, ts, dz, s, z, ʃ, ʧ, ʤ].

### 3.3 Data preparation and acoustic analysis of coronal fricatives

All target words were segmented and IPA labeled in PRAAT. Four different TextGrid tiers were created for the full Italian recording. These included: a) segmentation and orthographic transcription in Italian at the sentence level; b) segmentation and narrow IPA transcription at the word level; c) segmentation and narrow IPA transcription at the phone level for the target consonants and for the preceding and/or following phonetic context (for affricate consonants we separately segmented and transcribed the closure and frication phases); d) coding of the target consonant for manner of articulation (stop, affricate or fricative) and position within the word (initial or medial). In order to ensure transcription accuracy, the segmentation and the coding done by one of the authors (FA) were checked by a second author (CA). Cases where there was disagreement were discussed to arrive at a consensus.

We limited this investigation to voiceless coronal fricatives, with the aim of identifying their acoustic realization in Italian and comparing them to the corresponding consonants on the same speakers' dialect speech. Therefore we used the same acoustic analysis and articulatory interpretation as in our previous report on voiceless coronal fricatives in their dialect (for full details see Avesani et al., 2015).

The onset of the fricative was defined as the first appearance of aperiodic noise on the waveform (the point at which the number of zero crossings rapidly increased) that was simultaneously accompanied by high-frequency energy on the spectrogram. The offset for voiceless fricatives was defined as the first zero-crossing of the periodic waveform of the following vowel (Jongman, Wayland & Wong, 2000; Li, Edward & Beckman, 2009).

A common way to acoustically analyse fricatives is to consider their power spectrum as a probability distribution, a technique that allows simultaneous capture of both local (spectral peak) and global (average spectral shape) features of a power spectrum (Jongman et al., 2000: 1253). Such an analysis turned out to be sensitive enough to index fine-grained articulatory differences such as those between the

[17] The number of tokens produced by each speaker is: AM = 191; JF = 149; CZ = 183; GP = 96. Of the four speakers, GP was the most parsimonious, and AM the most loquacious, during this task.

interdental versus the lamino-denti-alveolar fricatives described for the dialects of Belluno and Rovigo, respectively (see Avesani et al., 2015).

In a spectral moment analysis four measures are calculated: the spectral center of gravity (spectral mean or centroid frequency), standard deviation (or variance), skewness, and kurtosis[18]. These spectral moments (SMs) are also referred to as M1, M2, M3, M4, respectively (Forrest, Weismer, Milenkovic & Dougall, 1988; Jongman et al., 2000; Harrington, 2010).

The center of gravity (CoG) provides information regarding where, on average, the energy is concentrated, and correlates negatively with the length of the front cavity resonance. Standard deviation (SDev) is a measure of the diffuseness of the spectrum around the CoG. Skewness (Skew) refers to the distribution's asymmetry. A value of zero indicates a symmetrical distribution around the mean, a positive value indicates that the right tail of the distribution extends further than the left tail, and a negative value indicates that the left tail of the distribution extends further than the right. Skewness is the inverse of spectral tilt: positive skewness indicates negative tilt with a concentration of energy in the lower frequencies, while negative skewness indicates positive tilt, a predominance of energy in the higher frequencies. The fourth spectral moment, kurtosis (Kurt), indicates the peakedness of the distribution: a positive value indicates relatively high peakedness (the higher the value, the more peaked the distribution, with just one or a few relatively sharp peaks), while a negative value indicates a relatively flat distribution. Positive kurtosis thus suggests one or a few clear, well-resolved peaks, while negative kurtosis indicates a lack of clearly defined peaks.

Therefore, CoG and Skew may be useful in differentiating fricatives that have a different place of articulation. As CoG negatively correlates with the length of front resonating cavity, it roughly describes where the constriction is relative to the length of the oral cavity (Li et al, 2009: 112). The lower the CoG value is, the more posterior the place of articulation, i.e., the larger the front cavity. Skew also correlates to a place-of-articulation distinction. A positive value indicates a concentration of energy in the lower frequencies, below the mean, suggesting a more posterior place of articulation. SDev and Kurt distinguish a compact and peaky spectral shape, respectively, from a diffuse and flat one. Thus, they help in differentiating fricatives based on their tongue posture, specifically apical vs. laminal tongue tip posture.

In order to compute the four spectral moments we adopted the time-averaging technique proposed by Shadle (2012)[19]. Adapting a PRAAT script by Di Canio (2013)[20], which implements Shadle's suggestion, prior to analysis we down-sampled

[18] Another important acoustic cue to fricative place of articulation is the onset frequency of F2 in the following vowel (Li et al., 2009).

[19] Specifically, each fricative segment is first divided into many shorter intervals; each of these is windowed and a Discrete Fourier Transform (DFT) is computed for each. The obtained DFTs are then averaged. Shadle's assumption is that for fricatives, "the signal properties are stationary during the long interval, and therefore the short windows represent independent samples of the same random process" (Shadle, 2012: 515).

[20] http://www.acsu.buffalo.edu/~cdicanio/scripts/Time_averaging_for_fricatives.praat

all recordings to 48 kHz 16-bit and applied a 300 Hz low pass cut-off filter to remove any F0-related influence. Then CoG, SDev, Skew and Kurt were computed over the central 80% of the fricative segment's duration[21] using 5 DFTs with an analysis window set to 10ms. Duration, RMS intensity (dB), number of zero crossings, frequency and intensity of the spectral peak were also extracted for each target consonant.

## 4. *Results*

In the present section we present and comment the results of our analyses and will proceed as follows. First we will report the results of the distribution of the target consonants in the whole set of the 619 tokens analysed for the four speakers (§ 4.1). Stops are presented in § 4.1.1, affricates in § 4.1.2 and fricatives in § 4.1.3. In § 4.1.1 coronal stops as produced in VRI are compared to coronal stops as produced by the same speakers, and in the same recording session, in the local dialects. The analysis specifically focuses on the voiced coronal stop /d/ as both NeVen and CVen dialects display lenition of /d/ in intervocalic position. Therefore, a direct comparison of the /d/ allophones produced in VRI and in dialect provides a basis for verifying whether or not dialect phonetic details have transferred into any speaker's Italian.

After an interim summary (§ 4.2), in § 4.3 we present the results of the acoustical analysis of a selection of these tokens, focusing on the unvoiced coronal fricatives. In this set we include also the postalveolar affricate [ʧ], of which we will acoustically analyse only the fricative release phase ([ʃ]).

In the acoustical analysis of unvoiced fricatives (§ 4.3), we verify whether a three-way phonetic contrast exists, in VRI, in the coronal region as evidenced by the auditory analysis in § 4.1.3. We check whether lamino-alveolar, apico\retracted-alveolar and post-alveolar fricatives previously identified significantly differ in their spectral moment properties (§ 4.3.1). In § 4.3.2 we compare [s] and the fricative release phase of the post-alveolar affricate [(t)ʃ] in VRI and in the local dialects, as [s] and [(t)ʃ] are consonants shared by all varieties. If the fine phonetic details of the substrate dialectal consonants affect the pronunciation of same consonants in VRI as posited in § 2 in the *Attrition* account (specifically b1: attrition of Italian features, which are replaced by dialect features), then the acoustic features of the shared consonants should be comparable between the speaker's local dialect and their VRI.

### 4.1 Target consonants: Distributional analysis

#### 4.1.1 Coronal stops

The total number of words presenting the voiceless stop /t/ amounts to 117 tokens occurring in 26 words (53 tokens produced by BL speakers, 64 by RO speakers). All were realized as expected, with no deviation from Standard Italian (SI): the coronal stop /t/ was always produced as a dental stop.

[21] In order to limit coarticulatory effects from the preceding and following segments we kept Di Canio's script settings but discarded 10% of the segment duration at its onset and 10% at its offset.

As for the voiced stop, we examined 67 occurrences of /d/, 9 tokens occurring word-initially and 58 occurring in intervocalic position, both within and across words. In all contexts /d/ is always realized as [d], as expected in SI.

In the local dialects, on the contrary, /d/ undergoes lenition in intervocalic context, as reported in the literature (e.g. Zamboni, 1988). To verify whether lenition of /d/ also occurs in the local dialect of our immigrant speakers, we analysed a set of words whose Italian counterparts present /d/ in intervocalic position (e.g., NeVen dialect [peˈð̞ɔʧo], SI [piˈdɔk:jo], *louse;* NeVen [ˈreð̞en], SI [ˈredine], *bridle*), including words from the picture naming task and from spontaneous production. We collected a total of 94 cases occurring within and across words. Globally, the allophones produced amount to 52 tokens of approximant [ð̞], 39 tokens of stop [d], 3 tokens of fricative [ð]. This shows that lenition of /d/ applies also in the dialect as spoken by our immigrant speakers. However, the lenited outputs of /d/ differ quantitatively among speakers. AM, the CVen female speaker, produced only [d], showing no lenition in intervocalic context. On the contrary, the NeVen male speaker, GP, did not produce any stop in intervocalic context, showing a free variation between a fricative [ð] and an approximant [ð̞] allophone skewed toward the approximant output ([ð]: 2/20 cases; [ð̞]: 18/20 cases). The remaining speakers show a free variation of [d] and [ð̞ / ð]: the NeVen female speaker CZ produces [d] and [ð̞] showing a preference for a non lenited allophone ([d]: 24/36; [ð̞]: 12/36); the CVen male speaker JF alternates between [d], [ð̞] and [ð] with a preference for the approximant allophone ([ð̞]: 22/29, [ð̞]: 6/29, [ð]: 2/29).

It is worth noting that while the literature attests a dental fricative as the only outcome of /d/ lenition in Veneto dialects, in our dialect data dental approximants were produced as output of /d/ lenition much more often than dental fricatives.

When speaking Regional Italian, however, none of the speakers produced any instance of [ð] or [ð̞]. The VRI data show no evidence of /d/ lenition and suggest that no transfer from the local dialect to Italian has taken place as far as coronal stops are concerned.

### 4.1.2 Coronal affricates

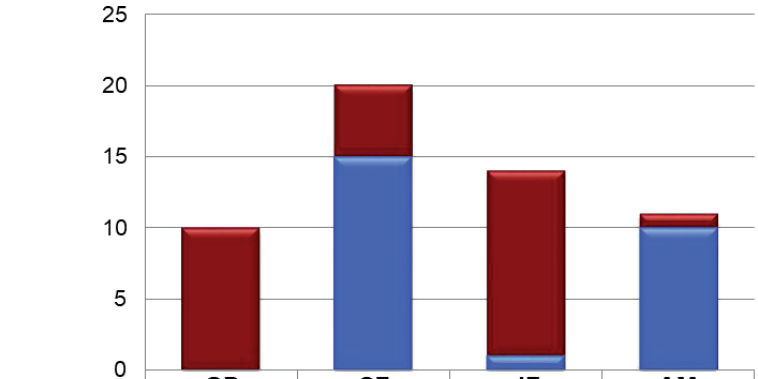
On the other hand, the analysis of how Italian coronal affricates were realized reveal noticeable evidence of transfer from dialect into Italian. The IRIAS corpus includes 7 Italian words with an instance of dental affricates (*zappa, zoccoli, zoppo, cavezza, cazzuola, fazzoletto, pezza*) and 11 words with one or two instances of post-alevolar affricates (*cenere, cento, cesta, ciliegia, cimice, cimitero, cipolla, damigiana, laccio, riccio, salice*). In word-initial position, as we have seen in § 1.3 dental affricates are produced as voiced (<*z*> in, e.g., *zappa (hoe), zoccoli (throwels*) despite the fact that the corresponding words in dialect show an unvoiced fricative in the same position. In the remaining words of the set, where the dental affricates appear in intervocalic position as geminates (<*zz*> as in *cavezza, pezza*), affricates are unvoiced in Veneto Regional Italian as in Standard Italian and are de-geminated[22]. In the word set of post-alveolar affricates, af-

[22] Northern Italian dialects lack consonant gemination. In RI as spoken in the northern regions of Italy either consonant gemination is absent or, if geminated consonants are produced, they are shorter

fricates that are orthographically represented as <*ce, ci*> are always unvoiced (e.g. [ʧ]) in all word positions, while those spelled with <*gi*> are produced as voiced [ʤ], which occurs in our Italian recordings of these speakers only in the words *ciliegia* and *damigiana*. Speakers spontaneously produced other instances of affricates in words not included in the list of target words. We obtained a total of 169 tokens: 52 with dental affricates and 117 with post-alveolar affricates (regardless of voicing status).

The dental affricates showed a strong tendency toward de-affrication and this was notably more frequent in the males than the females. Out of 55 expected cases of f dental affricates (29 voiced and 26 unvoiced) only 47% of them were realized as affricates (26/55), while the remaining 53% (29/52) were realized as fricatives. If we pool the number of affricates by the dialectal origin of the speakers, we obtain a balanced distribution: the two NeVen speakers were expected to produce 30 tokens of dental affricates and realized as such only 15 cases (50%); the two CVen speakers produced only 11 of the expected 25 cases as affricates (44%). However, pooling the data by gender, the picture reveals a highly unbalanced distribution: females were expected to produce 31 tokens of dental affricates and realized them as such 80,5% of the time (25/31) whereas only one affricate was produced by the males (4% of expected cases, e.g. 1/24). Examining the distribution by gender and by dialectal origin of the speakers (Figure 2), the NeVen male speaker GP never uttered any dental affricates, while the CVen male speaker JF uttered one. By comparison, the NeVen female produced a dental affricate in 15 of 20 expected cases (75%), while the CVen female speaker produced them in 10 of 11 expected cases (91%). Figure 1 summarizes such results.

Figure 1 - *Realization of expected affricates by speakers. Belluno speakers: GP (male) and CZ (female); Rovigo speakers: JF (male) and AM (female)*




| | GP | CZ | JF | AM |
|---|---|---|---|---|
| fricatives | 10 | 5 | 13 | 1 |
| affricates | 0 | 15 | 1 | 10 |

in duration with respect to the same consonants in SI, therefore reducing the phonetic difference between singletons and geminates. As de-gemination is a common feature in all northern Italian dialects and varieties of RI we do not take it as a specific case of transfer from Veneto dialect to Italian. We note however that this feature has been maintained also in the heritage VRI of our speakers.

Of the 29 cases of fricative output for expected dental affricates, all voiceless targets were produced as voiceless fricatives (12 cases). Voiced dental affricate targets produced as fricatives (17 cases) had voiced realizations except for one, which had a voiceless realization. It is interesting to note that the resulting voiced fricatives kept the same place of articulation as the fricated portion of the corresponding affricate, i.e., were realized as alveolar [z], while the voiceless fricative differed in place of articulation from the fricative portion of the dental affricate for two speakers. The male CVen speaker produced only two words that in Italian contain a voiceless dental affricate: one was produced as a dental affricate, the other was realized as a de-affricated lamino-denti-alveolar [s̪], which is the realization of the corresponding fricative of his dialect. However, the same fricative [s̪] also appears in all cases of de-affrication (6) by the NeVen female, whose dialect does not include such a lamino-denti-alveolar [s̪], providing further evidence of variability in the pronunciation of /s/ that may be attributed to a possible mixture of phonetic features from other Veneto linguistic varieties.

The post-alveolar affricates displayed much less de-affrication than did the dental affricates, and did so only for NeVen speakers. Out of 117 expected voiced and unvoiced affricates, 107 were indeed produced as such. Only 10 were realized as fricatives, maintaining the expected voicing (4 voiceless, 6 voiced post-alveolar fricatives). These fricatives were all produced by the NeVen speakers, more by the male (7/10, 4 voiceless, 3 voiced) than by the female (3/10, all voiced). Neither of the CVen speakers de-affricated any post-alveolar affricates.

### 4.1.3 Coronal fricatives

Our informants produced 183 cases of fricatives. In this set, the realizations that characterize the dialects of the NeVen and the CVen systems – respectively, the interdental [θ] and the lamino-denti-alveolar fricative [s̪] – are very few (9/183). The only token of [θ] in VRI was produced by the male of NeVen (GP), and it occurred in [kaˈθola], the word that GP used when speaking dialect. It is possible that he switched to dialect because he did not know the corresponding word in Italian ([kaˈts:wɔla], *trowel*): indeed, this is the speaker who acknowledged having scant practice of Italian. Similarly, the male of the CVen (JF) produced in VRI one token of the lamino denti-alveolar [s̪] that occurs in his dialect: his rendition of the SI word [kaˈvets:a] (*halter*) is [kaˈves̪a].

The remaining 7 cases of the lamino denti-alveolar fricative typical of CVen are unexpectedly produced by the female NeVen speaker (CZ) in words such as [ˈpɛs̪o] (*piece*), [fas̪oˈleto] (*handkerchief)*, [puˈpas̪o] (*puppet*), [ˈs̪apa] (*hoe)*, in which the fricative [s̪] substitutes the expected SI affricate [ts] in the first three words and the expected [dz] in the last one. Such a substitution is unexpected because that fricative does not occur in the phonological system of her BL dialect, and, as expected, she never used it uttering the corresponding words in dialect. In such words she used the interdental [θ] and the alveolar [s] instead: [ˈpɛθa], [faθoˈlet], [ˈsapa] (see Avesani et al., 2015).

The previous findings show evidence of a weak transfer of specific fricatives of the local dialect to the Italian spoken by the male Veneto speakers, and also show an interesting transfer of broader (not strictly local) dialectal features in the Italian speech of the female Central Veneto speaker CZ. Her use of fricatives that occur in the dialect of another Veneto subsystem (the North-Eastern one) show a mixing of features possibly induced by contact with other Veneto linguistic varieties.

Excluding the preceding 9 cases, of the remaining 174 cases, 28 are occurrences of voiced [z], 146 are voiceless alveolars. The narrow phonetic transcription of the voiceless fricative data reveals that 66% of total occurrences of VRI /s/ (96/146) are lamino-alveolar [s] as in Standard Italian, while in the remaining 33% of the cases (48/146) are apico-alvevolar with, possibly, a more back place of articulation (but not as far back as a post-alveolar [ʃ]). We chose to transcribe this variant as [s̻], using the IPA symbol for the alveolar fricative and the diacritic that indicates retraction. This type of fricative is not used as a substitute of SI /ts/ in words that have been de-affricated, but it alternates with [s] in words that in SI present /s/. [s̻] is produced by both NeVen speakers and by the male CVen speaker, while the female CVen speaker (AM, who professes to use dialect very little and Italian more often) uses only the SI allophone [s].

A set of Pearson $\chi^2$ tests were conducted on the alveolar fricatives produced by 3 speakers (CZ, GP and JF, 108 tokens in total: [s] = 60, [s̻] = 48) in order to verify whether the choice of one over the other allophone depends on any of the following factors: position in the word (initial vs. non-initial[23]); stress of the syllable in which the fricative occurs (stressed vs unstressed); the following phonetic context (V vs C); the type of following vowel (front, central, back).

These three speakers produced comparable numbers of coronal fricatives (NeVen: CZ = 38, GP = 35; CVen: JF = 35), and the distribution of plain [s] versus retracted [s̻] did not differ significantly among them ($\chi^2 = 2.438$; $p = 0.295$; number of tokens: CZ: [s] = 18, [s̻] = 20; GP: [s] = 21, [s̻] = 14; JF: [s] = 21, [s̻] = 14). The stress status of the syllable in which the fricatives occur had a non-significant effect on incidence of [s̻] ($\chi^2 = 0.337$; $p = 0.561$), while their incidences are significantly affected by position in the word as well as by the following phonetic context. Occurrence of [s̻] was significantly higher in word-initial position than elsewhere ($\chi^2 = 3.95$; $p = 0.047$). There is also a higher probability that [s̻] precedes a vowel than a consonant ($\chi^2 = 7.896$; $p = 0.005$), but does not differ by the type of following vowel ($\chi^2 = 1.483$; $p = 0.480$).

### 4.1.4 Interim summary

The data presented so far show clear evidence of transfer from dialect to Italian for dental affricates. As this features is attested in VRI as spoken in Italy (Canepari, 1984), the data indicate that such feature of VRI is maintained in three out of four speakers. The data also show that de-affrication is not evenly distributed among the

[23] As only one case of [s̻] in word-final position is attested in our data, we did not take into consideration a "null" following phonetic context as a relevant level in the $\chi^2$ tests.

speakers: males de-affricate more than females, independently from their language variety. Moreover, our analysis has shown that de-affrication applies also to post-alveolar affricates, though to a much lesser extent. As Canepari does not mention it and we do not have speech data yet of monolingual speakers currently living in the same areas in Veneto to compare with our heritage speakers, we cannot tell whether de-affrication of post-alveolar affricates is an innovative feature of heritage VRI induced by the contact with other varieties of RI or whether it is applied by our speakers to all affricates by analogy to de-affrication of dentals.

As for fricatives, three speakers (GP, CZ, JF) use two allophones of /s/: a "plain" SI lamino-alveolar [s] and an apical/retracted variant [s̺]. As Canepari (1984) claims that in VRI alveolar fricatives are apical or retracted, the additional presence of a lamino-alveolar [s] in their speech may indicate a step toward standardization of their Regional Italian. However, one speaker (CZ) also shows evidence of koinization, as the presence in her VRI of a coronal fricative typical of the local dialect of another Veneto sub-system indicates a mixing of phonetic features of different language varieties and may prelude to a subsequent levelling of the most marked forms (Siegel, 2001).

### 4.2 Acoustics of the Veneto speakers' Italian fricatives

#### 4.2.1 Veneto Regional Italian

In the distributional analyses of VRI coronal fricatives presented above, we found that speakers varied in their productions; specifically, three of the four speakers alternated between a standard alveolar [s] and an alveolar with a relatively more posterior articulation that we labeled [s̺] (retracted). Excluding the female CVen speaker who only produced plain alveolar fricatives, we conducted $\chi^2$ tests on the other three speakers, who did not differ in distribution of [s] and [s̺], and produced [s̺] significantly more often in word-initial and pre-vocalic than pre-consonantal positions.

Three of our four speakers alternated between plain and retracted alveolars, suggesting the presence of three phonetic categories in the coronal region for fricatives: lamino-alveolar, apico-/retracted alveolar and post-alveolar. This three-way partition of coronal fricative place of articulation differs from that displayed by both of the local dialects of the same speakers: the NeVen dialect has interdental, lamino-alveolar and postalveolar fricatives, while CVen dialect has lamino-denti-alveolar fricatives where NeVen has interdental ones.

In order to determine how the three fricatives differ acoustically in the speakers' VRI productions, we ran separate one-way Repeated Measure ANOVAs on each speaker for each of the four spectral moments measures with Type of Fricative ([s] vs. [s̺] vs. [(t)ʃ], i.e., the fricative portion of the affricate) as the independent factor. Details of these analyses are presented in Table 4, and mean spectral moment values in Table 5. For CVen speaker AM, who never uttered a retracted [s̺], the independent factor had only two levels: ([s] vs. [(t)ʃ]). Her [s] differed significantly from [(t)ʃ] on all spectral moments. A lower mean value of CoG and a higher value of Skew

(see Table 5) indicate a longer front resonating cavity and suggest a more posterior place of articulation of her post-alveolar fricative; while a lower value of SDev indicates a less diffuse spectrum and suggests a non-laminal tongue posture for [(t)ʃ], relative to her alveolar [s].

The other three speakers all displayed a three-way contrast ([s] vs. [s̲] vs. [(t)ʃ]). For the CVen male speaker JF and the NeVen female speaker CZ, none of the spectral moments distinguished significantly among the three fricatives. Only the NeVen male speaker GP displayed differences among the three places of articulation, which were significant for three spectral moments and nearly significant for the fourth (Kurt). Tukey-Kramer HSD post-hoc tests on GP's data revealed that [s̲] failed to differ significantly from the fricative release of [tʃ] for any spectral moments, but that [s] differed significantly from both of the other fricatives on all spectral moments.

Table 4 - *F-values for one-way repeated measures ANOVA results for each speaker on each spectral moment of the target fricatives*

| *Contrast* | *Language variety* | *Speaker* | *CoG* | *SDev* | *Skew* | *Kurt* |
|---|---|---|---|---|---|---|
| [s],[(t)ʃ] | RO | AM | F(1, 36) = 47.441 p < 0.0001 | F(1, 36) = 30.534 p < 0.0001 | F(1, 36) = 39.309 p < 0.0001 | F(1, 36) = 29.747 p < 0.0001 |
| [s], [s̲], [(t)ʃ] | RO | JF | n.s | n.s. | n.s. | n.s. |
| | BL | CZ | n.s. | n.s | n.s | n.s. |
| | BL | GP | F(2, 33) = 9.82 p < 0.0005 | F(2, 33) = 5.444 p = 0.0037 | F(2, 33) = 3.988 p = 0.0281 | F(2, 33) = 3.048 p = 0.061 |

Table 5 - *Mean values of the spectral moments for each fricative by speaker*

| *Language variety* | *Speaker* | *fricative* | *CoG* | *SDev* | *Skew* | *Kurt* |
|---|---|---|---|---|---|---|
| RO | AM | [s] | 4800.59 | 2273.78 | 1.16 | 3.33 |
| | | -- | -- | -- | -- | -- |
| | | [ʃ] | 3363.91 | 1542.28 | 2.59 | 4.12 |
| RO | JF | [s] | 4709.81 | 1803.04 | 2.23 | 10.08 |
| | | [s̲] | 4763.27 | 1576.48 | 2.42 | 14.17 |
| | | [(t)ʃ] | 4689.25 | 1640.00 | 1.77 | 8.24 |
| BL | CZ | [s] | 4167.49 | 1732.91 | 1.52 | 9.29 |
| | | [s̲] | 4110.88 | 1658.73 | 1.83 | 11.31 |
| | | [(t)ʃ] | 4167.49 | 1799.82 | 1.50 | 8.55 |
| BL | GP | [s] | 3849.00 | 1384.16 | 2.36 | 16.84 |
| | | [s̲] | 3205.88 | 1044.45 | 4.10 | 38.31 |
| | | [(t)ʃ] | 3413.42 | 1053.20 | 4.32 | 41.74 |

### 4.2.2 Italian and dialect fricatives compared

The [s] and [(t)ʃ] consonants are shared by Italian and by the local dialects of our speakers. The coronal fricatives that uniquely characterize the phonology of the NeVen and CVen dialects, i.e., the interdental [θ] and the lamino-denti-alveolar [s̪] respectively, are both absent from Italian. If the fine phonetic details of the substrate dialectal consonants percolate into VRI and affect the pronunciation of the shared consonants, as posited in the *Attrition* account (specifically b1: attrition of Italian features, which are replaced by dialect features) presented in our *Introduction,* then the acoustic features of the shared consonants should be comparable between the speaker's local dialect and their VRI.

To evaluate that hypothesis, we compared the spectral moments analysis of [s] and [(t)ʃ] in dialect reported in Avesani et al. (2015) to the corresponding analysis of the same consonants in Italian. Table 6 shows the articulatory interpretation of the results: if the consonants are not significantly different for a given SM, the phonetic symbols for the dialect and Italian fricatives are shown in curly brackets {x, y}; if they are significantly different, "x ⇒ y" indicates a significantly more advanced place of articulation in x than y, and "x > y" a significantly higher degree of laminality in x than y. Red bolded fonts indicate a change from dialect to Italian in the difference between the two consonants.

The comparison reveals that when speaking Italian the female speakers maintained the same features as in their local dialect: the NeVen speaker CZ did not distinguish [s] and [(t)ʃ] on any SM either in dialect or in VRI; the CVen speaker AM distinguished them in both languages on all SMs, producing a [ʃ] that was more retracted, i.e., articulated farther back in the vocal tract, and with a less laminal tongue shape. In contrast, the male speakers displayed different features in their fricatives when they speak dialect versus VRI, but in opposite directions. In Italian (VRI), the NeVen speaker GP produced a significantly more retracted and less laminal fricative in the post-alveolar affricate [(t)ʃ] than in [s], while in dialect he did not differentiate them on any SM. Conversely, the CVen speaker JF did differentiate these fricatives on all SMs in dialect, but produced both so variably in Italian that they showed no significant difference on any SM.

Table 6 - *Articulatory interpretation of spectral moments for each speaker. CoG ⇒: more advanced place; SDev >: more laminal; Skew ⇒: more advanced place; Kurt >: more laminal. Symbols within brackets show no significant difference. Red bolded fonts indicate a change from dialect to Italian in the difference between the two consonants*

| | *Dialect* | | | | *Regional Italian* | | | |
|---|---|---|---|---|---|---|---|---|
| Lang. variety | BL | | RO | | BL | | RO | |
| Speaker | CZ | GP | AM | JF | CZ | GP | AM | JF |
| CoG | {[s],[ʃ]} | {[s], [ʃ]} | [s] ⇒ [ʃ] | [s] ⇒ [ʃ] | {[s],[ʃ]} | [s] ⇒ [ʃ] | [s] ⇒ [ʃ] | {[s],[ʃ]} |
| SDev | {[s], [ʃ]} | [s] > [ʃ] | [s] >[ʃ] | [s] > [ʃ] | {[s],[ʃ]} | [s] >[ʃ] | [s] >[ʃ] | {[s],[ʃ]} |
| Skew | {[s], [ʃ]} | {[s], [ʃ]} | [s] ⇒ [ʃ] | [s] ⇒ [ʃ] | {[s],[ʃ]} | [s] ⇒ [ʃ] | [s] ⇒ [ʃ] | {[s],[ʃ]} |
| Kurt | {[s], [ʃ]} | {[s], [ʃ]} | [s] > [ʃ] | [s]> [ʃ] | {[s],[ʃ]} | [s]>[ʃ] | [s] > [ʃ] | {[s],[ʃ]} |

## 5. *Discussion and conclusions*

The data for these four speakers add to the socio-phonetic picture of a component of the Italian-Australian community who arrived in Australia more than 50 years ago, and provide new insights into how they have negotiated the languages that form their linguistic repertoire. In a previous study that focused on Veneto dialect of these speakers' native language (L1) (Avesani et al., 2015), it was observed that they had maintained the phonetic features that uniquely characterise their respective local dialects. Only one speaker, the female speaker AM from CVen, showed traces of initial attrition in the dialect-specific acoustic properties of the fricatives of her dialect. The authors interpreted this drift in her speech, which suggests a merger of the dialect's lamino-denti-alveolar into the alveolar fricative, as a result of her extensive contact with English rather than as an effect of contact with of Italian.

In the present study, we focused on the Veneto Regional Italian of the same four speakers, with the aim of ascertaining: 1) whether their VRI has crystallized at the stage it was at the time they left Italy; 2) whether it shows signs of attrition and, if so, whether it is due to replacement of features from the L1-dialect or from L3-English; or 3) whether their VRI shows signs of koinization due to the contact with other dialects and regional varieties of Italian.

The results on production of Italian coronal stops by these speakers indicate that at a phonetic level VRI has not drifted towards English for any of them, as their stop consonants have maintained the Italian dental place of articulation and have not shifted it back to become alveolars as in English. Nor has their VRI drifted toward dialect in any systematic way as none of the speakers lenited the Italian voiced dental stops in intervocalic position, even if some of them rarely used few fricatives of their local dialect.

The coronal affricates of their VRI, however, showed a strong tendency toward de-affrication as it has been attested in Veneto Italian (Canepari, 1984). As expected, de-affrication applies more to dental than to post-alveolar affricates in Italian, consistent with the fact that the former but not the latter affricates are missing in the phonemic inventory of both of the NeVen and CVen dialects. If de-affrication is the product of the long history of contact between local dialects and Italian in Italy, its presence in the VRI of our migrant speakers is compatible with the conservation of their regional Italian.

However, the amount of de-affricated consonants varies remarkably across the speakers. The difference cannot be attributed to their linguistic origin, as for a given Veneto regional variety (North-eastern and Central) males behave differently from females. Nor can it be easily attributed to a difference in their use of Italian, as the sociolinguistic questionnaires and the spontaneous interviews do not suggest a direct correlation between use and/or subjective proficiency of Italian and amount of de-affrication: for example, the Central Veneto female speaker who de-affricated only once (AM) is the one who admits using Italian only if compelled and only with interlocutors who do not speak English, while the male speaker (JF) of the same lin-

guistic variety who, conversely, produced only one affricate, declares to speak Italian with many of his friends and to have a good mastery of it.

The variability reveals a strong gender effect: males speakers never (GP) or only once (JF) produced dental affricates and substituted them with coronal fricatives, while females produced affricates as such in 91% (AM) and in 75% of cases (CZ). Such a strong difference can be explained by Labov's (2001) second principle of linguistic variation, that states that women show a lower rate of stigmatized variants than men. De-affrication is among the few variants which are socially stigmatized in Veneto (Canepari, 1984: 101) and AM and CZ, who show a strong preference for using the standard form [ts], confirm that Labov's principle is at work also in the VRI of our heritage speakers. The two female speakers differ in their rates of de-affrication. Such variability could be traced back to the level of education in Italian they received while in Italy: AM, who almost always (91%) chose the prestige variant [ts], attended in Italy both primary and middle schools, while CZ, who chose it less often (75%), attended only primary school. It is possible that AM may have developed more metalinguistic awareness of variation in Italian than CZ.

As for their VRI fricatives, none of the speakers showed a drift toward their local dialect, as the interdental fricative of NeVen [θ] and the lamino-denti-alveolar [s̪] of CVen, amount to very few cases and appear in dialectal words used in place of the Italian ones. However, all speakers except the CVen female showed an alternation between a voiceless lamino-alveolar fricative [s] and a voiceless fricative [s̪] that sounds more retracted (but not as posterior as a postalveolar [ʃ]) and less laminal[24]. Statistical analyses showed that the retracted allophone occurred more often word-initially and pre-vocalically than non-initially and pre-consonantally. As Canepari (1984) suggested that alveolar fricatives in Veneto are apical and have a more retracted place of articulation than in Standard Italian, this result could indicate that three of our speakers maintain their VRI. Our data, though, show alternation with an alveolar that, as far as we know, has not been reported in the literature. If we assume that in Veneto all voiceless alveolar fricatives are retracted, the presence of a non-retracted alveolar allophone in alternation with a retracted one could be seen as the first step in a koinization process due to the contact with other varieties of Italian, a stage in which allophones of other varieties enter the system before a levelling can occur. However, as more specific data on fine phonetic features of alveolar fricatives in Veneto are still lacking, we cannot exclude the possibility that Veneto speakers in Veneto also alternate between the two allophones; in such a case, the alternation could be evidence of an ongoing process of dialect-to-Italian convergence that started in Italy and was maintained or even continued while in Australia.

More revealing hints of the dynamics of contact among the three languages mastered by these speakers come from the acoustic analysis of the fricatives and the fricative release of the affricate [tʃ]. The NeVen speakers CZ and GP and the male CVen speaker JF produced three phonetic categories in the coronal region: [s, s̪, (t)

[24] The alternation occurs in the set of words that in Standard Italian present a fricative. It does not apply to the fricative outcome of de-affrication.

ʃ]. But for two of them (NeVen, female CZ; CVen, male JF) the three categories are acoustically similar, as none of the Spectral Moments (SMs) significantly distinguished them due to the high acoustic variability of the exemplars within each category. Only for the male NeVen speaker GP were they acoustically different for any SM, but even here he only distinguishes [s] from [(t)ʃ] and [s̲], and does not distinguish the latter two from each other. For the fourth speaker (CVen, female AM), acoustic values indicate that [s] is significantly more anterior and more laminal than [(t)ʃ].

A comparison of alveolar and post-alveolar fricatives as produced by the speakers in their local dialect and in VRI revealed interesting variations not related to their linguistic origin. In speaking VRI, both females maintained the differentiation (AM) or the lack of it (CZ) between alveolars and postalveolars they showed when speaking dialect. Conversely, the male speakers did change their pronunciations of these fricatives between dialect and VRI: when speaking dialect, the NeVen speaker GP did not distinguish [s] from [(t)ʃ] by Center of Gravity, Skewness and Kurtosis, while in VRI he did distinguish them on all SMs; the CVen speaker JF who, on the contrary, did distinguish them in dialect for all SMs, failed to distinguish them when speaking VRI. Two different processes seem to be at work for the two males. For JF, a complete loss of acoustic differentiation between the fricatives that were clearly differentiated in the local dialect may indicate an ongoing process of convergence of his VRI toward the new variety of Italo-Australian. His Italian is in the initial stage of "mixing" in which JF, who declares to being in contact with speakers of many varieties of Italian besides Australian English, is exposed to many different exemplars of coronal fricatives and produces phones with such a high range of acoustic variation that the phonetic area of each category is included in the others.

For GP, a closer look at the SMs values suggests that the coronal fricatives of his VRI display a form of phonetic *attrition* by the coronals of his local dialect. Recall that in the NeVen phonological system /θ/ contrasts with /s/ and /(t)ʃ/[25], and that in his VRI this speaker produced [s], [s̲] as allophones of /s/ and [(t)ʃ] as the only allophone of /tʃ/. In dialect, the acoustic analysis shows that [θ] is the most anterior and laminal among his set of fricatives, and that [s] and [(t)ʃ] are distinct only by tongue posture, as indexed by a significant difference in SDev, which indicates a more apical tongue posture for [s], but they are not significantly different for place of articulation (as indexed by CoG and Skew). In VRI he still distinguishes [s] and [ʃ], but the distinction is based on significant differences in all SMs, showing a stronger degree of phonetic differentiation with respect to his dialect. The SDev mean values of the set of coronal fricatives he produced in dialect and VRI, respectively [θ], [s], [(t)ʃ] and [s], [s̲], [(t)ʃ], show that the degree of laminality in the phones of the two languages increases according to the following progression:

[25] In the present paper, as in Avesani et al. (2015), we analysed the post-alveolar fricative not per se but as the fricative release of the affricate. A palatal fricative /ʃ/ occurs in the phonological systems of Veneto's dialect and also in the corpus we analysed. However, words such as ['biʃa] (*grass snake*) were excluded from our analysis due to an insufficient number of tokens.

| *Speaker GP* | *Belluno dialect* | | | | | *Veneto Regional Italian* | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Degree of laminality as indexed by SDev | [θ] | > | [(t)ʃ] | > | [s] | [s] | > | [(t)ʃ] | < | [s̻] |
| | 2555 (873) | | 1212 (321) | | 1126 (185) | 1384 (246) | | 1053 (237) | | 1044 (257) |

In the VRI set, one of the two allophones of /s/, [s], appears to have "replaced" the most laminal fricative ([θ]) of the dialect set, and the most apical fricative [s̻] took the place of the dialect [s].

In conclusion, our four Veneto speakers have shown specific paths of language change as revealed by the analysis of their spoken Italian. Individual differences in the accommodation of the languages of their multilingual repertoires emerged from the analysis of their coronal stops and obstruents: different speakers showed evidence of maintenance of some phonological and phonetic characteristics attested in their Regional Italian but also specific signs of ongoing koinization and phonetic attrition. The latter were possible to observe only through a fine-grained acoustic analysis of the frication noise, which has confirmed to be of great value for offering insights into the path of language change over time and distance.

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