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Italian roots in Australian soil: coronal obstruents in native dialect speech of Italian-Australians from two areas of Veneto[1]

We will discuss the maintenance of the heritage dialect coronal fricatives in the speech of Italian-Australian trilinguals (dialect/Italian/English) originating from North Veneto, Italy, as compared to the variability found in the productions of comparable Italian-Australian trilinguals originating from Central Veneto. Results on coronal fricatives' distribution based on narrow phonetic trancriptions and on their acoustic characteristics based on spectral moments analysis show that the immigrants have generally maintained the fine-grained features of their dialect. After more than five decades of residence in Australia, traces of interlinguistic influences exerted by L3-English are evident in one speaker only. We consider both internal (linguistic) and external (sociolinguistic) factors for this difference in maintenance of first language speech features between immigrants from two geographical areas of the same province of origin in Italy (Veneto).

1. *Introduction*

We live in an age of globalization that is seeing movements of large groups of people across vast distances. These immigrants must adapt to their new home across multiple dimensions. As they do, their cultural and linguistic origins take root in new soil, providing a foundation for their transplanted lives. Immigrant groups moving to a new country with a different dominant language tend to maintain their heritage language(s) as part of their cultural identity, while at the same time they must acquire and use the language of the host country for everyday communication. As bilingual or multilingual speakers, they hold a complex repertoire of linguistic forms and structures at their disposal, including the phonemes and pronunciation features of each of their languages. They draw on all elements of their linguistic repertoires in a selective way, as dictated by their language experience, conversational intentions, social activities and by the needs of the speech participants in specific conversational contexts. Our interest here lies in maintenance of the phonological and phonetic details of the specific varieties of language spoken by immigrants from a given region. Specifically, we address the extent to which fine-grained details of

[1] Authorship note: The project was designed and conducted by the first five authors. Tordini completed the transcription. Tisato provided tools for recording and access to materials in the *Multimedia Atlas of Veneto Dialects*.

their speech in their mother tongue may continue to provide unique markers of their linguistic origins.

In the linguistic contact situation typical of immigration settings, this is an important but little-studied question: How do people negotiate between their home language(s) and their new language even at the level of the fine-grained features of their speech in each? Do they maintain the detailed speech characteristics in their native dialect even across decades of speaking and hearing the language of their adoptive country? Or do those heritage language phonetic features dissolve over time as a result of living in the new setting, far away from the heritage language community in the old country? And how might the answers to these questions depend on use of the heritage language(s) and opportunities for speaking with other immigrants from their home region, and/or on other sociolinguistic factors?

Studies on bilingualism and second language acquisition indicate that the speaker's first language (L1) and second language (L2) can interact at the phonetic and phonological levels in several possible ways. One well documented pattern is that the L1 influences production of L2 phonemes and contrasts, consistent with the classic notion that the L1 acts as a sieve or filter on spoken production of later-learned languages (Trubeckoj, 1971, orig. ed. 1938). A considerable body of work has shown that the first acquired language (L1) influences the phonetic production and perception of a later acquired language even after many years of continued use of the L2 (e.g. Flege, 1991; Sebastián-Gallés, Soto-Faraco, 1999), and that the extent of such influence depends on the age of acquisition of L2 (e.g. Flege, Munro & MacKay, 1995). A second type of observed effect, however, is a bidirectional linguistic influence: in addition to interference from L1 to L2, learning an L2 can eventually induce changes in the production of L1. Such a bidirectional interaction can lead to the production of phones that differ from the native productions of both languages, as has been shown by a series of studies on production of stop consonant voicing as indexed by Voice Onset Time (e.g. Flege, Eefting, 1987; Sancier, Fowler, 1997; Antoniou, Best, Tyler & Kroos, 2011), and on vowel production (Chang, 2012). A third attested pattern of inter-language influence is that, independently of age of acquisition, if an L2 becomes the dominant language it may be "freed" from at least some of the effects exerted by L1 and instead exert a unidirectional influence on production of the non-dominant L1 (Flege, Mackay & Piske, 2002) and also on perception (Antoniou, Best, Tyler & Kroos, 2011; Antoniou, Tyler & Best, 2012). The final possibility is that no interaction occurs between the two languages, and that the productions of bilingual speakers are equivalent to those of monolingual speakers of each language, at least on certain specific measures of phonetic performance (e.g., Antoniou, Best, Tyler & Kroos, 2010).

Interlinguistic influences in speech production can also be modulated according to the sociolinguistic factors that determine the use of a given language. As well, they can be conditioned by the internal dynamics of the linguistic repertoires[2] of the

[2] According to the sociolinguistic literature, "repertoire" refers to the set of language varieties proper of a given linguistic community. The varieties that form a "linguistic repertoire" can belong to the same

speakers. A case in point is represented by bilingual speakers who learned as children an L2 that co-existed in a diglossic relation with the L1 in their community, and then later, as adults, learned a third language. Examples of such a case are those Italians who left their country in the post-World War 2 years (mid 40s-early 60s). According to the 1951 census, 65% of Italian population spoke only dialect and 35% also spoke Italian; ten years later, in the 1961 census, these figures had changed respectively to 43% and 57%.[3] Migrants who left Italy in those years had the local dialect of their village/town acquired from birth as their L1; the variety of Standard Italian (SI) of their territory, if spoken at all, was their "early" L2. It was typically learned in primary schools from about age 6 or, more infrequently, learned before then, at home, after the dialect. The local dialect was the language of everyday communication, exclusively oral, while Italian was the high variety, used for writing and, if spoken at all (see above figures), used in formal situations. Considering that dialect and Italian are structurally related to each other and yet are also perceived as clearly delimited from each other, they qualify as co-existing varieties standing in a diglossic relation in the linguistic repertoire of those speakers (type A repertoires; see Auer, 2005)[4]. The official language of the country where they moved and established was their "late" L3.

Complying with the conventions of Italian language research, we use the term "dialect" to indicate independent language systems and not geographical or social varieties of the national language. Italian (Italo-Romance) dialects refer to the local continuations of the Latin languages spoken across the Italian peninsula ever since the loss of Latin; even though they display different degrees of structural distance and mutual intelligibility, they are all sister languages of Italian, as they evolved in parallel with the Florentine dialect from which SI developed (e.g., Maiden, Parry, 1997; Cerruti, 2011; Dal Negro, Vietti, 2011).

In this paper we address the question of maintenance, attrition/drift or convergence of specific L1 phonetic features in two subgroups of Italian speakers who migrated to the greater Sydney area of Australia in the mid-1900s. Immigration from Italy to Australia started well before this time[5], but it was after the Second

language or to different languages (monolingual, bilingual or multilingual repertoires).

[3] Note however that these percentages are indirect estimates based on the data on schooling. People who did not attend the elementary schools were considered dialect monolinguals. Reliable statistic data are available only from 1974, when polls reported the percentage of people who declared to speak dialect, Italian or both and in which circumstances (cf. De Mauro, 1972 - ed. orig. 1963; D'Agostino, 2007).

[4] The contact and dynamics between the different Italian dialects and Italian as the base language in Italy have been extensively studied by sociolinguists, who distinguish among dialectalization of Italian, italianization of dialect, koineisation (dialect "mixing" that gives rise to a new variety), hybridisation, and discuss the different repertoires that emerge in such a complex dynamics (Berruto, 1989; 2005; Cerruti, Regis, 2011; see also Samarin, 1971).

[5] According to Campolo (2009), the first Italian immigrants to Australia, in 1770, were two sailors of Italian descent and an Italian convict aboard the *Endeavour*, Captain Cook's ship. Later, others Italian settlers followed as free citizens. The first large wave of immigration started in the second half of the

World War that mass immigration waves from different regions in Italy[6] first took place, induced by the difficult economic and social conditions in Italy and favored by good diplomatic and commercial relations between Australia and Italy[7] (e.g. Bettoni, Rubino, 1996; Campolo, 2009; Gallina, 2011; Rubino, 2014). We specifically focus on this group of first generation emigrants as they are aged (they show the highest mean age for resident groups born outside Australia) but still reasonably accessible: they can offer a unique window into mechanisms of language change in general and speech change in particular, *within* a given generation.

Almost all Italians in the first large wave of migration to Australia were late adolescents or young adults of the same generation at the moment of their departure toward the host country. Moreover, most were sequential dialect-Italian bilinguals. In the new homeland they came into contact with a third new language, which they needed to learn for their survival and social life in Australia. English became their L3, most often learned spontaneously after their arrival in Australia. There, they came into contact with other Italian language varieties, too, such as dialects from different regions in Italy that are structurally distant enough from their own dialect as to be mutually unintelligible, as well as the varieties of SI spoken in those regions that carried different phonetic, phonological and morphosyntactic features from those of their own variety of SI. Even more, speakers of a local variety of a given dialect could easily come into contact with speakers of other local varieties of the same dialectal system (for example, emigrants from North Veneto and from Central Veneto). Therefore, once in Australia, they found themselves in contact not only with English as a new language, but also with many varieties of Italian languages (local dialects and different forms of SI) spoken by the other Italian immigrants who formed a vast and variegated community in their adoptive country. Therefore, their multilingual repertoire includes the local dialect, the variety of Italian spoken by their community in Italy, and Australian English.

Given such a complex contact linguistic situation, and in light of the dynamics of dialect-Standard convergence of Italian repertoires in Italy (Auer 2005; 2011; Berruto, 2005; Cerruti, Regis, 2011) we can sketch some possible scenarios of interactions among the phonological and phonetic aspects of the linguistic repertoires available to those Italian speakers. These follow from the four types of interlanguage influences summarised above for bilinguals and L2 learners:

1. *Conservation of the phonetic/phonological features* of the linguistic heritage: immigrant groups tend to maintain the features of their linguistic heritage, crystalizing the state of the languages at the time they migrated and conserving archa-

1800s. At the end of that century, the first group of Italian settlers established themselves in North Queensland.

[6] Primarily from Sicily, Calabria, Abruzzo, Campania, Veneto, Friuli.

[7] In 1951 a bilateral agreement for assisted immigration was signed between Australia and Italy, based on which 20,000 immigrants were allowed to relocate to the country each year. The agreement was suspended in 1952 but it was resumed in 1954 (for details, see Campolo, 2009). From 1947 to 1961 more than 200,000 Italians reached Australia and settled there, contributing to more than 20% of the total immigration in that time span.

ic features more than the language(s) of the homeland[8] (Bartoli, 1925; 1945). Neither dialect nor Italian drift toward the other, as in the situation of diglossia (if any) they experienced in the late 40s/early 50s in Italy before leaving for Australia. In addition, English as L3 will not exert any influence on dialect or Italian.

2. *Interlanguage interaction*: the phonetic/phonological features of the heritage languages are subject to a bidirectional influence with respect to one another and with respect to English. This scenario opens up to four further possibilities:
   a. in a sociolinguistic situation in which speakers of different dialects need to communicate to one another within the Italian community, the structural distance of the home dialects can impede communication in their own L1. Italian becomes the vehicular language among the different groups of immigrants, and their L1-dialect can drift towards L2-Italian in a process of vertical advergence (Auer, 2005; Berruto, 2005; Cerruti, Regis, 2011), in which the dialect looses (some of) its features and becomes Italianized. An alternative is that a dialect-Standard continuum is formed (cf. type C diaglossia, Auer 2005) and that a new Australian version of Standard Italian will develop that takes on the typical phonetic features of the different dialectal substrata of the local Italian community.
   b. A related possibility is that speakers of a local dialect of a given region in Italy, once coming into contact with other speakers from the same region, may loose the most specific features of their local dialects converging toward a regional dialectal koiné.
   c. A third possibility is that the local dialect as L1 and Italian as L2 are kept in an attenuated form of diglossia (Auer, 2005) in which both varieties are structurally and attitudinally kept apart and used in different situations, but at the same time they maintain their own prestige (the former as a marker of regional identity, the latter as the official language of the Italian community). With respect to L3-English then, we can ask: (i) whether dialect as L1 will show more resistance to attrition than Italian as L2; (ii) whether both L1 and L2 drift towards English; and (iii) if they do, whether they show the same type of drift.
   d. Finally, English may become the dominant L3 after years of extensive use, exerting a strong influence on both dialect and Italian, while at the same time its production remains unaffected by the two heritage languages.

[8] According to the linguistic norms of Spatial Linguistics, a colony or "area seriore" is the area where a given linguistic variety arrived later with respect to the area to which it is traditionally connected. It tends to conserve archaic features more than the "area anteriore", i.e. the homeland (Bartoli, 1925; 1945).

2. *Focusing on Veneto immigrants and their dialect*

We explore the preceding possibilities by focusing on Italian immigrants to Australia who originated from Veneto, a region in northeast Italy. The dialect spoken in that region, named Veneto after the region, is better described as a macro-dialect (a dia-system according to Trumper, 1977) showing intra-dialect differences among its five subsystems (Mioni, Trumper, 1977; Zamboni, 1974; 1988). We selected four speakers originating from Northeastern Veneto (centered on the towns of Belluno, Treviso, Feltre) and Central Veneto (centered on the towns of Padova, Vicenza, Rovigo) subsystems. From now on we will refer to these subsystems respectively as NeVen and CVen. Of our speakers, two originate from the area centered on Belluno (BL) and two from the area centered on Rovigo (RO).

The two systems have been selected because they show interesting differences in the phonetic properties of the class of coronal obstruent consonants. These consonants 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 distance (language change).

According to Zamboni (1974; 1988), the NeVen system presents the following class of coronal obstruents: /t, d[9], θ, ð, s, z, ʧ, ʤ/; the CVen system has /t, d, θ, s, z, ʧ, ʤ/; in both systems the coronal stops are dental, as in SI. In this paper we will focus only on the voiceless fricatives /θ, s, ʧ/. Examples of NeVen voiceless fricatives include: (inter)dental /θ/ as in ['**θ**ento] ("one hundred", SI ['**ʧ**ento]), alveolar /s/ ['**s**ento] ("I hear", SI ['**s**ento]) and alveo-palatal /ʧ/ as in ['**ʧ**ave] ("key", SI ['**kj**ave]). In the southern part of the CVen system, specifically in the area which is centered around the town of Rovigo (Polesine), /θ/ has further evolved in a dento-alveolar fricative [s̪] (Trumper, 1972: 16). Examples of CVen fricatives include: /s̪/ as in [ˈ**s̪**egoe] ("onions", SI [**ʧ**iˈpol:e]), /s/ as in [ˈ**s**aleze] ("willow", SI [ˈ**s**aliʧe]); /ʧ/ as in [ˈ**ʧ**ɔðḭ] ("nails", SI [ˈ**kj**ɔdi]).

Note that the dental affricates found in SI ([ts], [dz]) do not occur in either of these Veneto dialect subsystems (Trumper, 1972; Zamboni, 1974). This absence is explained by the diachronic development of the phonology of Italo-Romance dialects from Latin. Palatalization and in certain cases affrication of consonants that were followed by the palatal glide /j/ in Proto-Romance occurred at an early date: it started probably in century I, AD, in any case not later than century II (Tekavčić, 1980: 114 ff), and affected all Romance varieties. This process was followed by a later, non Pan-Romance palatalization (and affrication) process affecting velar stop consonants /k/, /g/ immediately followed by a front vowel (this latter process was active not before century V: Tekavcic ibid.; see also Maiden & Parry, 1995: 48 ff). This is one of the most intricate chapters in the development of the Italo-Romance

[9] /d/ gets lenited in intervocalic position in both NeVen and CVen systems. But while the dialectological literature refers to the lenited allophone as a dental fricative [ð], in our data /d/ has two lenited allophones: a dental approximant [ð̞] in most of the cases (110/132) and a dental fricative [ð] in a minority of cases (22/132).

dialects' sound system from Latin. In general, palatalization of Latin /k/ produced voiceless apical affricate /ts/ (with further developments) in Northern Italian dialects, including Veneto, and palatal affricate /ʧ/ in the Central and Southern ones. As for Latin /g/, it produced the voiced affricate /dz/ (with further developments) in Northern Italian dialects, affricate /ʤ/ in Tuscany and Central Italian dialects, and the voiced palatal fricative /j/ in most of Southern dialects (see Tekavcic, 1970: 187 ff for a detailed discussion). In both systems Latin /k, t/ + /l/ clusters evolved in the voiceless affricate /ʧ/.

Comparing the phonetic properties and the distribution of the coronal fricatives of NeVen and CVen to one another and to those occurring in SI and English, the other languages of our trilingual Italian-Australian speakers, similarities and differences emerge. The NeVen phonological system shares with English the voiceless [θ] interdental fricative, while SI lacks it (so does CVen). Neither English nor SI (nor NeVen) has the lamino-denti-alveolar fricative [s̪] that is present in the Rovigo area of the CVen system. On the other hand, SI has dental affricates that do not occur in any of Veneto's regional subsystems.

The differences in the phonological/phonetic properties of coronal obstruents in Veneto dialects with respect to Italian and English will be the lens through which we will observe how the linguistic repertoires managed by the immigrant speakers maintain, loose or change their phonetic features in a multi-contact situation. To accomplish this, we conducted phonetic-acoustic analyses of words containing these target voiceless coronal fricatives in two Italian-Australian first generation (immigrant) speakers from each of the two Veneto subregions.

3. *Target words for the corpus*

In order to verify the presence and the phonetic characteristics of those coronal fricatives, we designed a corpus that, among other consonants, included the specific target consonants we are interested in: for dialect, /θ, s̪, s, ʧ/ and for Italian, /s, ʃ, ʧ/. As for the dialect, we drew baseline comparative data from the literature with the data available in the *Multimedia Atlas of Veneto Dialects* (Atlante Multimediale dei Dialetti Veneti: AMDV; Tisato, Barbierato, Ferrieri, Gentili & Vigolo, 2013) in order to ascertain whether, where and in which items the interdental and the lamino-denti-alveolar fricatives are attested in the present-day Veneto dialects as spoken in Italy. The AMDV contains Jaber and Jud's *Sprach und Sachatlas Italiens und der Südschweiz* data (Atlante Italo-Svizzero, AIS, 1921) collected for the Veneto region in 1921 by Scheuermeier (Perco, Vigolo & Sanga, 2011) and new data collected in 2009 by the authors of the AMDV. For the 1921 data, only graphic forms are available, while for the 2009 data also phonetic transcriptions in IPA and audio recordings are available. Relying on the results of this search in AMDV and AIS, we compiled a list of words containing in their dialectal realization one of the target consonants. For the sake of future comparability, most of the items we selected for this project were present in the AMDV. As far as possible, the list was balanced for

position of the consonant in the word (word-initial, word-medial, word-final) and phonetic context. The Latin derivation was also taken into consideration, in order to select only those items having a similar and comparable realization both in their dialectal as well as in their Italian form. The final and revised list of dialectal items used in the production task (see §4) consisted of 64 depictable words (see examples in Table 1), matched with a picture representing it and later used to elicit the target item[10].

In order to verify whether the dialect exerts any influence on the participants' spoken Italian, out of the 64 words that constitute our dialectal corpus, we selected a subset of 46 to be produced in Italian for the Italian production task (as described in §4).

Table 1 - *Examples of words used and their respective pronunciations*

Depictable word	*NeVen - Belluno*	*CVen - Rovigo*	*SI*
clogs	[ˈθɔkoj]	[ˈʂɔkoj]	[ˈtsɔkoli]
halter	[kaˈvɛθa]	[kaˈvɛʂa]	[kaˈvets:a]
trowel	[kaˈθɔla]	[kaˈʂoja]	[kaˈts:wɔla]
nail	[ˈʃɔðo̯]	[ˈʃɔðo̯]	[ˈkjɔdo]

4. *The Italian Roots corpus recordings*

To create our trilingual speech corpus, spontaneous speech samples in dialect, Italian and English were elicited and recorded by means of a MatLab recording tool (*Sync*Rec by G. Tisato). Audio was captured through a Shure model SM10A-CN headset microphone connected to an external Edirol UA-25 EX sound card. Each interview was recorded at 96 kHz 24bit-mono, ranging in duration from 1:45' to 2:45'. The recordings took place in a quiet location at the participants' home or at MARCS Institute (University of Western Sydney).

In order to tune the participants into the appropriate language mode (Grosjean, 1998) during the collection of the three speech samples (i.e. dialect, Italian and English), we adopted a specific interview protocol, as follows:

Starting with dialect, the initial phase was designed to perceptually attune the informants to their local dialect. This was achieved by having the speaker listen to excerpts of autobiographic tales (from AMDV) spoken by monolingual Veneto speakers living in the same areas in Italy where the informants were born and lived until they emigrated to Australia. The informant was asked to listen to these stories, while trying to bring back his/her memories of the past. A guided interview was then conducted in Veneto dialect. At this stage, one of the two interviewers

[10] We preferred using pictures instead of orthographic or verbal stimuli in order to avoid providing hints to the participants about the word and its pronunciation.

asked questions in the participant's own dialect: the resulting bouts of conversation produced by the participant related to facts, events, stories or memories from their childhood in Italy, proverbs, nursery rhymes. The whole interview was kept at an informal level. The participants were allowed to express themselves freely and without time constraints.

Then, after a short practice session, the 64 target images were presented to the speaker in random order on a 15'' monitor and asked him/her to name and describe them. In order to stimulate the participants' verbal productivity, the interviewer engaged them in conversation asking for descriptive details, but never directly asking for or suggesting the target word: this allowed us to elicit more tokens for each target item.

After a short break, the same procedure was repeated in Italian. In the conversation held in Italian, both interviewers interacted with the informant. The questions they asked addressed aspects of the speaker's linguistic competence in Italian, such as how and when they learned Italian, in which situations he/she prefers to use Italian or dialect, as well as their attitude towards each of them. Then, the informant was presented with the 46 items to be named and described in Italian.

The interview ended with a short conversation in English focusing on the following issues: i) which of the languages (dialect, Italian, English) he/she considered to be his/her "dominant" language; ii) the reasons of his/her switches between languages during the interview, if any; iii) if he/she has ever consciously suppressed his/her dialectal accent when speaking Italian or English; iv) if he/she ever consciously maintained or even exaggerated his/her dialectal accent.

5. *Participants*

Based on sociolinguistic information collected by means of a questionnaire, for the investigation reported here we selected two speakers each for the NeVen and the CVen areas (one female and one male, respectively). Participants CZ and GP were born in the province of Belluno (BL, NeVen; Bellunese variety); AM and JF were born in the province of Rovigo (RO, CVen; Rodigino variety). These speakers are also matched between BL and RO with respect to: age and local dialect as L1; number of years of experience of English, as indexed by length of residence (LOR) in Australia (range = 50-57 years). Moreover, the age they started to acquire Italian as L2 coincides for all of them with the beginning of primary school in Italy at age 6. The age of arrival in Australia (AoA) is lower for the females than for the males, and also represents the age they began to learn English as L3 (AoA Eng). Further detailed socio-linguistic information about our informants can be found in Table 2.

Table 2 - *Informants' sociolinguistic information: Age = age at time of recording; LOR = Length of Residence in Australia; AoA Eng = Age or Arrival and onset of Acquisition of English*

Veneto origins	*ID*	*Sex*	*Age (yr)*	*AoA Eng*	*LOR*	*L1*	*L2*	*L3*	*Highest education achieved*	*Profession*
RO	AM	F	64	14	50	dialect (Rodigino)	Italian	English (formal instruction)	university	judge
RO	JF	M	81	26	55	dialect (Rodigino, Vicentino)	Italian & Ferrarese dialect	English (formal instruction)	primary school	storekeeper
BL	CZ	F	74	17	57	dialect (Bellunese)	Italian	English (spontaneous immersion)	primary school	housewife
BL	GP	M	82	29	53	dialect (Bellunese-Cadorino)	Italian	English (spontaneous immersion)	primary school	craftsman

6. *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 recording. They included:

a. segmentation and orthographic transcription in Italian at sentence level;
b. segmentation and narrow IPA transcription at word level (for dialect);
c. segmentation and narrow IPA transcription at phone level of the target consonants and of the preceding and/or following phonetic context (for dialect). As for affricates, we separately segmented and transcribed the closure and frication phases;
d. coding of the target consonant and word position: for the target consonants, we coded their manner of articulation and their position within the word (initial or medial).

The acoustic analysis centered on the set of voiceless coronal fricatives. 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) simultaneously accompanied by high-frequency "noisy" 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). In order to ensure transcription accuracy, the preliminary segmentation and coding by one of the authors were checked by two other authors (from among CA, VG, MV).

Fricatives are sounds produced by making a tight constriction in the vocal tract (with an area of the order of 0.1-2 cm), which gives rise to an airstream forming "a turbulent jet" that provides a noise source (Shadle, 2010: 50). Previous research on languages that have a place-of-articulation contrast for fricatives, such as English or Italian, have focused on the spectral properties of the frication noise in order to differentiate them by place of articulation (e.g. Hughes, Halle, 1956; Stevens, 1960; Heinz, Stevens, 1961). The spectral content of a fricative sound is determined by shape and size of the oral cavity in front of the constriction. For example, a /ʃ/ is characterized by a longer front cavity than /s/, both because it is produced with a more posterior place of articulation and because of the typical lip protrusion (in the context of unrounded vowels) that further extends the front cavity. Such an increase in the length of the front resonance cavity produces a low-energy spectrum for /ʃ/ and a higher-energy spectrum for /s/.

In more recent years, a common way to acoustically analyze fricative sounds has been to consider their power spectrum as a probability distribution and to calculate its spectral center of gravity (also mean or centroid frequency), its standard deviation (or variance), its skewness and its kurtosis[11]. These are known as *spectral moments* and are 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, while a negative value indicates that the left tail of the distribution extends further than the right one. Skewness provides information on the spectral tilt: a positive skewness suggests a negative tilt with a concentration of energy in the lower frequencies, while a negative skewness is associated with a positive tilt and a predominance of energy in the higher frequencies. The fourth spectral moment, Kurtosis (Kurt), indicates the peakedness of the distribution: a positive value indicates a relatively high peakedness (the higher the value, the more peaked the distribution, containing one or a small number of relatively sharp peaks), while a negative one indicates a relatively flat distribution. Positive kurtosis thus suggests a clearly defined spectrum with well-resolved peaks, while negative kurtosis indicates a flat spectrum without clearly defined peaks.

The spectral moments metric thus incorporates both local (spectral peak) and more global (spectral shape) information (Jongman et al., 2000: 1253). We adopt the spectral moment analysis in order to classify the dialectal productions of the coronal fricatives of our speakers, as that set of measures can be sensitive enough to show acoustic cues indexing fine-grained articulatory differences, such as those

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

between the interdental versus the lamino-denti-alveolar fricatives described for Belluno and Rovigo dialects, respectively. 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 made relatively to the length of the oral cavity (Li et al, 2009: 112): the lower the CoG value 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 would indicate concentration of energy in the lower frequencies below the mean value and hence it would point to a more posterior place of articulation. SDev and Kurt distinguish a compact and peaky spectral shape, respectively, from a diffuse and flat one, and thus help in differentiating fricatives based on their tongue posture, specifically apical vs laminal fricatives.

So, while CoG and Skew distinguish [θ]-[s]-[ʃ] and help in identifying the place of articulation of the Rovigo [s̪], SDev and Kurt should further distinguish the non-sibilant [θ] from the sibilant [s]-[ʃ] and possibly help characterize the tongue posture of Rovigo's [s̪].

Prior to analysis, each file was down-sampled to 48 kHz 16-bit. In order to compute the four spectral moments we adopted the time-averaging technique proposed by Shadle (2012)[12]. Adapting a Praat script by Di Canio (2013)[13] that implements Shadle's suggestion, before the analysis a 300 Hz low pass cut-off filter was applied to all the recordings to remove any F0-related influence. Then CoG, SDev, Skew and Kurt were computed over the central 80% of the fricative segment's duration[14] using 5 DFTs with an analysis window set to 10ms.

8. *Results*

We report here the results of the dialectal target word productions of the 4 selected speakers, specifically concentrating on the set of words containing unvoiced coronal fricatives of the NeVen (Bellunese) and CVen (Rodigino) dialect systems. In this set we include also the postalveolar affricate [ʧ], of which we will acoustically analyse only the fricative release phase, [ʃ].

We considered 501 tokens, 210 produced by the Belluno speakers, 291 by those from Rovigo. The number of collected tokens in the two groups is unbalanced due to the eliciting procedure, in which we gave complete freedom to our participants to describe and comment on the object representing the target word. The conse-

[12] 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).

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

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

quence of allowing this more naturalistic approach in eliciting the data is that for each speaker the number of repetitions of a target word could range from 0 (if he/she did not know or recall the word in dialect) to a dozen repetitions.

8.1 Distribution of target coronal fricatives: Latin root words

Table 3 shows the percent distribution of the target coronals, per our fine-grained IPA transcriptions of them, as a function of their Latin derivation.

Table 3 - *Distribution of voiceless coronal fricatives, as produced in all word position by the four speakers*

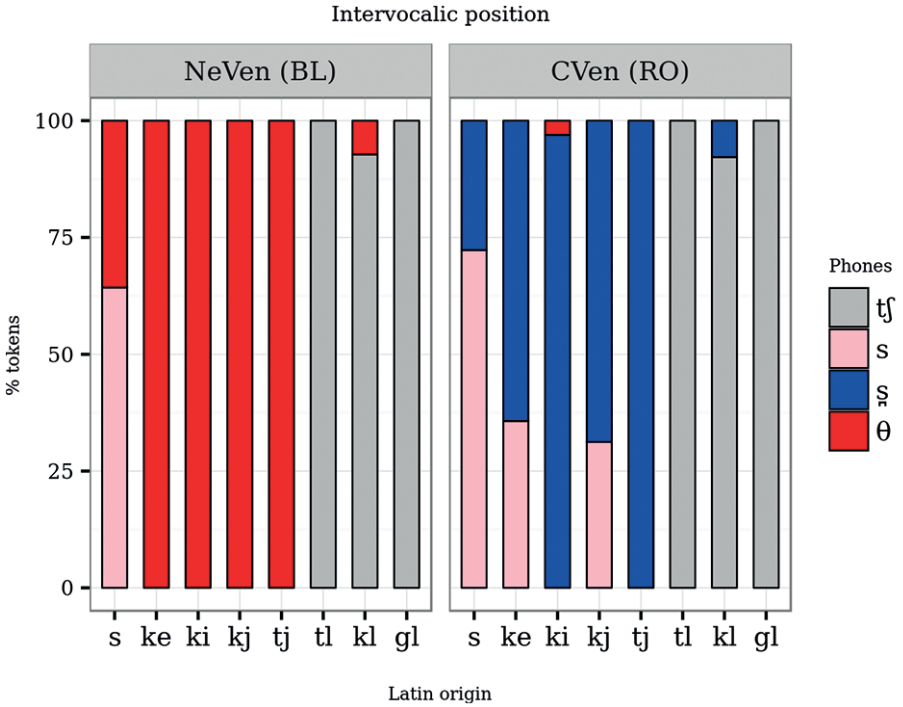
	NeVen system (Belluno)				*CVen system (Rovigo)*			
Latin Root	ʧ	s	θ	s̪	ʧ	s	θ	s̪
s	0	84% (43/50)	16% (7/50)	0	0	75% (58/77)	0	25% (19/77)
tj	0	0	100% (10/10)	0	0	0	0	100% (31/31)
ke	0	0	100% (28/28)	0	0	36% (10/28)	0	64% (18/28)
ki	0	0	100% (31/31)	0	0	5% (2/39)	3% (1/39)	92% (36/39)
kj	0	0	100% (16/16)	0	0	25% (5/20)	0	75% (15/20)
tl	100% (3/3)	0	0	0	100% (11/11)	0	0	0
kl	93% (64/69)	0	7% (5/69)	0	92% (72/78)	0	0	8% (6/78)
gl	100% (3/3)	0	0	0	100% (6/6)	0	0	0

The NeVen system has three voiceless coronal fricatives in its phonemic inventory: dental [θ], alveolar [s] and postalveolar [ʧ]. All were produced consistently by our BL speakers in the relevant dialect target words. [s] was our BL speakers' realization of the voiceless coronal fricative for 84% of the cases of words with /s/ in Latin. In the remaining 16% of Latin /s/ derivations, the BL speakers' realization was [θ], however, this was restricted to just one specific lexical item: Latin "soccus" > BL ['θɔk], SI "zoccolo" ['dzɔk:ɔlo] (sing.) (*clog*). By comparison, for dialect words derived from Latin stops that would have been palatalized due to a following front vowel or glide, /t, k/+ /i, j, e/, the BL speakers' realization is [θ]; there are no exceptions. BL productions did include the affricate [tʃ] but only for derivations from Latin words that had contained stop + liquid clusters /t, k, g/ + /l/. No cases of the lamino-denti-alveolar voiceless fricative [s̪] (described for Rodigino dialect: RO), were attested in our BL speakers' productions.

For the voiceless coronal fricatives produced by our speakers from CVen (RO), a different picture emerged. On the one hand, consistent with the speakers from Belluno, derivations from Latin /t, k, g/ + /l/ clusters were homogeneously realized in RO dialect as [ʧ] (as in Belluno, only /kl/ has a different output in a minority of cases: [s̪], in 8% of cases). On the other hand, deviating from the BL situation, derivations from Latin palatalized stop consonants resulted in more variable output in RO speech. In the majority of cases, the RO fricative produced is phonetically transcribed as the lamino-denti-alveolar [s̪] (/ke/ = 64%; /ki/ = 92%; /kj/ = 75%). But in the remaining cases, the realizations are transcribed as "plain" [s] or [θ] (the latter only in 1 case). Dialect words with Latin /s/ derivations are also produced variably by our RO speakers, including both [s] and [s̪] realizations.

The difference between the NeVen (BL speakers) and CVen (RO speakers) systems can be better appreciated in Fig. 1, which includes only the target voiceless coronals followed by a vowel (respectively 192 and 285 occurrences).

Figure 1 - *Percent distribution of voiceless coronal fricatives (y axis) followed by vowel as a function of their Latin derivation (x axis). For BL, n =192; for RO, n = 285*



In CVen (RO speakers), Latin /s/ gives rise to [s] in the majority of cases (75%) and [s̪] in the remaining (25%). Latin /tj/ is realized as [s̪] in all cases; /kj/ as [s̪] in 75% of cases, as [s] in the remaining 25%. Latin /ke/ and /ki/derivations are realized as [s̪] in the majority of cases (64% and 92%) and as [s] in a minority of cases (36%, 5%). In this system, then, the majority of derivations from original Latin palatalized

stops are realized as [s̪] while a minority of derivations from original Latin /s/ are realized as [s̪]. Conversely, the majority of derivations from Latin /s/ and the minority of derivations from Latin palatalized stops converge to [s].

On the contrary, in NeVen the Latin palatalization of stops in the context of front vowels results consistently in BL realizations as [θ]. The more variable outputs in the Rovigo system cannot be entirely explained in terms of a lexically induced variation: while the two RO speakers produce "*cherry*" (late Lat. "ceresia") as [sa'reza] in dialect instead of the expected [s̪a'reza], in other cases both speakers alternated between [s] and [s̪] realizations for the same lexical item.

8.2 Acoustic characterization: spectral moments

For the acoustic analysis we selected a subset of fricative tokens based on the quality of the following vowel: only those fricatives that occurred before /a/, /e, ɛ/ and /o, ɔ/ were included in the analysis, in order to balance the anticipatory coarticulatory influence of the following vowel. Means and standard errors of the 4 spectral moments for each speaker of the NeVen (Belluno) and CVen (Rovigo) systems are displayed in Figure 2[15].

The acoustic analyses are aimed to verify: 1) whether Veneto speakers conserved the consonants of their L1-dialect; 2) whether the two dialects have drifted to one another converging horizontally to form a Veneto koiné; 3) whether they have drifted toward SI in a process of vertical advergence; 4) whether they have drifted toward English.

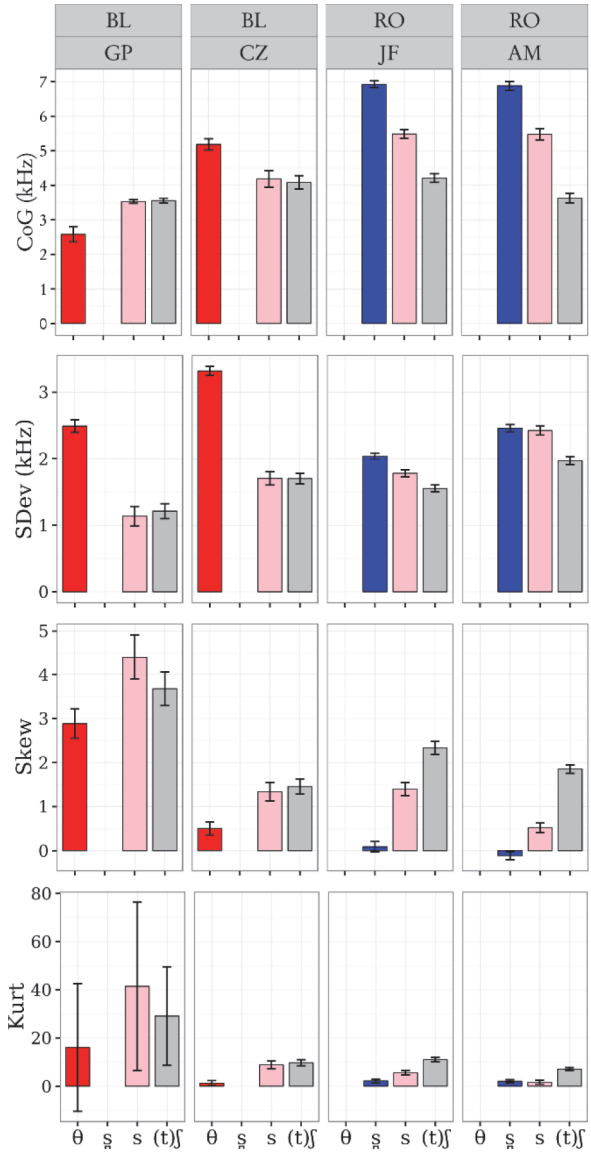
In the first case, comparing the NeVen to the CVen system, we expect that only the fricatives that are unique to each system, i.e. [θ] and [s̪], will be significantly different from each other, while the others will not be affected as they are shared consonants. Within each system, every fricative will be different from the others.

In the second case, [θ] and [s̪] will not be significantly different from each other at least on some aspect of their spectrum: if they have merged to a common place of articulation, they will have the same CoG and Skew; if they have merged to a consonant produced with the same tongue shape, they will have the same SDev and Skew; if they have completely merged, there will be no difference on all spectral moments. Within each system, [s] and the fricative release phase of [ʧ] will be different from the others (from now on, for simplicity, we will refer to it only as [ʃ]).

In the third case, [θ] and [s̪], will drift to the closest fricative consonant [s] that is present both in their own dialect and in SI: if this is the case, both in Belluno and in Rovigo the dental fricatives will equal the alveolars. As we assume that the other fricatives will not show significant difference between each other, we expect no difference between Belluno and Rovigo on any fricative. Within each system, [s] will be different from [ʃ].

[15] The spectral moment analysis has been applied only to the fricative release phase [ʃ] of the postalveolar affricate [ʧ].

Figure 2 - *Mean and standard error of the spectral moments for the four speakers*



In the fourth case, we expect different patterns of results in the two systems: for Belluno, we expect significant differences in the spectral characteristics of [θ] as compared to [s] and [ʃ], because the contact with English would reinforce the maintenance in the dialect of [θ], a consonant shared by Belluno and English. For Rovigo, we expect no difference between the dento-alveolar [s̪] and the alveolar [s], a fricative shared with English (and SI), while [s] would be significantly different from [ʃ].

To test those hypotheses, we performed two sets of statistical analyses. In the first we applied a Repeated Measure Model from the Generalized Linear Models provided by the JMP platform. Gender (male, female), dialect (Belluno, Rovigo) and Fricative (dental, alveolar, post-alveolar) were set as fixed factors, Subjects were included as random effect. Each of the four acoustic measures CoG, SDev, Skew and Kurt were the dependent variables.

In the second, we aimed at checking individual differences in the pattern of contact-induced drifts and we performed four 2-way Repeated Measure ANOVAs for each speaker. The within-subjects factor was type of Fricative (for Belluno: [θ], [s], and [ʃ]; for Rovigo: [s̪], [s], and [ʃ]) and the between-subject factor was type of Following Vowel. The dependent variable was each of the four acoustic measures CoG, SDev, Skew and Kurt.

8.2.1 *Statistical analysis*

The results of the first set of analyses for all spectral moments indicate that Fricative is significant and the interaction between Fricative and dialect is significant only for CoG, SDev and Skew. Gender and dialect are never significant (details are shown in Table 4).

The post-hoc tests (Student's *t,* alpha level 0.05) indicate that the difference in CoG between dental, alveolar and post-alveolar fricatives both in Belluno and Rovigo is non significant (while every fricative is different from the others within the Rovigo system, no difference is attested among the set of fricatives in Belluno). For SDev, both Belluno dentals and alveolars are significantly different from Rovigo ones (dentals: BL = 2929.34, RO = 2251.6; alveolars: BL = 1418.4, RO = 2095.3). Within each system, dentals are different from alveolars and post-alveolars in Belluno; all of them are different from each other in Rovigo. As for Skew, only dentals are significantly different from each other in Belluno vs Rovigo (BL= 1.696; RO= 0.022). Within each system, dentals are different from alveolars and post-alveolars in Belluno; all of them are different from each other in Rovigo. For Kurt, none of the fricatives shows significant differences between Belluno and Rovigo (see Table 5 for a summary).

Table 4 - *ANOVA values on the four acoustic parameters of the fricative spectrum*

Factors	*CoG*	*SDev*	*Skew*	*Kurt*
Gender	n.s.	n.s.	n.s.	n.s.
Dialect	n.s	n.s.	n.s.	n.s.
Fricative	F(2,476)= 105.201***	F(2,476)= 227.351***	F(2,476) = 65.915***	F(2,476)=4.615*
Fric*Dia	F(2,476)= 85.777***	F(2,476) = 88.613***	F(2,476) = 13.925***	n.s.

***p <0.001; **p <0.01; *p <0.05

Table 5 - *Post-hoc tests on the four acoustic parameters of the fricative spectrum*

Fricatives	*Differences*			
Dentals (D), Alveolars (A), PostAlveolars (P)	*CoG*	*SDev*	*Skew*	*Kurt*
BL vs RO	none	D, A	D	none
BL	none	D#(A, PA)	D#(A,PA)	none
RO	D#A#PA	D#A#PA	D#A#PA	none

The data on Skew support the conservation of features (first) hypothesis: the two systems differ only for the dental fricatives (interdental in Belluno vs. dento-alveolar in Rovigo) on this measure, while they do not differ about the remaining consonants. Dentals have a different place of articulation in Belluno as compared to Rovigo, while alveolars and postaveolars do not differ in the two systems. Looking at each system separately, though, the hypothesis is fully supported only by Rovigo, where each fricative is significantly different from each other, while in Belluno the dental fricative differs from the other consonants, but the alveolar equals the postalveolar. Neither the second (Veneto koinè) nor the third hypothesis (advergence to Italian) appears to be confirmed by the data of the four spectral moments, based on the post-hoc comparisons between BL and RO and within each system combined. Neither is the fourth hypothesis, a drift toward English, supported by the data of Rovigo, which is the crucial case for evaluating this hypothesis. Belluno data cannot inform about this hypothesis, as the extended contact with English would reinforce the *maintenance* of the dental fricative in the NeVen system (BL), as it is a shared consonant.

Table 6 - *ANOVA values for each acoustic parameter of the fricative spectrum*

Speaker	*Factors*	*Center of Gravity*	*Standard Deviation*	*Skewness*	*Kurtosis*
GP	Fricative	$F(2,92) = 10.284^{***}$	$F(2,92) = 45.608^{***}$	$F(2,92) = 3.319^{*}$	n.s.
(BL)	Vowel	n.s.	n.s.	n.s.	n.s.
	Inter.	n.s.	n.s.	n.s.	n.s.
CZ	Fricative	$F(2,97) = 13.81^{***}$	$F(2,97) = 149.167^{***}$	$F(2,97) = 14.549^{***}$	$F(2,97) = 17.263^{***}$
(BL)	Vowel	$F(2,97) = 7.463^{***}$	$F(2,97) = 3.232^{*}$	$F(2,97) = 18.683^{***}$	$F(2,97) = 10.3^{***}$
	Inter.	n.s.	$F(4,93) = 2.636^{*}$	n.s.	$F(4,93) = 3.168^{*}$
JF	Fricative	$F(2,140) = 143.881^{***}$	$F(2,140) = 22.547^{***}$	$F(2,140) = 71.505^{***}$	$F(2,140) = 23.811^{***}$
(RO)	Vowel	$F(2,140) = 7.006^{**}$	n.s.	$F(2,140) = 8.233^{**}$	n.s.
	Inter.	n.s.	$F(4,136) = 4.904^{***}$	$F(4,136) = 3.103^{*}$	$F(4,136) = 7.726^{***}$
AM	Fricative	$F(2,135) = 157.438^{***}$	$F(2,135) = 19.32^{***}$	$F(2,135) = 108.501^{***}$	$F(2,135) = 17.237^{***}$
(RO)	Vowel	$F(2,135) = 13.574^{***}$	n.s.	n.s.	n.s.
	Inter.	n.s.	$F(4,131) = 19.32^{*}$	n.s.	n.s.

$^{***}p < 0.001$; $^{**}p < 0.01$; $^{*}p < 0.05$

As the post-hoc tests clearly reveal a different picture for the two Veneto dialect subsystems, we proceed with the second set of analyses performed on each speaker. In reporting the results summarized in Table 6, we will comment about the articulatory configurations of each fricative consonant that can be inferred from the spectral moments data (for a summary, see Table 7).

Looking at the results we observe that the main effect of Fricative is significantly different for every spectral moment and every speaker, with the only exception being for GP's Kurtosis.

Starting with the Belluno system and the female speaker CZ, [θ] is significantly different from [s] and [ʃ] for all spectral moments, while [s] and [ʃ] do not differ from each other (Tukey-Kramer HSD, alpha level 0.05). CoG is higher for [θ] than for [s] and [ʃ] (Hz 5198,53 vs 4215,11 and 4086,12), indicating a concentration of energy in the higher frequencies, which supports a more advanced place of articulation for [θ] than for [s] and [ʃ]. Skew is lower for [θ] than for [s] and [ʃ] (0.513 vs 1.346 and 1.452), indicating a quasi symmetrical distribution of energy, while the values for the other two fricatives indicate a concentration of energy in the lower frequencies below the mean value. As skewness negatively correlates with the length of the front resonating cavity, these values suggest a more advanced place of articulation for [θ]. SDev is higher for [θ] than for [s] and [ʃ] (Hz: 3345.86 vs 1702.22 and 1701.90) and Kurt is lower (1.218 vs 9.758 and 9.162), both indicating a more diffuse spectrum that correlates with a more laminal articulation of [θ].

For GP, the male speaker from Belluno, the spectral moments that correlate with place of articulation distinctions give contradictory results: CoG values are lower for [θ] than for [s] and [ʃ] (Hz 2580.45 vs 3470.45 and 3556.75), unexpectedly suggesting a *less* advanced place of articulation for [θ], while Skew values are lower for [θ] than for [s] (2.883 vs 4.398), more in line with expectations, indicating a more advanced place of articulation for [θ] than for [s]. SDev, also as expected, shows higher Hz values for [θ] that are compatible with a more diffuse spectrum and a more laminal articulation of the dental fricative ([θ]: 2490.94; [s]: 1150.06; [ʃ]: 1212.34).

As for the Rovigo system, all target fricatives produced by the male speaker JF are significantly different from each other for all spectral moments. Progressively lower values of CoG and progressively higher values of Skew indicate that in the front-back dimension [s̪] has a more advanced place of articulation than [s], and also that [s] is more advanced than [ʃ] (CoG - [s̪]: 6922.34; [s]: 5532.48; [ʃ]: 4214.49. Skew - [s̪]: 0.100 [s]: 1.359; [ʃ]: 2.309). Moreover, progressively higher values of SDev and progressively lower values of Kurt indicate a more diffuse and more flat spectrum in the sequence [s̪] > [s] > [ʃ], compatible with a more laminal articulation for [s̪] than [s], and for [s] than [ʃ] (SDev - [s̪]: 2041.02; [s]: 1783.63; [ʃ]: 1561.33. Kurt - [s̪]: 2.214 [s]: 5.245; [ʃ]: 10.916).

For the female Rovigo speaker AM, [s̪], [s] and [ʃ] are significantly different from each other for CoG and Skew, with [s̪] as the most fronted fricative of the series, again according to the sequence [s̪] > [s] > [ʃ] (CoG - [s̪]: 6880.83; [s]:

5477.04; [ʃ]: 3628.33. Skew - [s̪]: -0.117; [s]: 0.521; [ʃ]: 1.852). As for SDev and Kurt, [s̪] and [s] are significantly different from [ʃ] but not from each other, indicating a spectrum that is more diffuse and less peaky for [s̪] than [ʃ] but equally diffuse and flat for [s̪] and [s] (SDev - [s̪]: 2459.1; [s]: 2424.44; [ʃ]: 1967.14. Kurt - [s̪]: 2.090; [s]: 1.643; [ʃ]: 7.135).

Table 7 - *Articulatory interpretation of spectral moments for each speaker*

	CZ	GP	AM	JF
CoG ⇒ : more advanced place	[θ] ⇒ {[s], [ʃ]}	{[s], [ʃ]} ⇒ [θ]	[s̪] ⇒ [s] ⇒ [ʃ]	[s̪] ⇒ [s] ⇒ [ʃ]
SDev > : more laminal	[θ] > {[s], [ʃ]}	[θ] > [s] > [ʃ]	{[s̪], [s]} > [ʃ]	[s̪] > [s] > [ʃ]
Skew ⇒ : more advanced place	[θ] ⇒ {[s], [ʃ]}	[θ] ⇒ {[s], [ʃ]}	[s̪] ⇒ [s] ⇒ [ʃ]	[s̪] ⇒ [s] ⇒ [ʃ]
Kurt > : more laminal	[θ] >{[s], [ʃ]}	n.s.	{[s̪], [s]} > [ʃ]	[s̪] > [s] > [ʃ]

9. *Discussion and conclusions*

The data collected and analysed so far allow us to draw a sociophonetic picture of how some members of an Italian-Australian community have negotiated the varieties that form its linguistic repertoire after 50 or more years since their arrival in Australia. Our focus was on their local dialect as L1, and we asked: 1) whether they have maintained the dialect-specific variety of the Veneto area from which they originated; 2) whether, due to the contact with other Veneto speakers, they have formed a Veneto koiné loosing some of the phonetic features of their local dialect; 3) whether they have converged toward SI as the vehicular language of the whole Italian community; and 4) whether their dialect shows signs of phonetic attrition due to the extensive contact with English.

The distribution of the target coronals as a function of their Latin derivation allows us to appreciate to what extent the actual pronunciation of a given word in our speakers conforms to the norms of the different Veneto systems. In turn, the spectral moments analyses offer a way to characterize how the coronals are differentiated acoustically (and articulatorily).

There are two fricatives that act as identity marks of each of the two Veneto dialectal varieties we considered: the voiceless interdental fricative [θ] differentiates the NeVen from the other Veneto consonantal systems; [s̪] differentiates the southern part of CVen from the other Veneto dialects. Those two consonants will be the pivots of our discussion.

The distribution data that are based on our narrow phonetic transcriptions show that in NeVen (Belluno) [θ] is maintained by both speakers in all the words in which it is expected based on their Latin derivation, with no exceptions. There are no cases in which [θ] drifts toward the lamino-denti-alveolar fricative [s̪] that characterizes the dialectal system of CVen (Rovigo) speakers, nor to [s] of SI and English, nor to the dental and alveopalatal affricates that characterize the corresponding words

in SI. Both BL speakers behave identically in these regards, independently of their gender and their age of arrival in Australia: recall that the female speaker arrived at age 17, 11 years younger than the male speaker, and at the time of the recording she had 57 years of residency in the country as compared to 53 years of the male speaker.

Also for the CVen Rovigo speakers, the data show that none of them produced any [θ], confirming that the speakers have not shifted toward the NeVen system (nor toward English interdental fricatives). However, they show more variable renditions as compared to the Bellunesi. The words that etymologically have /kj, ke/ in Latin can present both [s̪], as expected in Rovigo's dialect, and [s]. More importantly, while in some cases such variability can be reduced to the specific rendition of a given lexical item (i.e. a given word is always produced by both speakers with [s] instead of [s̪]), in a few other cases [s̪] or [s] may randomly occur in the same word (e.g.: [ˈlas̪]/[ˈlaso], *lace*; [ˈs̪egoe]/[ˈsegoe], *onions*). The latter type of more variable rendition, however, is restricted to only the female speaker AM.

From the distribution data it appears that all speakers of each dialectal variety have conserved the distinctive fricatives of their systems and the acoustic analyses confirmed that the landmark consonants [θ] and [s̪] are distinguished by different values of Skewness, which indicate that Belluno's [θ] has a more advanced place of articulation than Rovigo's [s̪], as expected from earlier descriptive work summarized in our introduction.

Moreover, all speakers but one are consistent in the production of a given fricative in all repetitions of the same lexical item. Only the variability observed for the Rovigo speaker AM, admittedly limited, could be a reflection of linguistic interference. We exclude the possible account that the exchange of [s] for [s̻] could be attributed to her uncertainty in recalling those specific words in dialect, as they are common words. Instead, it is the phonetic similarity between [s̻] and [s] that could be the initial opportunity for a possible attrition of this distinction. Only for AM in fact (but not for the other Rovigo speaker JF) do the two sounds appear to have the same tongue posture, as indexed by SDev and Kurt, which are not significantly different from each other. Lamino-denti-aveolar [s̻] maintains a different place of articulation, as indexed by the values of CoG and Skew, with [s̻] being more advanced than the alveolar [s]. The two places are so close to one another in the articulation space, though, that sharing the same tongue posture could be the trigger for an eventual complete merger of the two sounds, and certainly could increase variability in production of the two consonants in our CVen (RO) speakers. The attrition could be exerted both by English and Standard Italian, as both lack [s̻] while in both of them [s] is present. Based on AM's sociolinguisic data, the latter appears to be the most plausible of the two possible sources of attrition: AM arrived to Australia as the youngest of the group of our four informants and had her education in English from high school through university. The other RO speaker (JF) arrived later in the country, received all of his education in Italy and does not show any uncertainty in the articulation of any fricative: each is significantly differentiated from the others on the basis of all spectral moments. [s̪], [s] and [ʃ] have a progressively

less forward place of articulation and a less laminal tongue posture, as we expect in the productions of monolingual native RO speakers.

Also the two Belluno speakers differ from each other as for the acoustic characterization of the fricatives' spectra. CZ, the female speaker, systematically distinguishes [θ] from the other coronal fricatives: the analysis shows that her [θ] has an articulation that is significantly more front and more laminal than the other two fricatives. However, [s] and [ʃ] are not differentiated by any spectral moment. Note that this result is at odds with the narrow phonetic transcriptions: perceptually, none of the transcribers ever had any doubt about how to categorize any instance of [s] and [ʃ].

The male speaker GP (BL) produces the three fricatives with a significant difference in the diffuseness of the spectrum, with values of SDev that indicate a more laminal articulation for [θ] and progressively less so for [s] and [ʃ]. As for the other Belluno speaker, [s] and [ʃ] are not distinguished for CoG and SDev, but, contrary to CZ and contrary to our expectations, CoG values indicate a less advanced place of articulation for [θ] than for [s] and [ʃ]. However, Skew and SDev values are consistent with a more advanced place for the dental fricative than the others.

Since for GP too there are no doubts on the nature of these consonants on a perceptual basis, we infer that the spectral moments analysis is not sufficient in itself to properly characterize the fricatives of such speakers: further acoustic measures are needed such as, for example, the F2 onset of the following vowel. Future and more extended acoustic analyses on other Veneto emigrants will tell us whether the results of the Belluno speakers are idiosyncratic or shared by other speakers. We aim at widening the database of our analysis to include on the one hand more Veneto-Australians, and on the other hand to compare their productions with those of monolingual Veneto speakers in Italy living in the same areas or villages from where the emigrants originated, and of the same generation. These extensions will allow a more thorough characterization of NeVen and CVen dialects and of their resilience in the speech of Australian-Italians.

At the moment, the occurrence, distribution and acoustic features of the identity-mark-fricatives that uniquely characterize the Belluno and Rovigo systems, confirm the first of our hypotheses. All of our speakers maintained in their L1-dialect both [θ] and [s̪] after more than 5 decades of residence in Australia. Interlinguistic influence exerted by L3-English is evident in one speaker only, the one who had more formal exposure to it from a younger age and over a longer period of time: she shows the signs of an initial drift that could induce a merge between the lamino-denti-alveolar and the alveolar fricative. In the other speakers, L3-English apparently does not interfere with the production of the target fricatives, even though our broader recordings of their spontaneous conversations show frequent code switches to English.

No traces of a Veneto koiné formation are found in any of the speakers, nor traces of Italianisation of dialect, neither in their productions of the coronal fricatives nor in the lexicon of their spontaneous speech. Dialect as L1 is preserved and main-

tained in the context of an attenuated form of diglossia with respect to L2-Italian in Australia. In the sociolinguistic questionnaires as well as in the final interviews, our speakers report speaking dialect with family, relatives and friends who emigrated from their same areas, while Italian is used as the language of socialization with other Italians who emigrated from different regions.

The sociolinguistic picture suggests that the local L1-dialect will quickly decay in the competence of the speakers as the number of people with whom it can be spoken diminishes, and/or as the situations in which the individual must operate in English increases (in our study here, AM of the RO group). A related question that is still open and will be addressed in our future work is whether L2-Italian will show the same type of resistance to L3-English or will show more drift toward it.

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