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Doktori (PhD) értekezés

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HOW CAN ITALIAN PHONOLOGY LACK VOICE ASSIMILATION?

Hogy hiányozhat az olasz fonológiából a zöngésségi hasonulás?

PhD disszertáció

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Domokos Gyurinak, másod-témavezetőmnek,
a laringális szkepticizmus képviselőjének!

To Gyuri Domokos, my vice-supervisor
and the proponent of laryngeal scepticism!

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List of abbreviations

ATR	Advanced Tongue Root
C	consonant
Cat.	Catalan
child l.	child language
D	voiced stop
del	consonant deletion
Eng.	English
err	error (mispronunciation)
ET	Element Theory
F	voiceless frivatice
FA	foreign accent
FAA	Foreign Accent Analysis
Fr.	French
Ger.	German
GP	Government Phonology
Hun.	Hungarian
IPA	International Phonetic Alphabet
It.	Italian
Jap.	Japanese
L1	first language (mother tongue)
L2	any foreign language (not 2nd language)
LabPhon	Laboratory Phonology
LR	Laryngeal Realism
ms	millisecond
N	nasal stop
Neap.	Neapolitan
NoVA	does not happen any kind of voice assimilation
OT	Optimality Theory
PD	progressive devoicing (/TD/ → [TT])
PV	progressive voicing (/DT/ → [DD])
RVA	regressive voice assimilation (/TD/ → [DD], /DT/ → [TT])
/sC/	/s/+consonant cluster
Sic.	Sicilian
Sp.	Spanish
T	voiceless stop
V	vowel / voiced fricative (based on context)
VOT	voice onset time

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And finally, I would like to thank my family and the people who are closely linked to me, for having endured my whims in a really difficult period of life! Thanks to all of you!

Deo gratias perfeci die 30 Martii MMXIX hora decima!

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Chapter I

0. Preface

The general framework the present dissertation is couched in is phonetically-based phonology. On the basis of a phonetic assumption, the lack of voice assimilation in Italian, I will attempt to draw theoretical conclusions about various aspects of the laryngeal phonology of Italian, as compared to the general phonological descriptions and analyses of that language (cf. Rohlfs 1966; Muljačić 1969, 1972; Saltarelli 1970; Canepari 1980; Lepschy & Lepschy 1988; Nespor 1993; Mioni 1993; Maiden & Parry 1997; Schmid 1999; Bertinetto & Loporcaro 2005; Krämer 2009, 2016; among others).

Although several phonological frameworks will be involved during the work phase (most importantly *Laboratory Phonology, Laryngeal Realism, Optimality Theory, Government Phonology, Element Theory*), none of them will act as a main referential point in the analysis, they only help the explanation of a "theory-free", phonetically-based but phonologically motivated observation: that is, Italians usually – and very surprisingly – do not assimilate adjacent obstruents with respect to voice.

The first and simplest answer to the question in the title is: Italian lacks voice assimilation, since it does not have obstruent clusters, either. In fact, in the native vocabulary of Italian obstruent clusters inherited from Latin were eliminated for phonotactic reasons (apart from /s/ + consonant, henceforth /sC/; for details and references see Sections 1.1.3, 3.2.3 and 3.2.4); and voice assimilation targets obstruent clusters. At the same time, in the pronunciation of modern loanwords, as well as in the foreign accent of Italian speakers, it can be observed that Italians tend to preserve the underlying voice values of adjacent obstruents. And if loanwords and the speakers' foreign accent attest to a phonological phenomenon, even if it does not affect the native vocabulary, it cannot be claimed that the phenomenon does not belong to the productive phonology of the given language (cf. Siptár 1994: 187).

I think that my mother tongue, Hungarian, considerably influenced me in choosing this topic. Regressive voice assimilation is a salient phenomenon in Hungarian phonology (cf. Siptár & Törkenczy 2000: 76), which may have helped me to quickly recognise the "strange attitude" of Italian speakers, who tend to avoid voice assimilation in loanwords and in their foreign accent (about the influence of L1 on speech perception cf. Section 4.3). Indeed, the starting point of the present research was a simple impressionistic observation of mine about the absence of voice assimilation in the typical Italian pronunciation of foreign languages, which I made during the studies carried out for my MA thesis (Huszthy 2013a).[1]

No previous claim has been made in the literature to the effect that Italian phonology lacks voice assimilation. The common opinion is that voice assimilation in Italian concerns only /sC/ clusters (viz., /s/ gets voiced before voiced consonants) – since these are the only possible inputs of the phenomenon – and only within the domain of a single word (cf. Saltarelli 1970: 21-26; Lepschy & Lepschy 1988: 90; Nespor 1993: 74-76; Bertinetto & Loporcaro 2005: 134; Krämer 2009: 207-209). However, this restricted use of voice assimilation is phonologically rather strange (especially in view of the claims of Laryngeal Realism, cf. Sections 1.2.1, 3.2 and 3.4), and needs detailed examination. Besides, in certain Northern Italian dialects obstruent clusters other than /sC/ also appear, and in these clusters RVA may occur (cf. Rohlfs 1966: 341; Cavirani 2018; Cavirani & Hamann in prep.), but the same dialectal speakers apparently do not apply RVA in Standard Italian (cf. Section 4.3).

So far Žarko Muljačić (1972: 91) has been the only linguist to note that Italians in some loanwords do not apply voice assimilation between obstruents, namely in *afgano* 'Afghan', *substrato* 'substrate', *abside* 'apse', *feldspato* 'feldspar' and *tungsteno* 'tungsten'. At the same time, Muljačić does not attribute any phonological relevance to these sporadic examples. He calls these groups of obstruents "pseudo clusters", because the juncture of the crucial consonants is typically separated in the Italian pronunciation by a release or schwa epenthesis (cf. Sections 3.1.6 and 3.2.4). Most probably, Muljačić's data derive from his own perceptional experience, since he does not refer to a corpus or to the literature.[2] However, his observation is fundamental from the point of view of this work, since it confirms my hypothesis regarding the singular behaviour of voice assimilation in Italian phonology.

Therefore, this dissertation has a double purpose: firstly, to provide phonetic evidence for the lack of voice assimilation in Italian (cf. Chapter II); secondly, to find phonological answers to this strange laryngeal behaviour (cf. Chapter III), which may also have further consequences regarding the synchronic phonology of Italian (cf. Chapter IV).

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[1] In my MA thesis I aimed to describe and analyse the common features of Italian foreign accent (for details cf. Section 1.2.4).

[2] I presume that Muljačić was also helped by his mother tongue, Croatian, in the recognition of the absence of voice assimilation in Italian. In fact, among the non-Italian phonologists who deal with Italian (cited in this study) he is the only one whose L1 is a "classical" *voice language* (cf. Section 1.2.1), and so the lack of voice assimilation must have been a salient phenomenon to him.

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1. Introduction

The dissertation is structured into two minor (Chapters I and IV) and two major chapters (Chapters II and III). In the introductory part (Chapter I) terms and methods will be clarified, which begins with the title of the dissertation (Section 1.1) and follows with the theoretical frameworks used during the discussion part (Section 1.2). In Subsection 1.2.4 a brief outlook will be offered to an innovative method of phonological analysis which gave the central idea of my PhD research, namely *Foreign Accent Analysis*, which consists in the examination of the synchronic phonology of languages through the foreign accent of the speakers. Finally, in the last part of Chapter I (in Section 1.3) the corpus of the dissertation will be presented.

Chapter II includes the phonetic and statistical evaluation of the research corpus. In Section 2.1 I will attempt to provide “visible” evidence for the absence of voice assimilation patterns in Italian phonology, through various spectral analyses of the data. The acoustic analyses at first concern the non-/sC/ obstruent clusters (in the subsections of Section 2.1.1), then the /sC/ clusters (in Section 2.1.2). Subsequently, in Section 2.2 statistics will show that the occurrences of lacking voice assimilation in the data are not accidental or sporadic; that is, the informants apparently tend to avoid voice assimilation in obstruent clusters.

In Chapter III different phonological analyses are proposed for the data presented, starting with more practical approaches, then turning to more theoretical grounds. Firstly, in Section 3.1, the data is examined from the point of view of Laboratory Phonology, seeking phonetically-based answers to the question why voice assimilation means a problem for Italians, and why the informants do not prefer to apply it (or other repair strategies) in ill-formed obstruent clusters. In Section 3.2 we will attempt to reconcile Italian laryngeal phonology with the claims of Laryngeal Realism. Section 3.3 offers an OT-analysis to the absence of voice assimilation in Italian and to the phenomenon called “preconsonantal s-voicing”. Finally, in Section 3.4 a radically theoretical approach is presented, based on *Laryngeal Relativism* and Element Theory, which tries to present the Italian laryngeal system as one which is closer to the laryngeal patterns of Germanic languages than to those of Romance languages.

In the last part (Chapter IV) the conclusions and the results of the research will be summarised (Section 4.1); an outlook will be offered regarding the relation between language contact and the acquisition of voice assimilation (Section 4.2); and finally, indications will be given to further research in the topic (Section 4.3).

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1.1 Explaining the title

The clarifications of the introductory part must begin with the title of the dissertation, which practically holds three technical terms, even if they seem common and unambiguous expressions: *Italian* (see Section 1.1.1), *phonology* (see Section 1.1.2) and *voice assimilation* (see Section 1.1.3). In the first subsection general information will be shared about the nature of the Italian language, with a brief history of the formation of spoken Italian. In the following subsections the choice of the field of phonology (rather than phonetics) will be justified, and the most relevant concepts pertaining to voice assimilation will be clarified.

1.1.1 What is Italian?

Defining Italian is always a problem in synchronic linguistics (cf. Lepschy & Lepschy 1988: 11, among many others). In fact, Modern Italian is actually a written language, whose spoken varieties do not share a unified, standard norm (cf. Krämer 2009: 22). Native speakers are able to recognise the regional accent of any other Italian speaker, anytime – even if they tend to speak the grammatically and lexically standardised, literary variety, namely Standard Italian –, even only on the basis of pronunciation (cf. Beccaria 1988: 109). Since I deal with phonology, these normless spoken varieties of Standard Italian will stand in the centre of my interest and I will simply refer to them collectively as *Italian*.

Hence, spoken Italian is always associated with some dialectal phenomena. Bertinetto & Loporcaro (2005), when investigating the sound patterns of Standard Italian, compare the spoken varieties of three cities of Italy: Milan, Florence and Rome; describing a typically northern, a typically central and a central-southern pronunciation model, respectively. The contributors of the handbook entitled *Italiano parlato: Analisi di un dialogo* 'Spoken Italian: The Analysis of a Dialogue' (Albano Leoni & Giordano 2005) analyse the variety of Rome, even though Standard Italian was born in Florence, and currently the northern pronunciation variants are very influential (cf. Canepari 2012: 227).[3] As a matter of fact, there is no linguistic

[3] For instance, several phonological effects are spreading in spoken Italian through dubbing: dubbers typically use an "artificial" Italian which is geographically neutral but is based on a "northern-like phonology", e.g. with the generalisation of intervocalic s-voicing and with the relative reduction of "raddoppiamento sintattico". Canepari (2008: 8) also claims that a "neutral Italian" exists; however, it is not spoken as a native language, Italians can only acquire it by personal engagement (and use it in particular situations, like actors or dubbers).

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capital in Italy, similarly to the social and cultural life of the country, which was always fragmented during its history, and has never been concentrated in a single city or the capital (cf. Beccaria 1988: 79).

Historically, the origins of Italian are linked to the spoken vernacular varieties of Latin, called “volgare” from the early Middle Ages, which showed significant structural differences compared to Classical Latin, beginning even from the first attestations (like wall inscriptions, allusions to “rude” regional pronunciations of Latin, etc., cf. Marazzini 1994: 148; Zamboni 2002: 17; etc.). In fact, the real motivations for the radical split between Classical Latin and the Romance languages – which certainly does not originate only in the fall of the Roman Empire – are still among the major questions of Romance linguistics (cf. Salvi 2011: 318).[4]

The prominence of the “volgare” of Florence beyond the other regional varieties – which began to emerge in the 13th century – was due to the political and economic impact of Florentine merchants (Krämer 2009: 22), and mostly to the success of late 13th and 14th century Florentine literature (especially the works of Dante, Petrarca and Boccaccio), whose language was popularised during the next centuries, even by non-Tuscan authorities, like the Venetian cardinal Bembo (Marazzini 2010: 140). This period was subject to a huge controversy called the *questione della lingua* ‘the question of languge’, that is, “what sort of vernacular was best suited as a medium for literary expression?” (Lepschy & Lepschy 1988: 22). The leading role of the medieval Tuscan variety as a literary language of Italy has been strengthened in the early Baroque era by the movement of the *academia*s, in the circle of which the first grammars and dictionaries were published; most importantly, the *Vocabolario della Crusca* which took inspiration from Bembo’s theories (Lepschy & Lepschy 1988: 23; Migliorini 1994: 408).

In the 19th century, shortly before the unification of Italy, a definitive step in order to bring the dialect of Florence on the level of national language was made by another non-Tuscan celebrity, the Lombard writer Manzoni, who decided to write his influential novel, *I promessi sposi* ‘The Betrothed’ in Tuscan. The book reached several Italian schools, popularising a non-native, written Tuscan variety as the Italian language (Marazzini 1994: 346-349). After the unification of the state (which occurred officially in 1861) other novels also contributed to the spreading of Italian, such as Collodi’s *Pinocchio* and De Amicis’ *Cuore* ‘Heart’ (Beccaria 1988: 64). In fact, Italian was born and grown up as a real “literary language”, fed literally by the literature, through centuries.

[4] In order to scrutinise the linguistic transition from Latin to Romance, cf. Herman (2003), Wright (2010), Ledgeway (2012), Adams & Vincent (2016).

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Beyond schools and books, further spreaders of Italian included the obligatory military service (which forced dialectophone crowds to meet and talk), the internal migrations during the post-war periods and in recent times, the evolving national journalism, and finally, as the most powerful factor among all, the mass media (Beccaria 1988: 65). However, as it was mentioned earlier, despite the strong unifying efforts we still cannot talk about one well definable spoken variety of Standard Italian, and although the Italianisation of the dialects heavily concerns grammar and vocabulary, the regional accents seem to preserve their regional characteristics permanently (cf. Berruto 2000: 28-29; Huszthy to appear a).

In essence, Standard Italian definitely cannot be considered a homogeneous language. When I investigate the phonology of "spoken Italian", I should probably speak about Milanese, Florentine, Roman, Neapolitan, etc., rather than Italian. Nevertheless, Italian spoken varieties seem to share plenty of common phonological phenomena – at any level of phonology, for instance, in vowel and consonantal oppositions, in syllable structure, in word stress distribution, etc. (as we will see in Section 1.2.4.3) –, which makes us suspect the existence of an "Italian phonology" in synchrony. This dissertation will be focussed exactly on one of these common structural properties of spoken Italian, namely voice assimilation.

1.1.2 Why phonology?

Phonetics and phonology have always played a central role in Italian linguistics, especially in Italian dialectology. Beginning from the seminal works of Ascoli (the actual "starter" of the studies on Italian dialects in the second half of the 19th century), who worked within the framework of comparative-historical phonology; through the scientific activity of other giants of the field, such as Merlo (1920/2015) and Rohlfs (1966); until some more recent syntheses of Italian dialectology, prepared for instance by Grassi, Sobrero & Telmon (1997) or by Loporcaro (2009); *the study of speech sounds* (in particular historical phonetics and phonology) has always been overrepresented in the description of Italian dialects, and it has definitely become the "traditional approach" in Italian dialectology and in the classification of the dialects (Repetti 2000: 3-4; Loporcaro 2009: 59).

At the same time, the relation between the two fields of the study of sounds, phonetics and phonology, has been constantly changing since the first half of the 20th century, therefore I have to justify the choice of the term *phonology* in the title. At the beginning of modern linguistic research (more or less until early structuralism), the discipline which dealt with sounds had two cohesive faces: a practical one, which investigated how sounds were produced, namely phonetics; and a theoretical one, which aimed to explain how sounds were ordered in a language or how they could be described with features, namely phonology (cf. Saussure 1916/1983; Sapir 1921; Bloomfield 1933).[5] The radical split between phonetics and phonology lies in Trubetzkoy (1939)'s contribution to structuralism, who defines the principles of phonology as a theoretical discipline, so it becomes independent of phonetics.

In the second half of the 20th century, due to the appearance of better and better possibilities to record and segment speech sounds, the distance between phonetics and phonology grew larger, the former going into the direction of natural sciences (mostly physics), while the latter becoming more and more theoretical, and so approaching the modern conception of linguistic research (cf. Ohala 2005: 418). In the 21st century, with the development of various acoustic software packages and computer programs targeting speech analysis – among which currently the most popular is probably Praat (Boersma & Weenink 1992-) – the difference between the two fields has become even sharper. Phonetics has definitively turned into an experimental and statistical study, while phonology has become the discipline of sounds within linguistic theory, relying on formal (often abstract) representations.

At the same time, the contrary effect of the same development is also detectable: near the end of the 20th century the two fields started to converge again in various aspects. The stream called "Laboratory Phonology" started to seek theoretical answers through practical investigations (for a detailed description see Section 1.2.1); and other phonetically based theoretical directions also appeared, such as *Natural Phonology* (cf. Donegan & Stampe 1979), *Articulatory Phonology* (Browman & Goldstein 1992), etc.

In conclusion, the choice of the term *phonology* (rather than *phonetics*) is arbitrary in this work, especially because the title could even lack the word *phonology* and remain both grammatically and conceptually correct ("How can Italian lack voice assimilation?"), but its presence is crucial, because it indicates the target discipline of the research: in this dissertation phonetics is a device, while phonology is the goal; that is, I aim to analyse the structural reasons for a phonetic discovery in Italian, the lack of voice assimilation.

[5] In certain uses (especially formerly) one of the two terms alone could cover both fields of the study of sounds, e.g. *phonetics* was used also for *phonology* (cf. Trask 1996: 270). In Italian linguistics, even now, the term (It.) *fonetica* 'phonetics' generally refers to both phonetics and phonology, while the rarely used term (It.) *fonologia* 'phonology' may refer to historical phonetics, as in Repetti (2000)'s synthesis above. Moreover, in Hungarian, for instance, there is still a collective term which covers both phonetics and phonology: (Hun.) *hangtan*, literally meaning 'the study of sounds'.

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1.1.3 What is voice assimilation?

A process when two segments get similar to each other in some phonetic or phonological property, is commonly called *assimilation*. In phonetic terms, assimilation is the variation of a speech sound as it becomes more like another speech unit (Ellis & Hardcastle 2002: 374), which is a pervasive characteristic of connected speech (often originating in coarticulation), found across the world's languages. The phonological definition of the phenomenon seems to be more simple, but it is also more complex: assimilation is spreading (Kiparsky 1995: 660).

Types of assimilations may vary along numerous factors (for details consult Trask 1996: 36-37; Baković 2006; Cser 2015: 198).[6] In this work we will only deal with *local* (also known as *contact*) assimilations, between adjacent consonants. The segments which participate in this kind of assimilation do not have a balanced relationship: one is the assimilator, while the other one undergoes the process. The order of the two members is not balanced, either: segments usually tend to assimilate to a following one (evoking *regressive assimilation*, e.g. A+B→BB), while the reverse order (when a segment provokes the assimilation of a following one, i.e., *progressive assimilation*, e.g. A+B→AA) is much rarer (cf. Ohala 1990: 259, Szigetvári 2008a: 115).[7] This work will focus on the most frequent kind of assimilatory processes: regressive local assimilations between consonants.

Among regressive consonantal assimilations the two most common in languages are those regarding the [place] and the [voice] feature: in the first case the consonants affected come to share their place of articulation (stops usually turn into a geminate, e.g. /p/+/t/ → [tt]), in the second case they come to share the positive or negative voice value becoming both voiced or both voiceless (e.g. /p/+/d/ → [bd] or /b/+/t/ → [pt]). By way of illustration, the phonotactics of some languages does not tolerate obstruent sequences of dissimilar place features, for instance, Italian (except for /sC/ clusters, cf. Sections 1.2.4.3, 3.2.4; also cf. Morelli 1999: 160-165), in which such clusters inherited from Latin underwent place assimilation, e.g. (Lat.)

[6] Some parameters influencing types of assimilation are the direction of the process (*regressive* vs. *progressive*), the contact of the segments (*local* vs. *distant*), the natural classes of the affected segments (e.g. *vowels* or *consonants*), the degree of participation of the segments (*total* vs. *partial*), etc. (cf. Lass 1984: 171-177; Spencer 1996: 47; Cser 2015: 198).

[7] The phonological motivation of the default regressive direction of assimilations (at least among obstruents) is chiefly based on syllable structure, since obstruents are much more stable in the onset than in the coda. A further reason is the so-called "presonorant faithfulness", that is, obstruents before a vowel or a sonorant consonant are also more stable than before another obstruent (for a detailed explanation see Section 3.3.1 and Rubach 2008).

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a[kt]*us* ‘act’ → (It.) *a*[tt]*o*, (Lat.) *i*[ps]*e* ‘himself’ → *isse* → (It.) *esso* (cf. Rohlfs 1966). As far as [voice] is concerned, most languages do not tolerate obstruent sequences with different voice features, e.g. the international Slavic loanword *vodka* (*voda*+*ka* ‘water+diminutive’ → *vo*[tk]*a*) is pronounced with two voiceless obstruents in the majority of the languages (for further examples and a more detailed explanation see Section 2.1.1). This kind of assimilation is often called *voicing assimilation* in the literature (see among others Baković 2006; Recasens 2014), but I will label it *voice assimilation* (also used elsewhere in the literature, e.g. in Balogné Bérces 2017), leaving the terms *voicing* and *devoicing* to refer to the results of the process.

Voice assimilation may have a variety of interpretations both in phonetics and in phonology; however, all of these interpretations originate at the same place: the *larynx* (also called *voice box*), the organ which contains the vocal cords. Laryngeal activities do not concern the [voice] feature only, but others too, like [spread glottis] and [constricted glottis] (cf. Section 3.2, also cf. Balogné Bérces & Huber 2010a, 2010b). The [constricted glottis] feature is irrelevant in this dissertation, but [spread glottis] will acquire importance in a further phase of the work, since it is the laryngeal feature which is responsible for aspiration in obstruents (cf. Sections 1.2.2, 3.1.2, 3.2.5). Aspiration is not less a laryngeal property than voicing or devoicing, even if it does not concern precisely the vocal cords, but the emission of a short breathing (or burst), which follows the release in the articulation of the obstruents (cf. Trask 1996: 36). From a phonetic point of view aspiration always characterises the articulation of obstruents, but its amount may have phonological consequences, and it may determine language classes as well. I will turn to this question in Sections 1.2.2, 3.2 and 3.4, when the phonological theories of Laryngeal Realism and Laryngeal Relativism will be presented.

1.2 The frameworks applied in the dissertation

In the dissertation various current theoretical frameworks are applied, because the phenomenon to be explored (i.e., the lack of voice assimilation in Italian) needs to be examined from different phonological approaches. In Section 1.2.1 the “movement” called Laboratory Phonology will be briefly presented, which is practically the collective term for phonetically-based phonological studies. In Section 1.2.2 a first description of Laryngeal Realism will be offered, which will be followed by others in Sections 3.2 and 3.4. Section 1.2.3 will present a short clarification of the use of both Optimality Theory and Government Phonology, two theoretical frameworks which are not usually combined. The final background theory of the dissertation,

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Foreign Accent Analysis, will have a more detailed description in Section 1.2.4. Since the last-mentioned method is mainly based on my research activity, the discussion will not be able to rely on and refer to much previous literature.

1.2.1 About Laboratory Phonology

In Section 1.1.2 we have claimed that the fields of phonetics and phonology have been increasingly diverging during the history of modern linguistics, so the study of sounds has been divided into two well defined disciplines: a practical one and a theoretical one. It was also mentioned that recently phonetics and phonology are approaching each other again: “an effort to bridge the gap between laboratory-oriented phonetic research and theoretically-oriented phonological scholarship” is offered for instance by the direction labelled *Laboratory Phonology* (Nádasdy 1995: 71).

The term “Laboratory Phonology” (henceforth LabPhon) was used first as the name of a conference series in 1987. Since then it has become the name of a rather heterogeneous discipline as well which covers a specific (and at the same time relatively unspecified) field of the phonetics-phonology interface (cf. Pierrehumbert, Beckman & Ladd 2000). LabPhon is not a particular school of phonological theory, and actually it is not a theoretical framework, either. In essence, LabPhon gathers together scholars who work within phonological theory on the basis of their own laboratory experiments (such as sound recordings made in a soundproof studio, with statistical analyses). These scholars may be working in different theoretical frameworks and also be concerned with other fields of study beyond phonetics and phonology, for instance psychology, rehabilitation, neurosciences, sociology, psychiatry, etc.; that is, LabPhon offers an interdisciplinary, cognitive approach to phonetically-based phonology (Pierrehumbert, Beckman & Ladd 2000; Pierrehumbert & Clopper 2010).

“Determining the relationship between the phonological component and the phonetic component demands a hybrid methodology”, claim Beckman & Kingston (1990: 3) in the Introduction of the *Papers in Laboratory Phonology*’s first volume. At the same time, LabPhon is not identical with applied phonology, since starting points and objectives are different. In applied linguistics the practical usability of theories is an aim, while LabPhon, from an opposite perspective, seeks to maintain theories on a practical ground. The inception of LabPhon (firstly as a conference, i.e. an “initiative of brainstorming”) was probably motivated by several factors, among which we can certainly mention the “overdose” of different theories, new data and

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technical advances near the end of the 20th century, which caused theoretical linguistics to drift away from the practical basics of language. Another very likely root cause is "bad data": in fact, theoretical approaches in modern linguistics are often based on complex databases and on others' uncontrolled data,[8] which sometimes includes wrong information.[9]

Besides LabPhon, another recent tendency called "Experimental Linguistics" is also reaching large popularity in general linguistics, which is based on similar aims, i.e., the reconciliation of theoretical and experimental research methods (cf. Bánréti 2017). In this dissertation, mentioning LabPhon is important, because after some research in Italian phonology on the basis of my own sound recordings, I became aware of actually working according to the principles of laboratory phonology (or experimental linguistics). Indeed, in this research I will use self-collected data for theoretical purposes, encouraged by a typical LabPhon motto: *do not trust others' data*.

1.2.2 About Laryngeal Realism

Similarly to LabPhon, Laryngeal Realism (henceforth LR) is not an actual theoretical framework, either. It can be rather called a theoretical stream, since the phonologists who are dealing with it generally use various theoretical frameworks (most importantly Government Phonology and Optimality Theory). At the same time, LR will be described in this section as one of the most important referential models which inspired the central ideas of the dissertation.

In general linguistics it has been long known that the articulation of consonants shows various laryngeal patterns in single languages (or language groups). For instance, in some languages voiceless plosives (like /p, t, k/) are generally followed by significant aspiration (e.g. in most of the Germanic languages), while in others they are not (e.g. in most of the Romance and Slavic languages) (cf. Lisker & Abramson 1964).

Voice Onset Time (henceforth VOT) is a crucial acoustic property of voiceless stops in the idea of LR. After the release of every plosive consonant a burst noise is produced at the place of articulation, which is immediately followed by an aspiration noise produced at the

[8] Researchers often work with (or refer to) languages which they do not speak at all, and therefore, in absence of personal linguistic intuition, they may make serious mistakes.

[9] The phenomena of "bad data" have recently induced an international workshop as well: "Dealing with Bad Data in Linguistic Theory", which took place in 2016 in Amsterdam; programme and abstracts are available at http://www.meertens.knaw.nl/baddata/ (last access: 12-12-2018).

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glottis; the burst noise has a very short duration, but the aspiration noise may also be quite long, according to the language type (Johnson 2003: 140). VOT is composed of these two noises, that is, it lasts from the release of a stop until the beginning of the articulation of the next segment (which is usually a vowel, so it lasts until the onset of voicing). Consequently, the length of aspiration can be measured in stops with the aid of VOT lag (cf. Gósy 2004: 124-125).[10]

The role of aspiration has recently been re-evaluated by a group of phonologists, who claim that aspiration is not only a “secondary” phonetic phenomenon in the articulation of voiceless stops, but it can also be an important phonological feature which makes a difference in laryngeal oppositions. Iverson & Salmons (1995, 1999, 2003, 2008) are the first to assume that aspiration has serious phonological consequences in consonant systems. In their interpretation Lisker and Abramson (1964)’s voice categories become two-way, three-way and four-way laryngeal contrasts, whereas the distinctive feature [voice] can combine with [spread glottis] (which is the distinctive feature used for aspiration, cf. Section 1.1.3).

Among the languages with two-way voicing oppositions, Iverson and Salmons (1995) make a clear difference between those which use the [voice] feature to express voice oppositions, and those which use [spread glottis]. As a result, some languages which were formerly thought to have a voicing contrast (e.g. English and German) are differently evaluated in this respect: even if they may have voiced obstruents, the contrast which makes a phonological difference in the laryngeal system (for instance between homorganic stops) is not the [voice] feature, but [spread glottis]; that is, fundamentally voiceless (or passively voiced) and unaspirated stops are in phonological contrast with fundamentally voiceless and aspirated stops (e.g. g̊~k^h, as in *goal~coal* [g̊əʊɫ]~[k^həʊɫ]).[11] This basically means that English (like most of the Germanic languages) does not have a voice opposition in this approach, contrary to previous grammatical descriptions.

Iverson and Salmons (1995)’s ideas were followed and integrated by many phonologists (among others Jessen & Ringen 2002; Honeybone 2002, 2005; Beckman, Jessen & Ringen 2009, 2013; Balogné Bérces & Huber 2010a, 2010b; Cyran 2008, 2011, 2012, 2014, 2017a, 2017b; Balogné Bérces 2017; etc.); so they began to analyse languages with respect to aspiration as a phonological variable in laryngeal oppositions, mostly in the framework of

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[10] The VOT lag of voiceless stops changes not only according to languages, but places of articulation as well: so, posterior stops have a longer VOT lag than anterior ones; the usual order is: /p/ → /t/ → /k/ (cf. Section 3.2.5).

[11] In the IPA transcriptions, the small circle above a segment means voicelessness, while the ^{h} in the index means aspiration: that is, the examples *goal* and *coal* do not differ according to the voice value of the initial stops (since both are voiceless), but according to the presence or absence of aspiration.

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Government Phonology (and in some of its branches, using Element Theory). This approach to laryngeal phonology was called for the first time "Laryngeal Realism" (and also "the narrow interpretation of [voice]") by Honeybone (2005); in fact, it places voicing systems in a more realistic phonological view (cf. Balogné Bérces & Huber 2010a: 446).

On the basis of the literature on LR, languages which exhibit a two-way laryngeal contrast may be classified into two categories, according to the markedness of either the [voice] or the [spread glottis] feature. In the traditional view of generative phonology (also followed by Wetzels & Mascaró 2001, among many others), two-way laryngeal contrasts are generally simplified to the activity of a single, binary [±voice] feature, while a phonological role is not assigned to the aspirating properties of some Germanic languages. LR breaks with these traditions and sets up a dichotomy between "true" *voice languages* on the one hand (such as Slavic and Romance languages), in which the laryngeal opposition is based on the marked [voice] feature; and *aspiration languages* on the other (such as most of the Germanic languages), in which the marked phonological feature, [spread glottis], is related to the typical aspiration of (fortis) plosives. LR uses the *fortis-lenis* dichotomy in order to simplify the treatment of different laryngeal contrasts: fortis refers to aspirated stops in aspiration languages and to voiceless stops in voice languages; while lenis refers to unaspirated stops in aspiration languages and to voiced stops in voice languages.[12]

Voice languages and aspiration languages essentially differ, because only voice languages present "thoroughly voiced" initial stops, which in phonetic terms means that voiced plosives (such as [b, d, g]) in utterance-initial position appear with an early VOT lead,[13] that is, they are fully voiced (cf. Iverson & Salmons 2008). On the other hand, in aspiration languages initial lenis stops appear with a short-lag VOT, so they are not sufficiently voiced from an acoustic point of view. In these languages obstruent voicing is usually passive, that is, possible only in intersonorant position (between vowels or sonorants, mostly by lenition); while in voice languages voiced obstruents have their own voice value (which is considered active and so it can spread, evoking voice assimilation). Conversely, fortis stops are generally unaspirated in voice languages, and their acoustic shape is similar to the case of lenis stops in aspiration languages (viz. they have a short-lag VOT). Instead, in the latter category, fortis stops are

[12] Besides, a third (phonetic) term, *tenuis*, marks the neutral consonants, i.e., neither voiced nor aspirated (cf. Balogné Bérces 2017).

[13] Early VOT, or "negative VOT" means that the vocal cords start vibrating before the release of the stop, during the closure phase.

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heavily aspirated (with a long-lag VOT), and aspiration is also the main phonological criterion of the laryngeal contrast, indicated by the [spread glottis] feature.

Another very important property of voice languages is regressive voice assimilation (henceforth RVA), which stems from active voice that, in fact, can spread (cf. the phonological definition of assimilation in Section 1.1.3). According to the concepts of LR, the default direction of voice assimilation is regressive (that is, it is always the rightmost obstruent's underlying voice specification which determines the voice value of the cluster), and the process is absent in aspiration languages. Voiced obstruent clusters in aspiration languages (also explained by progressive voice assimilation in traditional phonology) are seen in this theory as the result of passive voicing and not assimilation (cf. Balogné Bérces & Huber 2010a).

In a LR approach, RVA consists in the sharing of [voice] values between adjacent obstruents, from the right towards the left, viz. the consonant to the right transfers its positive or negative voice value[14] to the one on the left. As a result, two obstruents which are specified differently for voice underlyingly, cannot appear strictly next to each other on the surface: they either have to be both voiced or both voiceless. RVA is a postlexical process, so it is not sensitive to word or morpheme boundaries, and it normally does not target vowels and sonorants, because they are not specified for [voice] (cf. Petrova *et al.* 2006; Kiss & Bárkányi 2006; Blaho 2008; Siptár & Szentgyörgyi 2013; etc.).

The literature on LR initially claimed that RVA is predictably present in voice languages (cf. van Rooy & Wissing 2001), but this statement was later debated (cf. Ringen & Helgason 2004). In order to definitely prove the correlation between distinctive [voice] and RVA we would need a complex typological survey on voice languages, which has not been done (yet). But we can maintain that in those voice languages which have already been analysed in the framework of LR (most of the Slavic languages, Hungarian, some Romance languages and Dutch), RVA has always been identified. Consequently, we will assume that the correlation found in other voice languages between the phonetic voiced-voiceless contrast and RVA is not accidental but systematic, and then the lack of RVA in Italian, which will be shown in this dissertation, is completely unexpected.

[14] Moreover, in Element Theory (which is the mainstream theoretical framework in LR) only the positive voice value is represented in phonological expressions and is therefore supposed to spread (cf. Section 3.4, also cf. Balogné Bérces & Huber 2010a, 2010b; Balogné Bérces 2017).

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1.2.3 Optimality Theory vs. Government Phonology

Optimality Theory (henceforth OT) and Government Phonology (henceforth GP) are two current mainstream frameworks in phonological theory. They were both born broadly at the same time, during the ’90s, and within generative theory, but on the basis of practically opposing ideas. GP (Kaye, Lowenstamm & Vergnaud 1985; Harris 1990, 1994) is a representation-based framework, which assumes that phonological processes are due to mechanisms involving a few universal elements (also called primes), for instance, in our case **L** expresses voice, while **H** expresses aspiration (for detailed descriptions see Section 3.4). On the other hand, OT (Prince & Smolensky 1993; McCarthy & Prince 1995) is a constraint-based framework, which presumes that phonological processes are realised through the net of universal conflicting constraints (for detailed descriptions see Section 3.3).

RVA is seen in a GP-account as the result of the instruction “activate **L** in licensed position”, where licensing comes from a following vowel; that is, C_1 is always unlicensed, while the next C_2 is licensed by the following pronounced vowel (Balogné Bérces & Huber 2010a: 455). In an OT-account RVA is basically the result of two high-ranked constraints: the markedness constraint called VOICEASSIMILATION (or AGREE(VOICE), which requires obstruent clusters to agree in their voice value) and the positional faithfulness constraint called IDENTPRESONORANT(VOICE) (which requires presonorant consonants to be faithful to their underlying voice specifications). Since the presonorant obstruent is the rightmost of the cluster (the term *presonorant* includes both vowels and sonorants), the assimilation will always be regressive (cf. Kenstowicz, Abu-Mansour & Törkenczy 2003; Petrova *et al.* 2006; Rubach 2008; Siptár & Szentgyörgyi 2013).

The use of both GP and OT in the phonological analyses of this dissertation may seem redundant and unnecessary. Still, I claim that both frameworks are needed in order to comprehensively explain the lack of voice assimilation in Italian phonology. GP and OT have been combined in analyses with success (cf. Polgárdi 1998; Blaho 2008), still, such theoretical hybrids have not met with general acceptance and remain isolated analytical experiments. In the literature, the phenomenon of RVA is very frequently analysed in OT, while GP’s Element Theory (henceforth ET) is one of the most frequently used models in the analyses of Laryngeal Realism. As we will see in Chapter III of the dissertation, these frameworks will offer two different, but relevant theoretical explanations for the examined phenomena. We will also see that OT and GP are in complementary distribution as far as the analysis of Italian laryngeal

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phonology is concerned: in fact, the OT-analysis is able to treat Italian as a voice language despite its not having RVA; while the analysis in ET cannot treat Italian as a voice language, since if it does not have voice-spreading, it cannot have the L-element, either.

1.2.4 The starting point: Foreign Accent Analysis

Most of the basic ideas which appear in this dissertation were born on the basis of a previous research, my MA thesis (Huszthy 2013a), in which I investigated the common phonological properties of the foreign accent of Italian speakers. The idea which that thesis was built on was that the phenomenon of foreign accent may reveal various characteristics of the productive phonology of the speakers' mother tongue. In the upcoming subsections I will explain the theoretical basics of a method I have dubbed *Foreign Accent Analysis* (henceforth FAA), and then illustrate it with the case study of Italian.

1.2.4.1 The idea of Foreign Accent Analysis

Foreign accents, or the way foreign languages are pronounced under the influence of the speakers' mother tongue, can be seen as errors in language learning, at least from the point of view of second language acquisition research and applied linguistics. However, from the perspective of theoretical linguistics, foreign accents may become a never-ending source of phonological data (cf. Huszthy 2013b: 2).

In Foreign Accent Analysis the phenomenon of foreign accent (henceforth FA) is seen as a product of phonetic and phonological interference between the speaker's dominant mother tongue (or first language, henceforth L1) and the foreign language (henceforth L2, where the number 2 refers to any language acquired in a second phase and not to the number of the foreign languages; cf. the terminology used in Mackey 2006). FA is unavoidable, at least some of the time, and in this way it can reveal synchronic phonetic and phonological characteristics of the speakers' L1 (Huszthy 2016a: 75).[15]

[15] According to the so-called Critical Period Hypothesis (cf. Piske, MacKay & Flege 2001: 195-197) only the first few years of life are adequate to acquire any language perfectly, and the "complete mastery of an L2 is no longer possible if learning begins after the end of the putative critical period". The method of FAA takes advantage exactly of L2 learning after the critical period, when the first language of the speakers (acquired before the critical period) inevitably influences their L2 pronunciation.

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The idea of analysing FA is not new at all, several researchers are occupied in this kind of activity with different goals, mostly from the perspective of sociolinguistics, second language acquisition and speech intelligibility (cf. Scovel 1969, Flege 1981, 1987, 1995; Altenberg & Vago 1983; Major 1987, 2001, 2008; Munro 2006; Gut 2009; Munro & Derwing 2011; Wheelock 2016; etc.). However, the idea of using FA only for theoretical linguistic purposes, that is, the initiative to analyse L1 phonology through L2 pronunciation, is rather new. Linguists do occasionally argue in some theoretical questions with sporadic examples from foreign accent (cf. Kaye 1992; Wells 2000; etc.), that is, FA arises in the literature as a secondary argument in the synchronic analysis of certain phenomena; however, in Foreign Accent Analysis the entire argumentation is based on FA, that is, FAA aims to reanalyse the synchronic phonology of languages through the pronunciation of foreign languages (cf. Huszthy 2013a, 2013b, 2014, 2015, 2016a, 2016b, to appear a, to appear b).

The theoretical basis of FAA consists in a simple fact: I claim that L2 pronunciation is strictly determined by the phonetic and phonological properties of L1, but only by the productive ones. The productive aspects of L1 phonology are not always well identifiable merely on the native vocabulary, since diachronically based language effects (and analogical extensions) may influence the speakers' spontaneous linguistic behaviour. Sometimes a need arises to analyse L1 through intermediary devices, like FA, in order to concentrate only on the synchronic and productive dimensions of L1 phonology (cf. Huszthy to appear a, to appear b).

There are also other experimental methods to find out about the productivity of phonological phenomena, such as *loanword adaptation* (cf. for instance Boersma & Hamann 2009a) or the reading out of *nonsense words* (cf. for instance Krämer 2009: 167-169).[16] However, FA seems to bypass some weaknesses of these other strategies: on the one hand, it helps to avoid potential diachronic effects which may weaken the efficiency of loanword experiments; on the other hand, foreign language speech creates a more authentic linguistic milieu than nonce-word reading, given that the source of the data is a natural language. At the same time, loanword tests can efficiently integrate the results of FAA; in fact, the basic idea of this dissertation – the lack of RVA in Italian – was deduced from FAA, but it will be tested on loanwords (cf. Section 1.3 and Chapter II).

[16] Further methods also arise, like language games, e.g. some Italian informants of mine have the habit of read words out loudly in a reverse order (e.g. *mantello* 'cloak' → "olletnam"): this kind of word game can be an excellent method to test a language's productive phonology (since consonant clusters change their regular order in the language, sometimes overcoming the sonority scale, etc.), but it requires experience from the speakers, and also appears to be less spontaneous compared to the other methods mentioned above.

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1.2.4.2 Phonetic and phonological components of foreign accent

Foreign accents may be made of several linguistic "ingredients", involving not only phonetics and phonology, but also other components of language (e.g. grammar, semantics, vocabulary etc.). However, from the approach of FAA, only phonetic and phonological factors are relevant, most of all the latter. The main reason of the primacy of phonology in FAA is that phonetic differences are gradual in languages, while phonological differences are presumed to be categorical (cf. Kager 1999: 5). That is, FA is not purely the outcome of sounds missing in L1 compared to L2, but much more, since FA can be attested even between languages with a very similar articulatory basis, but different phonological settings. Indeed, the analysis of FA must handle diversely the phonetic and the phonological component of the interference of L1 in L2.

During the phonetic analysis of FA, the articulatory bases of L1 and L2 are compared first. According to the claim of Flege (1987: 47-65), three kinds of sound may appear in L2 for the speakers of L1: there are "identical", "similar" and "new" sounds. Flege (1987: 48) explains that English speakers who learn French find "new" the L2 phones which do not have a counterpart in L1, such as the labial-palatal high vowel [y]. These sounds may be first identified with other similar sounds in L1, such as [ʊ], but the speakers eventually come to recognise the "new" L2 sounds, and they also can acquire to realise them. The situation is more complicated in the case of "similar" sounds, like English and French [t] or [u]. In fact, voiceless stops are aspirated in English, in contrast with French, while [u] is realised with a higher and more variable second formant in English compared to French. "Similar" sounds are more typical marks of FA than "new" sounds, since it is far more difficult to refine well-accustomed articulatory gestures than to acquire completely new ones.

Most of the phonetic and phonological components of FA consist of "transfer phenomena", that is, speakers transfer elements or processes from L1 to L2 (cf. Major 2008). A very common transfer process in the phonetic component of FA is *segment substitution*. This notion refers to the spontaneous activity of foreign language speakers to replace a "similar" or "new" sound of L2 (still using Flege's terminology) with another sound of L1, or with a sound intermediate between the typical L1 and L2 realisation.[17] However not only "similar" and

[17] Such "intermediate" sounds belong to the phenomena of "interlanguage", an intermediate language which is presumed to be personally built by the L2 students on the basis of their L1 and the other previously studied foreign languages (cf. the interlanguage literature, e.g. Selinker 1972; Ioup &Weinberger 1987; Costamagna & Giannini 2003; etc.). In the view of FAA, interlanguage is considered an idiolectal phenomenon (since its formation is always individual): that is, FA is not the result of interlanguage, FA is rather a further component of it. This

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"new" sounds can be substituted in FA, but even "identical" ones, that is, sounds with the same (or very similar) articulatory and acoustic patterns in L1 and L2. The substitution of "identical" sounds is usually motivated by phonological issues, in particular, by differences between the distributional criteria of the same sounds in L1 and L2.

Consider, for instance, the tense/lax opposition of Italian mid vowels ([e, ɛ] and [o, ɔ]), which is conventionally expressed in the literature by the [±ATR] (Advanced Tongue Root) feature (cf. Krämer 2009: 51). In the phonology of Italian [-ATR] vowels ([ɛ, ɔ]) may appear only in stressed syllables, while in unstressed syllables all mid vowels are [+ATR] ([e, o]); so lax mid vowels are the marked set in the system (Krämer 2009: 100). The consequences of this fact can also be observed in the FA of Italians. In unstressed syllables, Italian speakers tend to substitute [-ATR] vowels of L2 with [+ATR], even "new" sounds (like palatal-labial vowels). On the other hand, stressed [-ATR] vowels of L2 may also be substituted for [+ATR] in the Italian FA.

By way of illustration I cite here a few examples from the research corpus of my MA-thesis (Huszthy 2013a):[18] (Fr.) *volcanique* 'volcanic' [vɔlkaˈnik] → (It. FA) [volkaˈniːkə], (Eng.) *recent exams* [ˈriːsənt ɪgˈzæmz] → (It. FA) [ˈrisent ekəˈsɛːm], (Ger.) *lustigen Texten* 'funny texts' [ˈlʊstɪgən ˈtɛkstən] → (It. FA) [lusˌtiˑgen ˈtɛksten], (Ger.) *Glück* 'luck' [glʏk] → (It. FA) [glykː], etc. In these examples [-ATR] vowels became [+ATR] in Italian speakers' pronunciation: (L2) [ʊ, ɪ, ɛ, ɔ, œ, ʏ] → (It. FA) [u, i, e, o, ø, y]. On the contrary, in Italian most word-final stressed /o/-s are open, so Italians usually pronounce French final [o]-s as an open [ɔ]-s in their FA, e.g. (Fr.) *château* 'castle' [ʃaˈto] → (It. FA) [ʃaˈtɔ], *Bordeaux* [bɔʁˈdo] → (It. FA) [boʁˈdɔ], etc. In consequence, this type of segment substitution redirects FAA to the phonological component of FA.

As far as segmental phonology is concerned, three types of phonological processes are relevant in FAA: *insertion*, *deletion* and *modification* of segments (these are also in correspondence with the general typology of phonological changes, cf. Cser 2015).[19] At the same time, in the phonological analysis of FA at least two very different work phases can be

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consideration means that FAA cannot use the entire phenomenon of interlanguage in order to draw conclusions about the speakers' L1, only the module of FA (i.e., in FAA the concept of interlanguage is irrelevant).

[18] The target words are drawn from complex sample sentences, while all of the indicated pronunciations derive from different Italian informants, they are not hypothetical (cf. the description of the corpus in Section 1.2.4.3).

[19] As a fourth phonological process type, we could also add the *reordering* of segments (e.g. by metathesis), but it is a less relevant property of FA, it gains more importance in loanword adaptation (as it will also be considered during the analysis of the loanword test, cf. Section 3.1.4).

distinguished. In previous papers I labelled these phases *qualitative analysis* and *quantitative analysis* of FA (cf. Huszthy 2013a, 2013b, 2014); the first regarding the modifications of sound quality by phonological factors, and the second the extension (mostly in terms of length or weight) of sounds. This dichotomy was motivated by the nature of the target accent, namely the FA of Italians. Since this dissertation is concerned with the phonology of Italian, I keep using the above terms (being aware that they may require developments in the analysis of other languages' typical FA). Among the three types of phonological processes *modification* will be relevant in the qualitative analysis, while *insertion* and *deletion* will be relevant in the quantitative analysis.

During the qualitative analysis of FA, all the phonological processes are contrasted in L1 and L2 which are responsible for the distribution of segments, i.e. this part examines how phonetic segments are combined in FA (with respect to vowel and consonant clusters, the positional characteristics of the segments, such as initial or final appearance of consonants, stressed and unstressed segmental requirements, etc.).[20] In other words, typical phonemic contrasts and the effects of L1 phonotactics on L2 pronunciation are tested in this phase of FAA. In contrast, the main influencing factor of the quantitative analysis of FA is syllable structure. The speakers' spontaneous syllabification and the inherent requirements of stressed and unstressed syllables may determine the pronunciation of L2 (e.g. the alternation and duration of segments may depend on them). Syllable structure is an often discussed part in the phonology of languages, so FAA may also offer an alternative way to analyse L1 syllable structure through the FA of the speakers. Finally, the analysis of suprasegmental features may also be relevant in FAA, for instance, the Italian FA may help to discover the phonological conditions of word stress assignment (cf. Huszthy to appear a).

1.2.4.3 Italian consonantal system vs. Italian foreign accent

In the following subsections I will attempt to list the most important phonological characteristics of the Italian FA in connection with the consonants, starting with an introduction to the Italian consonantal system (Section 1.2.4.3.1). Then, a discussion about the phonemic status of /z/follows (Section 1.2.4.3.2). The description of the Italian FA will be concerned first

[20] All the "new", "similar" and "identical" sounds are part of the segmental distribution of FA, which were phonetically substituted or preserved in the speakers' FA.

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with the qualitative phonological processes found in the FA, and second with the quantitative peculiarities, mostly the effects of Italian syllable structure on the FA (Section 1.2.4.3.3).

Before proceeding, however, we need to explain what we mean when we talk of Italian FA. Despite the extreme dialectal fragmentation of the Italian linguistic territory (cf. Section 1.1.1), Italians tend to pronounce foreign languages with a FA which is phonologically almost identical and easily recognisable, irrespectively of their geographical origin. This discovery helps us to understand that the dialectal accents of Italian share a great number of phonological phenomena in synchrony, which also appear in their FA. Accordingly, the synchronic dialectal differences between Italian L1 pronunciations seem to be more of phonetic than phonological nature (i.e. they stem from articulatory patterns, while as for the distribution of segments, the speakers' behaviour does not show significant structural differences).

1.2.4.3.1 Italian phonemic consonants

The exact number of the phonemically contrastive consonants of Standard Italian is a controversial issue in the literature. However, it is accepted that only four places of articulation are distinctive, where the first three include subdivisions that are not contrastive in themselves: bilabial/labiodental, dental/alveolar, postalveolar/palatal, velar (Bertinetto & Loporcaro 2005: 132-133). The phonemic consonants of Italian are shown in Chart (1) in a revision based on various descriptions and analyses of Italian phonology (cf. Saltarelli 1970; Muljačić 1972; Canepari 1980, 1992; Mioni 1993; Nespor 1993; Schmid 1999; Bertinetto & Loporcaro 2005; Krämer 2009, 2016; Huszthy 2017b).

Chart (1): *Italian phonemic consonants*

	Bilabial	Labiodental	Dental	Alveolar	Postalveolar	Palatal	Velar
Plosive	p b		t d				k g
Fricative		f v		s	ʃ		
Affricate				t͡s d͡z	t͡ʃ d͡ʒ		
Nasal	m			n		ɲ	
Lateral				l		ʎ	
Rhotic				r			
Glide	w					j	

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I will add here some complementary information to Chart (1), following Bertinetto & Loporcaro (2005: 133) and Krämer (2009: 45-50, 2016: 207). Plosives are unaspirated in all positions.[21] The thrill /r/ appears often as a monovibrant flap [ɾ], mostly between vowels. The consonants /t͡s/, /d͡z/, /ʃ/, /ɲ/ and /ʎ/ are phonotactically allowed only in intervocalic position and word-initially, and are always long intervocalically.[22] Besides, all consonants occur in Italian as geminated, but the contrastivity of consonant gemination is limited (for dialectal reasons as well, because in many Northern Italian varieties gemination is absent).

Beyond the consonants in Chart (1), further consonantal segments belong to the phonetics of Standard Italian, which are realised in specific positions: [z, ɾ, ɱ, ŋ]. Furthermore, several additional consonantal segments appear in the dialects of Italy, mostly fricatives, like [ʒ, ɸ, β, θ, ð, x, h, ɦ, ɣ] in Tuscan varieties, and [ç, ʝ] in Southern Italian varieties (cf. Rohlfs 1966; Loporcaro 2009; Ulfsbjorninn 2017). However, these extra segments generally undergo segment substitution even in the FA of Italian dialect speakers.

1.2.4.3.2 About the phonemic status of /z/ in Italian

Many linguists consider /z/ a phoneme in Italian; its phonemic status is quite questionable, though, for several reasons (hence we did not include /z/ in Chart (1), either; cf. Huszthy 2016a, 2017b, 2018). First of all, /z/ is presumed to be phonemic only in Tuscan varieties (even if Standard Italian was built on them, cf. Section 1.1.1). In Northern Italy the voiceless [s] does not appear in intervocalic position, only word-initially and before voiceless obstruents (and also word-finally, even if it is a rather limited position); so, [s] is never in phonological opposition with [z]. On the other hand, in Southern Italy (as well as in many Central Italian varieties) only [s] is allowed between vowels, at least from a diachronic perspective. Nowadays, due to the effect of northern-like pronunciations through the mass media (cf. footnote 3), [s] is in free variation with [z] in intervocalic position (both intraspeaker and interspeaker variation is attested); that is, [s] and [z] are not in phonological opposition in these varieties, either.

However, the phonemic status of /z/ is questionable in Tuscan pronunciations as well. In the literature generally three minimal pairs are mentioned with /s/ and /z/: a) *pre*[s]*ento* 'to have a presentiment, 1sg' vs. *pre*[z]*ento* 'to present, 1sg'; b) *fu*[s]*o* 'spindle' vs. *fu*[z]*o* 'to fuse,

[21] However, a small amount of aspiration has recently been identified in Italian plosives, cf. Sections 3.1.2, 3.2.1.

[22] In Southern Italy, /m/ and /d͡ʒ/ are also geminated in intervocalic position (cf. Loporcaro 2009, 2011). Moreover, the phonemic status of /d͡z/ is questionable in Italian, cf. Section 3.2.3.1.

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past participle'; c) *chie*[s]*e* 'to ask, 3sg, "remote" past' vs. *chie*[z]*e* 'church, pl.'. The first (and most cited) example is certainly not a real minimal pair: according to Nespor & Vogel (1986: 125), intervocalic s-voicing applies within the domain of the phonological word, and derivational prefixes constitute independent phonological words in Italian; consequently, the verb *pre*[s]*entire* 'to have a presentiment' includes two phonological words (*pre*+*sentire*) – i.e., the /s/ is initial and as such, it could not appear as [z] –, while the verb *pre*[z]*entare* 'to present' forms a single phonological word (cf. Nespor & Vogel 1986: 128). In examples b) and c) the words with [z] are much more frequent in language use than the words with [s]; moreover, in today's pronunciation varieties those with [s] also exhibit variation between the voiced and voiceless realisation of the sibilant.[23]

In conclusion, we will not consider /z/ a phoneme in this dissertation, which deals with spoken Italian. The most important argument to support this decision is that initial and final /s/ is always voiceless (as well as /s/ before [-voi]), while in other positions variation is attested between voiced and voiceless realisations, so [z] seems to be produced by a phonological process, namely s-voicing. In any case, the phonemic status of /z/ is not a relevant question to decide in the present study; in fact, during the upcoming loanword analysis (in Chapters II and III) the input forms are not supposed to go back to the underlying form, but mostly to the written form of the loanwords (even so because the data source is built on a reading task).

1.2.4.3.3 The consonantism of Italian compared to the FA

In the following part of this section we will focus on consonantal phenomena found in Italian FA (cf. Huszthy 2013a, 2013b, 2014, 2015a, 2015b, 2016a, 2016b). The results are based on my own speech recordings, which were made between 2012 and 2013 in Italy, with people encountered in the streets. Three Italian cities participated in the experiment, in order to roughly cover the major dialectal territories of Italy, namely Gorizia in the north, Florence in the centre of the Italian peninsula, and Naples in the south. In total I had 68 informants who provided me with useable data (39 male and 29 female native Italian speakers, with the age average of 24 years). For the most part, the data were recorded outdoors with a high quality digital sound recorder device. The informants were asked to read out loud different sample sentences, extracted from authentic texts in four languages, English, German, French and Spanish. The

[23] Such variation is also indicated in some monolingual dictionaries of Italian, e.g. in *Zingarelli* and in *Treccani*. About the question of word frequency in language use (and its source) cf. Section 2.2.1.4.

informants had to choose the foreign language(s) they were more familiar with. Eventually I managed to collect approximately 12 hours of speech recordings with them (for other details of the data collection and for the sample sentences, see Huszthy 2013a).

The qualitative properties of Italian FA originate from the distribution of “new” and “similar” L2 singleton consonants and the handling of unusual consonant clusters. The major problem of Italians is linked to fricative consonants and obstruent clusters. Among fricatives, the “new” segments in L2 compared to the articulatory basis of Standard Italian (e.g. [ɸ, β, θ, ð, ç, ʝ, x, ɣ, χ, h]) can be easily acquired by Italians, but phonotactically they are handled with difficulties.[24] For instance, Italians who speak Spanish well, also use the interdental fricatives [θ, ð], but they often make mistakes in their phonological distribution: they tend to use them regularly in intervocalic position, but often miss them word-finally or next to a consonant, e.g. (Sp.) *quiero ha*[θ]*er un arro*[θ] *con ver*[ð]*uras* ‘I want to make rice with vegetables’ → (It. FA) *quiero ha*[θ]*er un arro*[s] *con ver*[d]*uras* (Huszthy 2013a). Similar patterns were found in the case of German posterior fricatives, i.e. Italian speakers were able to acquire [ç, x, h], but they used them with unsystematic non-L2 distributional patterns, e.g. (Ger.) *ich kann es nicht verstehen* ‘I can’t understand it’ [ʔɪç kan ʔɛs nɪçt fɛʁʃteːən] → (It. FA) [ˈʔix ˌkan ˌʔez ˈniʃt feˈʃteːn], (Ger.) *das habe ich mir auch gedacht* ‘I thought that too’ [das ˈhaːbə ʔɪç miːɐ ˈʔaʊx gəˈdaxt] → (It. FA) [das ˈsaːbe ʔiç miːa ˈʔɔwx geˈdakt]. In these cases the “new” fricative sounds could be perfectly produced by the Italian informants, but they also underwent different substitutions, e.g. [ç] → [x], [ç] → [ʃ], [x] → [k], [h] → Ø.

The most important and unique characteristics of Italian FA derive from quantitative phonological properties, first of all by the influence of syllable structure, which will be considered soon. The handling of obstruent clusters represents an area of transition between the qualitative and quantitative analysis of Italian FA, since both phonotactic and syllabic effects are involved. The qualitative characteristics of Italian FA most relevant to this study lie in the voice patterns of obstruents. Initial voiced obstruents are pronounced by Italians as thoroughly voiced, even in English and German L2. Furthermore, in /sC/ clusters Italians tend to apply s-voicing in L2 before voiced consonantal segments, even sonorants and the semivowel [w], e.g. (Eng.) *snake, smoke, slide, swimming* → (It. FA) [s] → [z]; (Ger.) *Lebensmittel* ‘food’ [ˈleːbənsmɪtəl] → (It. FA) [lebenˈzmitːel]; (Fr.) *franchement* ‘clearly’ [fʁɑ̃ʃmɑ̃] → (It. FA) [fʁɑ̃ʒˈmɔ̃] (where even the postalveolar sibilant /ʃ/ gets voiced); etc. On the other hand, Italians

[24] As it was mentioned in Section 1.2.4.3.1, dialectal speakers may be articulatorily familiar with some of these consonants, even so, they tend to substitute them in L2 with the phonemic consonants of Standard Italian.

tend to not apply consonant voicing or devoicing in the case of any other obstruent cluster, and not even in /sC/ clusters at word boundaries, e.g. (Ger.) *wo gibt es?* [ˈvoː ˌgɪpt ɛs] ‘where is it?’ → (It. FA) [vo ˈgiːbt es], (Ger.) *langfristigen* [ˈlaŋfʁɪstɪgən] ‘long-term’ → (It. FA) [laŋgˈfʁistigen]; (Sp.) *muchas gracias* ‘thank you very much’ [z|g] → (It. FA) [mutʃas ˈgraːθjasː], (Sp.) *Islas Baleares* ‘Balearic Islands’ [z|b] → (It. FA) [ˌizlas baleˈaːres], etc. These examples were the first occurrences to motivate me to examine the voice assimilation patterns of spoken Italian more precisely.

In order not to offer an incomplete description of the FAA of Italian, I will mention a few of other phenomena related to syllable structure; specifically, schwa epenthesis and consonant lengthening in obstruent clusters and sentence-finally, stressed vowel lengthening and unstressed vowel shortening. These phenomena – which are among the most prominent characteristics of Italian FA – arise from quantitative, rather than qualitative phonological processes, namely by insertion and deletion.

There is general agreement among Italian phonologists that the syllable rhyme in Italian may contain at most two elements: a long vowel in the nucleus or a short vowel in the nucleus with a sonorant in the coda (cf. among others Bertinetto & Loporcaro 2005: 140-141; Krämer 2009: 134-135). Loanwords which do not fit into these patterns are automatically adapted to these syllabic restrictions with schwa epentheses, i.e. a schwa is introduced in the middle of complex consonant clusters or word-finally, e.g. (It.) *fast*[ə]*food*, *ping*[ə]*pong*[ə], *Nord*[ə] ‘north’, *Est*[ə] ‘east’, *alt*[ə]! ‘stop!’, *sport*[ə], *file* [ˈfaˑjlə], etc.[25]

Schwa epenthesis is a very common repair strategy to resolve consonant clusters in Italian FA as well. The duration (and the phonetic quality) of the schwa in the FA does not always reach that of lexicalised loanwords, but the tendency is well perceptible (first of all in sentence-final position), e.g. (Eng.) *students* → (It. FA) [ˈstjuːdent͡sə], *forked tongue* → (It. FA) [ˈforkᵊtə ˈtɔŋgə], (Ger.) *längst* ‘long ago’ [lɛŋst] → (It. FA) [ˈlɛŋgᵊstə], etc. Schwa epenthesis is also very likely to happen in monosyllabic L2 words which end in a single consonant. When the monosyllables appear at the end of a sentence (or before a prosodic pause), the final consonant tends to be geminated in the Italian FA, which also results in the additional schwa

[25] The phonological motivation of schwa epenthesis is quite simple: when the Italian syllable rhyme contains too many elements (i.e. when a vowel is followed by two coda-consonants, like in /sport/), the cluster will be resyllabified into two syllables (/spor.t/), and the nucleus of the new syllable gets obligatorily filled by the least marked vowel of Italian: [spor.tə] (which is recently the schwa, but diachronically there were other vowels to fill this position, e.g. in earlier loanwords, like *sterlina* ‘sterling’, *malto* ‘malt’, *stanforte* ‘stamford’, etc. (cf. Domokos 2001: 297-298; also cf. Repetti 2012: 170-171)).

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insertion (but final gemination may also take place without a schwa epenthesis), for example: (Eng.) *had* → (It. FA) [(h)ɛdːᵊ], *sheet* → (It. FA) [ʃitːə], *step* → (It. FA) [stɛpːᵊ], *of* → (It. FA) [ɔvːə], *feel* → (It. FA) [filːə], etc.

Another important characteristic of Italian FA is the frequent lengthening of stressed vowels in open syllables, in line with the shortening of unstressed ones. Italian syllable structure is sensitive to word stress, accordingly, stressed syllables must be heavy (that is, the rhyme must contain at least two segments).[26] This "heavy-stressed syllable requirement" (also known as Stress-to-Weight Principle, cf. Kager 1999: 268; also cf. Section 3.3.1) of Italian phonology is often present in the FA of Italians as a general tendency, and usually comes forward with the lengthening of the stressed vowel, e.g. (Eng.) *ever* → (It. FA) [ˈɛˑvər], *cities* → (It. FA) [ˈsiːtiz]; (Sp.) *pueblos* 'villages' [ˈpweβlo(s)] → (It. FA) [ˈpwɛːblos], *conocer* 'to know' [konoˈθer] → (It. FA) [koˈnɔːθeɾ]; (Ger.) *stille Nacht* 'silent night' [ʃtɪlə naxt] → (It. FA) [ˈʃtilːe ˈnaːxtə], *Geschichten* 'stories' [gəˈʃɪxtn̩] → (It. FA) [gəˈʃiːxtən]; etc.[27]

Alongside stressed vowel lengthening, the opposite process is also present in the FA of Italians, namely the tendency to shorten unstressed long L2 vowels. In Italian phonology long vowels may only occur in stressed position, and this fact has its consequences on Italian FA as well, e.g. (Eng.) *maybe* [ˈmeɪbiː] → (It. FA) [ˈmeˑjbi], *close read* [kləʊs riːd] → (It. FA) [ˈklowz rid]; (Ger.) *hochheilige* 'most holy' HD [hoːxˈhaɪlɪgə] → (It. FA) [oˈxajlige], *übersetzen* 'translate' [yːbɐˈzɛt͡sn̩] → (It. FA) [ybaˈzɛt͡sːən], *Lebensmittel* 'food' [ˈleːbənsmɪtəl] → (It. FA) [lebenˈzmitːel]; etc. The typical monophthongisation (or non-diphthongisation) of Italian FA may also be in concordance with unstressed vowel shortening (in this case, indeed, unstressed L2 diphthongs tend to turn into short vowels), e.g. (Eng.) *profile* [ˈprəʊfaɪl] → (It. FA) [proˈfajlᵊ], *hydro-bob* [ˈhaɪdrəʊbɒb] → (It. FA) [ajdroˈbobːə], *faithfully* [ˈfeɪθfəli] → (It. FA) [feθˈfulːi], etc.

On the basis of the FA of Italians we can draw some general conclusions about the synchronic phonology of Italian which could be useful in the assessment of voice assimilation as well. On the whole, Italian phonology seems to be "conservative" in synchrony (cf. Huszthy 2015a), which is mainly manifested in tendencies of "input preservation". This assertion, based

[26] At the same time, the weight of the rhyme in Italian phonology is maximised in two moras, so according to Krämer (2009: 179)'s proposal, the stressed syllable rhyme must contain exactly two segments in Italian.

[27] In the German examples the lengthening of the stressed vowel before fricative+obstruent clusters indicates that these clusters are parsed as tautosyllabic by the informants (cf. Huszthy 2016a).

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on Italian FA, will be very important in the formulation of the hypotheses of this work (for further details cf. Section 3.3.2).

Italian speakers' phonological attitudes during the pronunciation of foreign languages can be called conservative for several reasons. With respect to the qualitative analysis, Italians tend to possibly preserve the input elements in their accent; that is, they apply insertion processes more easily than deletion or modification (viz., modification can also be seen as a sort of deletion). One of the most obvious tendencies of Italian FA to maintain this claim is schwa epenthesis. Italians apply several schwa insertions in L2, almost at every occurrence of consonant-ending words or obstruent clusters (apart from /sC/). The most likely appearance of a schwa is after a long consonant (or a cluster) and before a prosodic pause. In this case Italians, instead of deleting any of the input consonants, more likely insert a new syllable in the word (since the schwa resyllabifies the ill-formed consonants), with the purpose of preserving the input elements, rather than deleting them.

Consonant gemination is a similarly motivated process: gemination helps to preserve input elements as opposed to deletion. When Italians encounter L2 words which end in a singleton consonant, they tend to geminate them (and the gemination, in a further step, may involve schwa insertion as well). In stop plus consonant clusters (which are ill-formed in Italian phonotactics)[28] Italians tend to geminate the stop before the consonant (especially Southern Italians), e.g. (Eng.) *kept* → (It. FA) [ˈkɛpː(ə)t(ə)], *correctly* → (It. FA) [korːekː(ə)ˈtli], *text* → (It. FA) [ˈtɛkː(ə)st(ə)], etc.[29] This gemination process is a conservative tendency in order not to delete the input segment, but to phonologically strengthen it (cf. Huszthy 2015a: 259-260; and also cf. Section 3.1.5).

These first considerations about the conservatism of synchronic Italian phonology may be important in the analysis of voice assimilation as well. Indeed, the lack of voice assimilation in [+foreign] words may be explained similarly to the previous processes, as an inclination to preserve the input segments (cf. the OT-analyses in Section 3.3). Voice assimilation, in fact, is

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[28] In diachrony, the ill-formed stop plus consonant clusters (inherited from Latin or adopted from Greek) were resolved by place assimilation and deletion in Italian (cf. Rohlfs 1966), e.g. (Lat.) *abstractus* 'abstract' */apstraktus/ → (It.) *astratto* (where /p/ was deleted and /k/ was assimilated). However, place assimilation and deletion are not productive processes anymore in current Italian phonology, neither do they appear in recent loanwords or in the FA of Italians (cf. Huszthy to appear a). Present-day Italians tend to resolve the ill-formed stop plus consonant clusters with insertion, rather than deletion.

[29] Brackets mean optionality in these cases, since in the dataset gemination occurs both with and without schwa epenthesis (Huszthy 2015a: 246).

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associated with sound modification (and so feature deletion) as well, but Italian phonology seems to resist deletion.

1.3 The research corpus

The corpus of the study on Italian foreign accent has been introduced in Section 1.2.4.3. After the discovery of the strange laryngeal patterns in Italian FA, a need for a new corpus arose: a very specific data collection, focussed on various obstruent clusters and /sC/ clusters. Another analysis of Italian foreign accent would not have been enough this time, since the aim of the new study was to discover the synchronic laryngeal patterns of spoken Italian. However, the native Italian vocabulary lacks the obstruent clusters that were needed (cf. footnote 28); therefore, the new corpus was based on a loanword experiment.

Loanword experiments usually consist in testing L1 pronunciation in authentic texts with the use of a variety of loanwords and proper nouns within, containing ill-formed or unusual sound sequences for L1 phonology. Some tendencies observed in FA often get lexicalised in loanwords (like Italian vowel insertions in ill-formed consonant clusters and word-finally), while others typically disappear (like many segment substitutions). In this way, loanword experiments may thoroughly integrate into FAA, especially if someone is interested in a restricted area of L1 phonology, such as voice assimilation in our case.

The most useful data collection would have stemmed from recordings of spontaneous speech, but in our case that seemed practically impossible, since we needed very precise acoustic data, recorded in a soundproof cabin with high quality microphones. Finally I decided to carry out a reading task.

The material of the corpus has been prepared on the basis of *target words* containing diverse laryngeal variables, which have been organised into short Italian *sample texts* (formulated by myself, with the help of two native Italian speakers). Eventually 18 sample texts have been prepared with 108 target words; each text consists of one, two or three sentences. The target words are mostly loanwords which, according to monolingual dictionaries, are used in Italian; moreover, a number of foreign proper names and technical terms were also used.

Various consonant clusters appear in the target words, ideally containing every possible consonantal concatenation, that is, stop plus consonant clusters (with respect to the three major places of articulation: labial, palatal and velar), fricative plus consonant clusters, affricate plus consonant clusters and sonorant plus obstruent clusters. The sample texts were pasted as scripts

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in the SpeechRecorder software.[30] The complete research design can be found in the appendices of the dissertation: cf. Appendix (A) for the Italian sample texts with English translation, Appendix (B) for the list of the target words with the expected word-internal laryngeal phenomena, and Appendix (C) for target word pairs with expected laryngeal phenomena in sandhi position.

The recording phase of the data collection was carried out on different occasions between 2015 and 2017, in two soundproof studios: at the Research Institute for Linguistics of the Hungarian Academy of Sciences in Budapest (henceforth Studio A), and at the Laboratorio di Linguistica “Giovanni Nencioni” of the Scuola Normale Superiore di Pisa (henceforth Studio B). In Studio A 12 Italian informants were recorded, mostly Erasmus students in Budapest, to whom money was offered in exchange for their services. The informants of Studio B were three local PhD students and collaborators, who volunteered to be recorded. Information about the informants is given in Chart (2).

Chart (2): *The informants of the data collection*

Informants from	Male	Female	Age average	Total
Northern Italy	1	3	23.25	4
Central Italy	1	5	29.16	6
Southern Italy	2	3	26.8	5
Total	4	11	26.4	15

As shown in Chart (2), the 15 Italian informants came from several different dialectal territories of Italy, which was an important criterion of the data collection, since the aim was to compare different dialectal accents of Italian from the point of view of laryngeal activities. Two of the 4 Northern Italian informants are from Emilia-Romagna, one comes from the province of Verona, while the northernmost speaker is from the province of Trento. Two of the 6 Central Italian informants are from Pisa, 3 are from Rome (the dialectal accent of Rome is considered here a central accent, even if some Italianists consider it a central-southern accent), while another informant comes from Nuoro, Sardinia (she is also considered central for convenience, even if Sardinian accents markedly differ from all other dialectal accents of Italian; her laryngeal

[30] SpeechRecorder (2014-) is a popular computer software for acoustic data collection, created by the *Institut für Phonetik und Sprachverarbeitung* of the Ludwig Maximilian University of Munich (www.bas.uni-muenchen.de/Bas/software).

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results, however, fit among the Central Italian ones, cf. Section 2.2.1.1). Among the 5 Southern Italian informants 2 are from Southern Calabria (the province of Vibo Valentia), 2 from Naples and one from Northern Apulia (the province of Foggia).

The speakers were recorded alone in a soundproof cabin, in Studio A with a high quality head microphone, in Studio B with a classical standing microphone (therefore, a minimal background noise can be detected in the recordings of Studio B). After a brief self introduction,[31] the informants were asked to read out loud the texts which appeared on the screen, in their normal speech tempo. Each sample text appeared five times, so the procedure took approximately half an hour per person. The results of the recordings are uncompacted mono wav files. The files were handled and processed for phonetic and statistical analysis in Praat.[32] Statistics and diagrams were made with the aid of Excel and R.[33]

Three general problems arise with the data collection procedure, which cannot be fixed anymore, but even so, the corpus is appropriate for the purposes of the dissertation. Firstly, Cavirani (2018: 143) formulates a criticism with respect to my data collection method: he writes that "a factor that Huszthy (2016a) does not take into account is the influence of the spelling of the loans on the production/perception (Hamann & Colombo 2017), and therefore on the presence or absence of RVA" (cf. Section 4.3). This observation is in part right, since spelling may in fact have its influence on the pronunciation of the target words. Unfortunately, the only applicable method for high quality acoustic data collection was the one used in this study. However, laryngeal phenomena are among the least controllable of speech production, and RVA as a postlexical process is supposed to manifest itself during the reading of a written text as well. As far as the loanwords are concerned, even if the speakers are aware of the "underlying" form of the target word, suggested by the graphic dimension, this does not change

[31] Prior to the concrete sample sentence reading, the informants were asked to talk about themselves for a couple of minutes in the studio, during the calibration of the microphone (mostly general information was told about personal background, such as home, family, education, work etc.). This self introduction was useful even from the point of view of the research, in order to observe dialectal differences between their accents. All of them spoke Standard Italian, but with a slight dialectal accent (later I showed these intro recordings to other Italians, who were immediately able to recognise their accents, and localise them geographically; at the same time, they confirmed to hear standard accents). Based on the dialectal variability of the speakers, the research aims to prove that the laryngeal properties of different dialectal accents of Italian show a phonological uniformity, in which the most important hypothesis is that voice assimilation is equally absent in all of the native accents of the corpus.

[32] Praat is one of the most popular speech analysis software packages, created by Boersma & Weenink (1992-; www.praat.org).

[33] R is a statistical analysis software created by the R Foundation for Statistical Computing (www.r-project.org).

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the validity of the data collection method, since in a loanword test the input is exactly the written form (cf. Krämer 2016: 205). At the same time, it is also right that the lack of RVA may occur in the case of any voice language speaker during slow careful speech (cf. Sections 3.1.3 and 4.1; also cf. Markó, Gráczi & Bóna 2010); nonetheless, the Italian informants of the study applied a relatively fast speech tempo during the recordings.

A control group of five Hungarian informants (fluent speakers of Italian as L2) also participated in the recordings. They pronounced the same sample texts in Italian, but with sharply different results (applying RVA in 81% of the obstruent clusters, as opposed to the 15% of the Italians' RVAs), which also legitimises the loanword test (cf. Section 2.2.1.1). Moreover, if the spelling of the target words really influences the Italian informants' pronunciation, it is even better for us, since only optional processes can be influenced by spelling. That is, RVA is not systematic in the pronunciation of these Italian informants, unlike in the case of the Hungarian control informants.

A second weakness of the data collection was that too many target words were included in the single sample texts. According to the informants' feedback, some sentences in the corpus seemed tongue twisters. On the other hand, not all of the target words were provided with laryngeal variables, many of them contained equally voiced or voiceless obstruent clusters, which served as distractors.

The third problem with the corpus is that the data collection was unbalanced as far as the repetitions are concerned. Six informants of the experiment repeated the sample texts five times; however, seven informants repeated them only three times, one informant only twice, and another only once. This happened for various reasons, mostly out of issues of time and patience. Fortunately, the results of the single informants correspond to the overall averages of the dataset. During the statistical analyses of Section 2.2 these cases of unbalancedness will be considered, and detailed statistics will also be shown; therefore, the results of the corpus will be as normalised as possible.

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Chapter II

2. Phonetic and statistical issues: How to prove that voice assimilation is absent in Italian?

In the second part of the dissertation phonetic evidence is provided in order to support the claim that Italian lacks voice assimilation. Firstly, in Chapter 2.1 spectrograms and waveforms will reveal that the adjacency of a fully voiced and a fully voiceless obstruent is physically possible, as it is observed in the pronunciation of Italian informants. Secondly, in Chapter 2.2 statistics will demonstrate that Italians tend to avoid voice assimilation in obstruent clusters. Speakers are capable of applying voice assimilation, which appears in 15% of the obstruent clusters pronounced by the informants (with both intraspeaker and interspeaker variation), but in two-thirds of the occurrences they do not assimilate the differently voiced obstruents at all. Consequently, Chapter 2.1 offers "visible" evidence for the lack of voice assimilation in Italian by a few individual representative examples, while in Chapter 2.2 "countable" evidence is offered, since statistics permit us to see through "the big picture" of the dataset.

2.1 "Visible" evidence for the lack of voice assimilation

The fact that adjacent obstruents can be differently voiced in the pronunciation of Italians cannot be well identified in the auditory modality, but with the aid of speech analysing software the graphic shape of pronunciation is accessible. In this section two kinds of visual sound representations will be shown, produced with Praat: on the one hand, *waveforms* (also called *oscillograms*) are linear-temporal representations of speech in the form of waves, which are useful to distinguish voiced and voiceless obstruents (waves only appear when there is vocal cord vibration); on the other hand, *spectrograms* show the spectrum of sound frequency, which reveals a large amount of information about the constitution of sounds. The segmentation of sounds and the acoustic analyses are based on the relevant phonetic literature (cf. Ladefoged 1996; Ladefoged & Maddieson 1996; Kassai 1998; Johnson 2003; Gósy 2004; Machač & Skarnitzl 2009; Boersma & Weenink 1992-; etc.).

Before proceeding we must note that the phonetic transcriptions of the selected target words will not exactly agree with their acoustic shape on the spectrograms. Transcription is always conventional, these conventions will be here phonologically based, which refers

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primarily to the indication of the length of the segments. Length will be indicated only if it is phonologically relevant, that is, when we expect a segment to be lengthened (such as in the case of stressed vowels and final consonants). In the case of unexpected lenghtening the length will not be indicated in the transcription; for instance, final vowels often seem long in the spectrograms, which probably happens for paralinguistic reasons – e.g. because the speech tempo becomes slower near the end of the pronunciation of the word –, but they are always transcribed as short (i.e., in Italian there are not final long vowels).

In the following subsections selected waveforms and spectrograms will be shown of relevant target words, so as to also offer a comprehensive image about the informants. Accordingly, different speakers' pronunciations will be shown in the figures, and in this way it will be demonstrated that every single informant is capable of keeping up opposing voice values of adjacent obstruents, i.e., of not applying voice assimilation.

2.1.1 Obstruent clusters other than /sC/

In Sections 2.1.1 and 2.1.2 I will separately analyse non-/sC/ clusters and /sC/ clusters, since the latter are the only obstruent clusters which are present in the native Italian vocabulary and may diachronically hold regressive voice assimilation (or, synchronically, present s-voicing). Among non-/sC/, clusters of stops are of extreme relevance: in Chapters 2.1.1.1 and 2.1.1.2 stop plus stop clusters will be examined according to the order of the voiced and the voiceless element. As usual in recent phonological works, voiced stops will be referred to with a capital D, while voiceless stops with a capital T.[34]

In "ordinary" voice languages (cf. Sections 1.2.2 and 3.2), devoicing by RVA would be expected in DT clusters (DT → TT), while voicing by RVA would be expected in TD clusters (TD → DD). Section 2.1.1.3 deals with consonant clusters which are composed of a fricative and another consonant (where F stands for voiceless fricatives and V stands for voiced ones).[35] The same section will present /Cs/ clusters (i.e. consonant plus /s/), too, whose behaviour does not show significant differences compared to other consonant plus fricative clusters. Finally, in

[34] In certain works D and T may stand even for voiced and voiceless obstruents in general (as in Honeybone to appear); here, however, they also symbolise their manner of articulation, viz. plosive.

[35] The allusion to voiced fricatives with a capital V may be disturbing, since V also indicates "vowel". Unfortunately, no better solution was found, since the other possibility, the use of capital Z does not work, since sibilants are treated separately in this work. However, the context will always reveal whether V denotes a voiced fricative or a vowel.

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Section 2.1.1.4 consonant clusters with an affricate will appear, which are more complex phonetically, since affricates are combined segments a priori.

2.1.1.1 Data: DT clusters

Generally, the underlying adjacency of a voiced stop (D) and a voiceless stop (T) surfaces in languages as a cluster of two voiceless stops: /DT/ → [TT]. This process is classically interpreted as devoicing by RVA (cf. Wetzels & Mascaró 2001). But in the innovative view of LR it can also be seen as not a result of any process, instead, as the lack of active voice in the laryngeal phonology of certain languages. These languages may only exhibit passive voicing in the case of lenis obstruents, i.e. underlyingly voiceless obstruents may acquire voice in intersonorant position only; that is, the real input of /DT/ is already /TT/, without any transformation (cf. Balogné Bérces 2017).

Another, very rarely surfacing solution of DT clusters is progressive voicing: /DT/ → [DD]. Phonologists often debate its reason of existence, because the potential examples of it – e.g. suffix-voicing in English (such as in *do*[gz]; even if the voiced element is a fricative here) and Dutch (e.g. *gekra*[bd]*e* 'to scratch, past. part.' /bt/ → [bd]) – are recently reinterpreted as underlying and not derived phenomena; moreover, in these examples the morphological structure may also determine the direction of the assimilation (cf. Zonneveld 2007; Cyran 2011, 2014).[36] Nevertheless, progressive voicing is considered in this work as an option, since even in the dataset of the corpus a few occurrences appear when Italians spontaneously resolve DT-clusters with progressive voicing.[37]

The prevalent Italian solution of DT clusters, however, seems to be exceptional compared to the literature, since Italian speakers tend to retain the underlying voice values of the adjacent stops, so /DT/ usually surfaces in their accent as [DT]. Among the target words of

[36] On a forum of *Researchgate* a relevant discussion can be read in the topic: on the initiative of Geoffrey Schwartz, various phonologists are inquiring for synchronic examples of progressive voicing, but they do not find any of it. Nonetheless, they remain certain in the phenomenon's existence (the question was asked in 2015). URL: https://www.researchgate.net/post/Can_someone_provide_insight_regarding_progressive_voicing_assimilation_dtdd (last access: 26-12-2018).

[37] On the other hand, a South-Western Chinese control informant also participated in the data recordings of the dissertation at the Scuola Normale Superiore di Pisa (he read out the sample texts in Italian): in his accent many DT clusters were pronounced with progressive voicing, e.g. *vodka* [ˈvodga].

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the corpus 11 DT clusters are present, as they are listed in (3). The relevant input clusters are highlighted in bold and they are also transcribed.

(3): *DT clusters in the target words of the corpus*
*su**dc**oreano* /dk/ ‘South Korean’, *Bi**g T**asty* /gt/ ‘sandwich name’, *vo**dk**a* /dk/ ‘id.’, *Sü**dt**irol* /dt/ ‘South Tyrol’, *Su**d T**irolo* /dt/ ‘South Tyrol’, *nor**dc**oreani* /dk/ ‘North Koreans’, *foglie o**bc**ordate* /bk/ ‘oblique leaves’, *pin**gp**ong* /gp/ ‘id.’, *clima su**bt**ropicale* /bt/ ‘subtropical climate’, *su**bc**ultura* /bk/ ‘subculture’, *ra**gt**ime* /gt/ ‘id.’

In the highlighted clusters of the target words in (3) all three main places of articulation appear (*bilabial*, *alveolar* and *velar*), both in D and in T. The exhaustive combination of each place with each other place was not possible because of the scarceness of relevant loanwords in the Italian sample texts, but it was not even necessary for examining how the informants handle stop plus stop clusters with differently voiced members.

In Figure (4) the phonetic shape of the target word *vodka* is shown, in the pronunciation of a 22-year-old Northern Italian female informant (from Mirandola, Emilia-Romagna).[38] The upper part of the figure is the waveform, the central part is the spectrogram, while the lower part includes the phonetic transcription of the segmented sounds.

[38] The pronunciation of this Emilian informant is crucial, because Cavirani (2018) and Cavirani & Hamann (in prep.) claim that RVA is a rule in Emilian dialects. However, neither of the two Emilian informants of the present study apply RVA more than the other informants (for a discussion, see Section 4.3).

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Figure (4): *Waveform and spectrogram of the target word* vodka

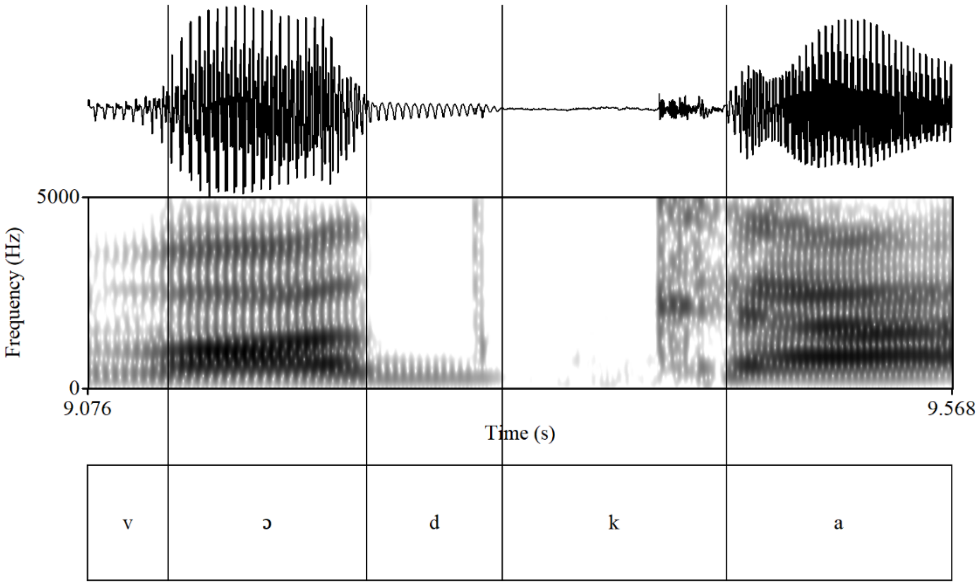

Figure (4) shows the most typical Italian pronunciation of *vodka* occurring in the corpus, with a relatively lengthened mid-open [ɔː] in the stressed syllable, and no assimilation (or any kind of repair strategy) between the two stops. The conventional phonetic transcription of this pronunciation is [ˈvɔːdka] (as it was noted in Section 2.1, the "paralinguistic" length of the final [a] is not indicated in the transcription of the word). Both the waveform and the spectrogram very clearly show the positive voice value of [d] and the negative voice value of [k].

In the waveform, the voice of [d] is indicated by the simple quasiperiodic waves which start at the end of the previous vowel, and last until the release of the consonant: such waves during the closure part of a stop indicate prevoicing. On the contrary, the articulation of the [k] starts with a straight line on the waveform and without waves until the release, where aperiodic waves appear. The absence of waves during the closure part means voicelessness in the case of stops, while the long release with aperiodic waves is the VOT (cf. Section 1.2.2): the period from the release of the stop until the beginning of the next (voiced) segment, which is also a typical characteristic of voiceless stops.

As far as the spectrograms are concerned, the consonants' voice value is marked by the so-called *voice bar*, which can be seen at the bottom of the spectrogram. The largest part of the spectrum of the stops is always white on spectrograms (at least in the case of fairly pure recordings). When the voice bar is filled on the spectrogram (viz., we may observe a long grey "chromatism" at the bottom of it), the stop is voiced. The formant movement of the vowels

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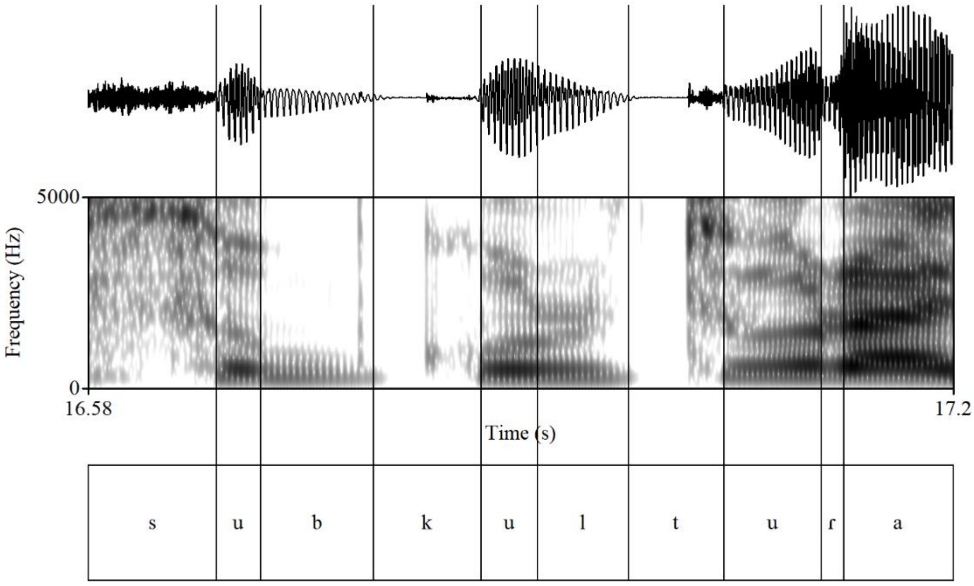
before and after the stops may also help us to judge their voice value. In Figure (4) [d] is voiced and [k] is voiceless, as we can undoubtedly inspect it with the aid of the previous clues.

The release of both stops is well identifiable on the spectrogram by the vertical grey lines near the end of the articulation of the consonant. Owing to the fact that the voiced [d] is released before the voiceless [k] in Figure (4), there is no immediate contact between the two stops; still, it is very surprising that there is no repair strategy between the two segments. From an articulatory point of view, this is a really hard "pronunciation task", since the larynx must reconfigure in a very short time and without any real transition. It seems, however, that the release of the first stop allows enough time for the reconfiguration. At the same time, the pronunciation of *vodka* seen in Figure (4) is a rare and peculiar solution cross-linguistically,[39] yet it seems to be the ordinary Italian pronunciation of the word.

To bring a second example of DT clusters, in Figure (5) the target word *subcultura* 'subculture' is shown, in the pronunciation of a 27-year-old Central Italian female informant (from Nuoro, Sardinia).

Figure (5): *Waveform and spectrogram of the target word* subcultura



[39] The same word in other languages is usually pronounced with two voiceless consonants: in voice languages (like Slavic) because of regressive voice assimilation (*vo*/dk/*a* → *vo*[tk]*a*), while in aspiration (like many Germanic) languages due to the absence of passive voicing of lenis obstruents (*vo*[d̥k]*a*).

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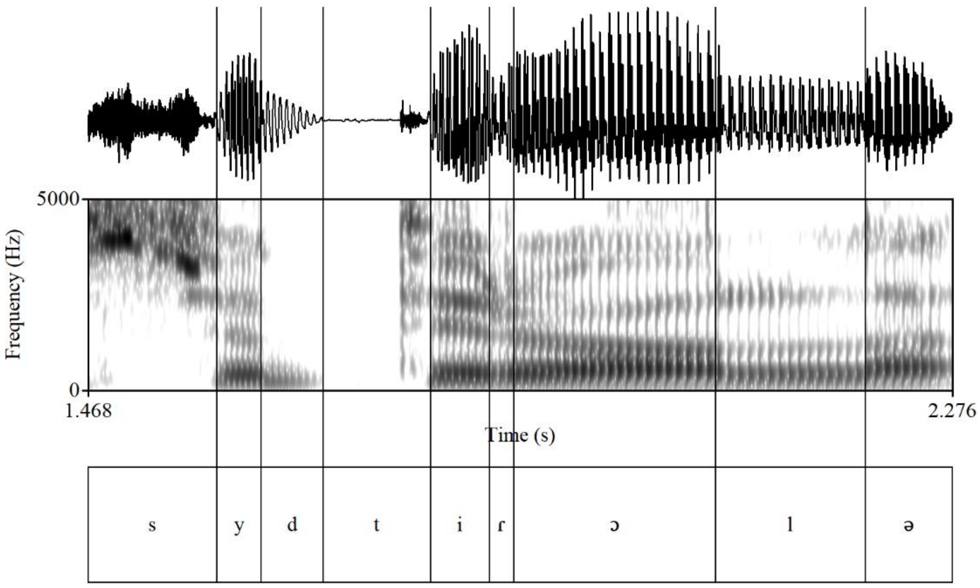
On the basis of Figure (5) the conventional phonetic transcription of the target word *subcultura* is [subkulˈtuːɾa]. The same peculiarities can be observed in the [bk] cluster as previously in the [dk]: the first stop of the cluster is entirely voiced and also released, as it is clear from the waves and the voice bar, while the second one is entirely voiceless with a relatively long release phase (the VOT is only 38 ms, but since it is longer than the closure phase, it may mean aspiration; cf. Section 3.2.5).

The lack of repair strategies (especially of voice assimilation) is striking again. Now, however, we may notice a very light reduction in the voice degree of [b] before the [k]: the waves and the voice bar lines decrease towards the end of the articulation of the first segment. This decreasing sonority may mean that the pronunciation of a voiced stop before a voiceless one is an articulatory problem for the speaker which needs to be adjusted (indeed, in Section 3.1.3 similar situations will be analysed as phonetic repair strategies). The places of articulation of the stops in the cluster are rather extreme: bilabial and velar; nevertheless, there does not appear any phonological repair strategy in this case (such as consonant deletion, vowel insertion or assimilation), even if, because of the larger distance of the adjacent consonants, we expected it more compared to the previous situation.

The third example we mention is “literally” a DT cluster, since the target word is *Südtirol* ‘South Tyrol’. In Figure (6) the pronunciation of a 28-year-old Southern Italian male informant is shown (from Soriano Calabro, Calabria).

Figure (6): *Waveform and spectrogram of the target word* Südtirol



On the basis of Figure (6) the conventional phonetic transcription of the target word *Südtirol* is [sydtiˈrɔlːə]. The solution of the DT cluster is really surprising, because the stops are coarticulated (the first member is not released); still, the cluster's articulation starts with positive voice and ends as completely voiceless (with continuously decreasing sonority). Practically, we see a long alveolar stop whose laryngeal patterns change during its closure phase. The target word *Südtirol* is pronounced 53 times in the corpus recordings: on 24 occasions full devoicing is attested in the cluster (/dt/ → [tt]), that is, there are not any waves during the closure phase; and there is also one occurrence of progressive voicing (/dt/ → [dd]). The situation seen in Figure (6) occurs 28 times, and the first stop is released only 5 times.

Other similar DT clusters, in which a voiced D encounters a voiceless T, also occur in the corpus; the target words *pi**ngp**ong* and *no**rdc**oreani* are of special interest, since D is in postsonorant environment which may help the retention of its voice.[40] When D is released, sometimes schwa epenthesis also appears, which splits the cluster and helps to maintain the voicelessness of T. In most cases, though, there is no schwa after the release of D, and in several other cases the first stop is not released, either. The fact that the release burst is not "obligatory" between differently voiced stops (i.e. voice assimilation can be absent even with coarticulation), demonstrate that we can effectively interpret this phenomenon as the lack of voice assimilation in stop plus stop clusters.[41]

2.1.1.2 Data: TD clusters

The case of TD clusters appears to be more complicated than that of DT clusters. While in the case of /DT/ an output as [TT] is much more frequent in languages than [DD], in TD clusters the ratio between the two possible surface forms ([DD] or [TT]) is much more balanced; viz., progressive voicing is much rarer than progressive devoicing. Therefore, we will have one additional option for the realisation of TD clusters.

In languages which regularly exhibit RVA (like Slavic and Hungarian) we usually find voicing in this environment: /TD/ → [DD]. On the other hand, in languages like German and

---

[40] Several Italian dialects are characterised by postsonorant (especially postnasal) voicing (cf. Rohlfs 1966; Loporcaro 2009: 128), so this environment supposedly helps to retain voice, too.

[41] At the same time, in Section 4.3 we will also see that the release burst of the first stop of the cluster does not necessarily block RVA, not even with schwa epenthesis.

English we usually find devoicing: /TD/ → [TT]. In the traditional view of phonology (mostly from a diachronic perspective) the latter phenomenon is seen as progressive devoicing by assimilation, which is regularly present in the history of Germanic languages (cf. Wetzels & Mascaró 2001: 215). However, the literature on LR asserts that in languages where TD clusters appear as [TT] there is no assimilation, because obstruents are underlyingly voiceless; so, progressive devoicing does not exist in synchrony (cf. Honeybone 2002). At the same time, for conventional reasons, I will label this phenomenon progressive devoicing (PD), at least in the phonetic part of the dissertation.

The prevalent Italian pronunciation of TD clusters is exceptional again: Italian speakers tend to retain the "underlying" voice values of the adjacent stops even in this environment, so /TD/ usually surfaces in their accent as [TD]. Among the target words of the corpus 13 TD clusters are present, as listed in (7). (The meanings of the words are the same in Italian as in English, so I will not add glosses now.)

(7): *TD clusters in the target words of the corpus*
*u**pg**rade* /pg/, *Mc**D**onald's* /kd/, *M**cB**acon* /kb/, *Sam**pd**oria* /pd/, *foo**tb**all* /tb/, *rön**tg**en* /tg/, *ca**tg**ut* /tg/, *gin**kg**o* /kg/, *ou**td**oor* /td/, *sof**tb**all* /tb/, *ho**td**og* /td/, *ba**ckg**round* /kg/, *ju**ke**b**ox* /kb/

Similarly to the target words with DT clusters (which we have seen in (3)), in the target words listed in (7) all three main places of articulation appear (*bilabial*, *alveolar* and *velar*), both in T and in D, but not all of the places are combined with each of the others because of the limits of loanword collection. Even so, we can draw relevant conclusions because there is a sufficient number of examples for every distance among the clusters (from homorganic to distant places of articulation).

In Figure (8) the phonetic shape of the target word *McDonald's* is shown, in the pronunciation of a 28-year-old Northern Italian male informant (from Zevio, Veneto).

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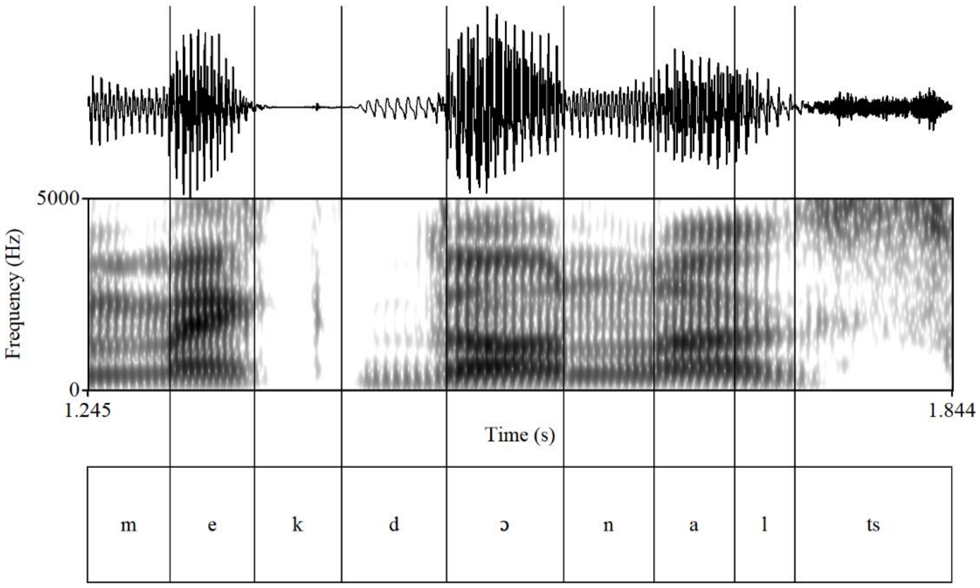
Figure (8): *Waveform and spectrogram of the target word* McDonald’s



The usual Italian pronunciation of the brand name *McDonald’s* is without the final /s/,[42] but in the realisation in Figure (8), whose conventional transcription is [mekˈdɔˑnal͡ts], this final /s/ is preserved, and it forms an affricate with the previous /t/. The reasons may originate in both the recording situation (cf. Cavirani (2018)’ criticism cited in Section 1.3) and the formulation of the given sample text where the entire brand name “McDonald’s Corporation” appeared (cf. Appendix A): the speakers probably tried to pronounce the expression as a whole, so they maintained the /s/. It certainly does not change the purpose of the recording, since the TD cluster in question surfaces without voice assimilation (or any repair strategy).

The [k] is released and thoroughly voiceless, while the [d] acquires a positive voice value, as it is evident from the increasing waves and the voice bar on the spectrogram. Nonetheless, the same brand name in classical voice languages is usually pronounced with RVA, e.g. (Hun.) [ˈmɛgdonaːl͡ts]; while in classical aspiration languages without voicing, e.g. (Eng.) [məkˈd̥ɒnəl͡d̥z̥].

[42] The deletion of the final /s/ in postconsonantal context is common in Italian loan phonology; other examples include: *Google map*<s>, *Uncle Ben’*<s>, *dart*<s>, *la Champion*<s> ‘the Champions League’, etc. (Huszthy 2017b: 209). Apparently, /s/ is a really special segment which is able to override the “conservatism” of synchronic Italian phonology (cf. Section 3.2.3 for other exceptional properties of /s/).

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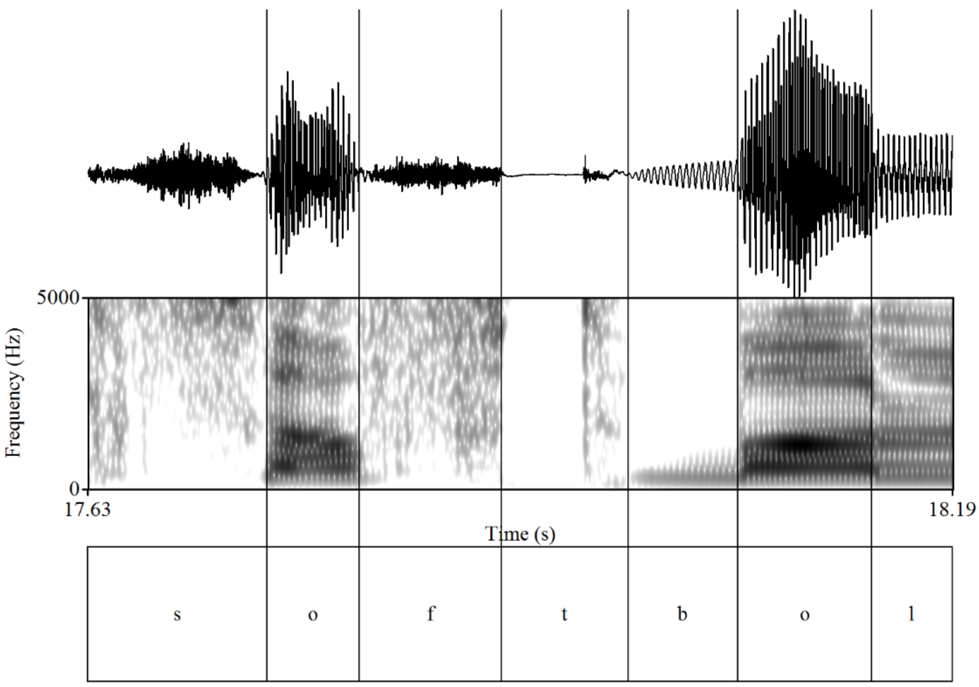
The Italian informants pronounced the target word 65 times in total, from which in 52 cases there was no voice assimilation in their realisations. 8 times they inserted a schwa between the T and the D: [mekəˈdɔːnal͡ts], and in 13 occurrences they assimilated the two stops: 10 times with RVA [ɡd], and 3 times by devoicing [kt] (cf. Section 2.2.1.1 for detailed statistics). The proportions of these resolutions reveal that the default Italian pronunciation of the word *McDonald's* is with two differently voiced stops: [kd], which is quite surprising both phonetically and phonologically, and exceptional compared to other languages.

The case of complex consonant clusters (made of three or more elements) is particular in Italian. Italians tend not to simplify complex clusters by deletion (unlike many other languages, e.g. in Hungarian), and they usually retain every input consonant in their pronunciation. The lack of voice assimilation appears to be even more surprising in complex clusters compared to the previous situations, e.g. in *Sampdoria* where the [p] between [m] and [d] is often deleted in languages. However, most of the Italian informants of the recordings did not delete any of the cluster's three consonants: [sampˈdɔːrja]. The target word *softball* is even more complicated, since it contains three obstruents in the input: /ftb/. In Figure (9) the phonetic shape of the target word *softball* is shown, in the pronunciation of a 25-year-old Southern Italian female informant (from Sansevero, Apulia).

Figure (9): *Waveform and spectrogram of the target word* softball



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The conventional phonetic transcription of the target word *softball*, shown in Figure (9), is [softˈbolˑ]. The usual pronunciation of the same word in English is [ˈsɒf(t)b̥ɔːl], that is, with the optional deletion of the [t] and with voiceless obstruents only. On the other hand, in typical voice languages these obstruents would be all affected by RVA: /ftb/ → [v(d)b], with the optional deletion of the central consonant, e.g. (Hun.) [ˈsovbɒlː]. As opposed to this, in the Italian pronunciation of the word the [t] in the middle of the cluster was deleted in only one of 53 occurrences, and voice assimilation did not happen in 48 cases (we had only one example of voicing to [vdb] and four examples of devoicing to [ftp]; cf. Section 2.2.1.1).

As it is apparent in Figure (9), the three members of the cluster have very similar articulation times, we can see a carefully articulated [f], [t] and [b]. The [t] is normally released with mild aspiration (its VOT is 28 ms, cf. the Italian VOT means in Section 3.2.5), then the sonority of the [b] is continuously increasing till the next vowel: the top of the voice bar traces out a direct ascendent line, which already starts during the VOT phase of the [t]. Similarly to what we have already seen in Figure (5), in the case of *subcultura*, we encounter an asymmetric voice value here, which will be analysed in Section (3.1.3) as a “phonetic repair strategy”.

The last illustration which will be shown in this section is the homorganic TD cluster which is found in the target word *outdoor*. A similar homorganic [td] cluster appears in *hotdog* as well, but since this loanword is much more frequent compared to the first one, the coalescence of the homorganic cluster is already lexicalised in its Italian pronunciation: *hotdog* [odˈːɔgːə] (every Italian informant pronounced this word with a long [dː]). In *outdoor*, however, very few assimilations have been found, even if it was expected because of the identical place of articulation of [t] and [d]. Figure (10) shows the phonetic shape of the target word *outdoor*, in the pronunciation of a 25-year-old Central-Southern Italian female informant (from Rome).

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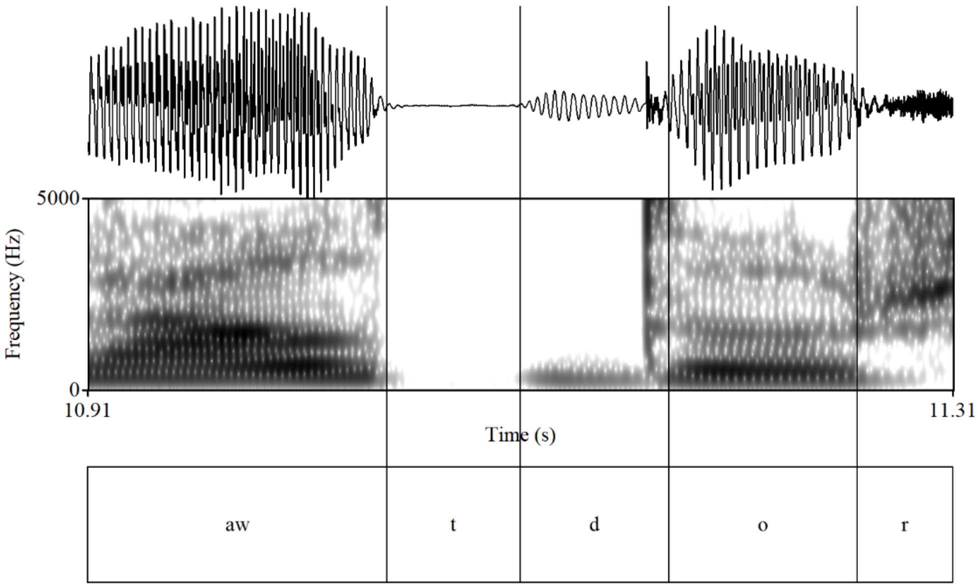
Figure (10): *Waveform and spectrogram of the target word* outdoor



The case of Figure (10) is very similar to Figure (6), where we have seen a homorganic DT-cluster in the target word *Südtirol*. The two stops are coarticulated even on this occasion, since the first one is not released. At the same time, Figure (10) shows clearly that the closure phase of the coarticulated cluster is divided into two halves: a voiceless one and a voiced one, thus, the approximate transcription of the pronunciation in Figure (10) is [ˈaˑwtdor]. The target word *outdoor* is present twice in the same sample sentence of the corpus, so it is repeated 106 times by the informants. In 59 occurrences there is no voice assimilation between the [t] and the [d], as in Figure (10), but the [t] is in most cases released before the [d], which sometimes results in schwa epenthesis as well (in total 18 schwas are inserted; cf. Section 2.2.1.1 for detailed statistics). RVA occurs 22 times to cause /td/ → [dd], while on 15 occasions progressive devoicing happens to yield /td/ → [tt].[43]

Other target words of particular interest are *upgrade*, *Sampdoria*, *football* and *catgut*: in the first three, bilabial and lingual places of articulation are met, so potentially there is sufficient time for the larynx to reconfigure in order to realise the opposite function; in fact, for the most

[43] The other homorganic TD cluster of the corpus, /kg/ in *background*, also occurred with and without voice assimilation, in the latter case always with a released [k] before the [g]: [bekˈgrawndə]. However, this target word was present only in a control recording situation, and pronounced by three Italian informants only, so it does not take part in the overall evaluation of the data.

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part there is no voice assimilation, while voicing and devoicing sporadically occur in the same measure in these words. On the other hand, in *catgut* two lingual (an alveolar and a velar) stops are combined, and in this case RVA does not take place at all, but the proportion of progressive devoicings is significant, 32% of the occurrences; while the Hungarian control informants systematically apply RVA in *catgut* (cf. the statistics in Section 2.2.1.1).

2.1.1.3 Data: Clusters with fricatives

Clusters where fricatives meet stops of the opposite voice value are of particular interest: fricatives are not released (since their articulation lacks plosion), so they can more easily constitute a "real" consonant cluster with a stop, compared to clusters of two stops. Accordingly, fricative plus stop clusters may offer a better argument for the lack of voice assimilation in obstruent clusters, since they produce a more immediate contact between the clusters' members.

Four relevant combinations appear in the case of fricative plus stop clusters: when a voiced fricative (V) precedes a voiceless stop (i.e. VT clusters), when a voiceless fricative (F) precedes a voiced stop (i.e. FD clusters); and vice versa, when the fricative is the second member of the cluster (i.e. TV clusters and DF clusters).

9 target words are in the corpus which present one of these possibilities, as they are listed in (11). Since these kinds of obstruent cluster are rather infrequent, only few loanwords were found which contained them, and therefore the place of articulation was not considered in the data collection. (/Cs/ clusters are examined as DF clusters, since they do not show any particular phonetic or phonological differences compared to other obstruent clusters, unlike the exceptional /sC/ clusters.) The first 4 of the target words in (11) have DF clusters, the following 5 contain FD clusters, and the last one is a VT cluster; while TV clusters were not attested in loanwords, so this combination is not present in the collection.

(11): *Obstruent clusters of fricative and stop in the target words of the corpus*
*gan**gs**ter* /gs/ 'id.', *Bildun**gs**roman* /gs/ 'education novel', *Sin**gs**piel* /gʃ/ 'German music drama', *a**bs**ide* /bs/ 'apse', *A**fg**anistan* /fg/ 'Afghanistan', *a**fg**ana* /fg/ 'Afghan, fem.', *Wol**fg**ang* /fg/ 'first name of Mozart', *sur**fb**oat* /fb/ 'id.', *so**vch**oz* /vk/ 'sovkhoz'

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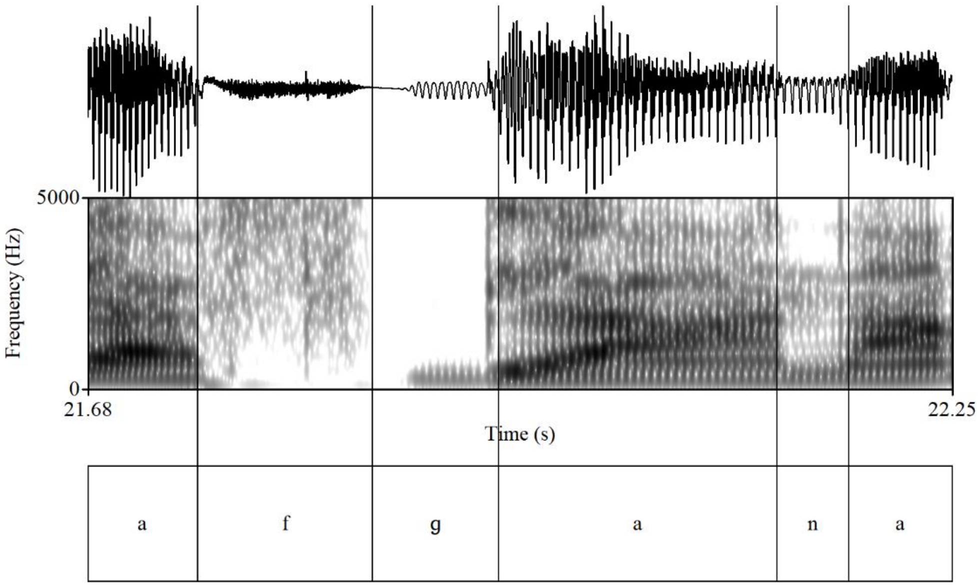
In the dataset several waveforms and spectrograms attest to the perfect adjacency of a fricative and a stop (first of all in the target words *Afganistan*, *afgana*, *Wolfgang*, *surfboat* and *sovchoz*). The two obstruents are coarticulated, still, the assimilation generally does not take place. Obviously, there are also some examples of RVA in the clusters, when the fricative and the stop are both voiced, e.g. *afgana* [avˈgaːna] (which is the usual pronunciation of the cluster in classical voice languages). A few cases of progressive devoicing also occur, when the [f] remains voiceless and the following stop loses its voice value, e.g. *afgana* [afˈkaːna] (which is the usual pronunciation of the cluster in classical aspiration languages). In most cases, however, fricatives and stops appear in a cluster with opposite voice values (the statistics of the different realisations are shown in Section 2.2.1.1, with a comparison with the Hungarian control informants' results, who use mostly RVA in these clusters). In Figure (12) the phonetic shape of the target word *afgana* is shown, in the pronunciation of a 27-year-old Southern Italian female informant (from Pomigliano d'Arco, Campania).

Figure (12): *Waveform and spectrogram of the target word* afgana



The conventional phonetic transcription of the target word *afgana*, based on Figure (12), is [afˑˈgaːna], with a semi-lengthened /f/, and without voicing or devoicing in the marked cluster. A further interesting acoustic phenomenon also appears in the realisation in Figure (12): the [g] starts without voice after the [f] and acquires its positive voice value some time later. This minuscule gap may also be interpreted phonetically as a very small silence between the two

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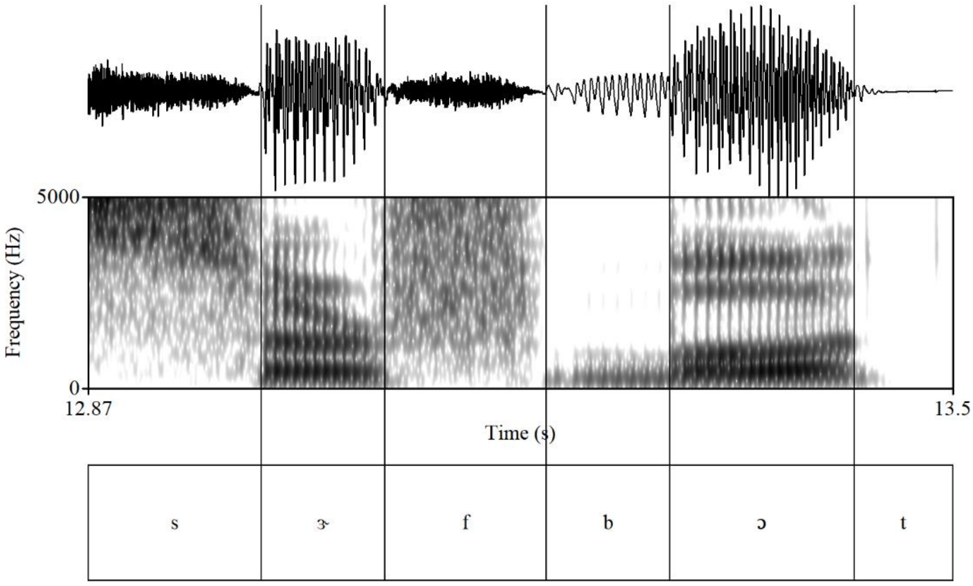
consonants which allows the larynx to reconfigure (similar "partial" voicing patterns will be reinterpreted in Section 3.1.3 as "phonetic repair strategies"). The partial lengthening of the preconsonantal fricative will also be considered later as a repair strategy in order to avoid deletion or assimilation (cf. Section 3.1.5). This process can also be interpreted as a kind of "preparation" of the vocal cords to run the opposite mechanism.

The comparison between the realisations of the two target words *afgana* and *Afganistan* is quite interesting and surprising. Even if in most cases the voice values of [f] and [g] are retained (in total: 98 from 123 pronunciations in the two words; cf. Sections 2.2.1.1 for detailed statistics), cases of RVA (/fg/ → [vg]) occur only in *afgana*, while in *Afganistan* far more progressive devoicings are found. These contrary effects may be in correlation with word stress (the marked cluster is closer to stress in *afgana* [afˈgaːna] than in *Afganistan* [afgaˈniːstan]) or with token frequency, since the adjective *afgano/afgana* is more common in language use than the proper noun *Afganistan*. Even in the case of the same informants, three of them applied RVA in *afgana*, but retained voice values in *Afganistan*; and vice versa, four of them often used progressive devoicing in *Afganistan*, and never in *afgana* (Section 2.2.1.3 offers a special statistical comparison about the effects of word stress to the use of RVA, while the effects of token frequency are analysed in Section 2.2.1.4).

The next example which will be shown in Figure (13) below is another FD cluster, with near-homorganic consonants. The informant is a 28-year-old Southern Italian male informant (from Naples, Campania), and the target word is *surfboat*, where the labiodental voiceless [f] meets the bilabial voiced [b].

Figure (13): *Waveform and spectrogram of the target word* surfboat



The approximate transcription of the realisation in Figure (13) is [sɝfˈbɔˑt], where the first vowel is an r-coloured centralised one. The pronunciation of *surfboat* varied among the informants, the first vowel was often realised as a mid-open palatal [ɛ], but [a] occurred as well, and even the word stress was placed to either the first or the second syllable; but the most common pronunciation was [ˈsɛrfbot].

The cluster of [f] and [b] was realised in 45 cases out of 53 with the preservation of the input voice values of the consonants (besides, 3 RVAs and 5 progressive devoicings took place; cf. Section 2.2.1.1 for detailed statistics). The consonants of the marked cluster have a common articulatory gesture (i.e., the use of the lips), which permits a direct pronunciation of the adjacent elements, so the segments can be defined "near" homorganic (cf. the classification in Section 2.2.1.2). Still, as it is evident from Figure (13), the [f] remains completely voiceless before the entirely voiced [b].

In the following example in Figure (14) below a DF cluster is shown by the participation of [g] and [s] in the target word *Singspiel*. The speaker is a 30-year-old Central-Southern Italian female informant (from Rome).

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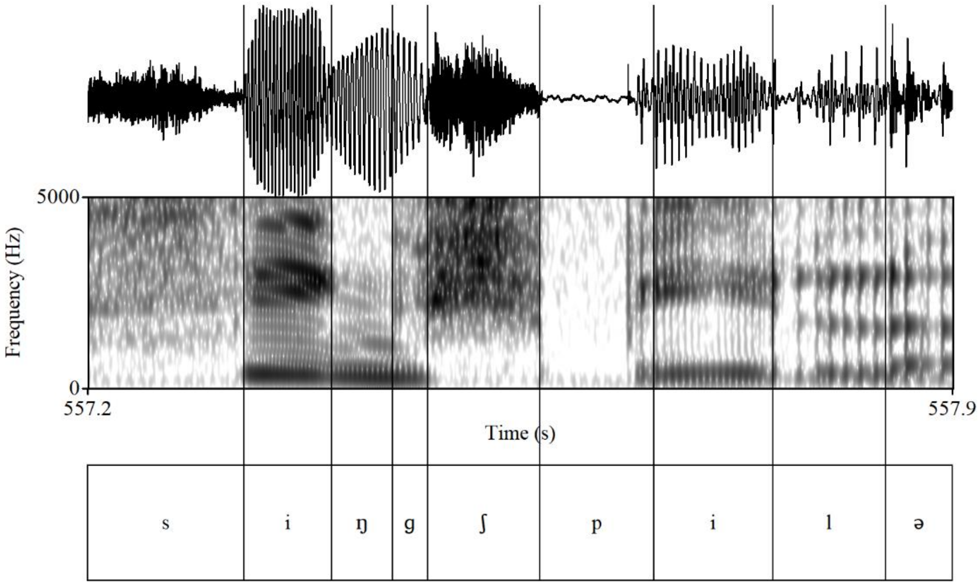
Figure (14): *Waveform and spectrogram of the target word* Singspiel



DF clusters were only found in /ngs/-context among the loanwords (cf. the target words in (11)). These clusters usually surface in voice languages as [ŋks]. Acoustically, the decision about whether the stop is voiced or voiceless in a post-nasal and a preconsonantal position is problematic, since the closure phase is partially filled by the voice of the preceding nasal stop by effects of coarticulation. In these cases the release of the stop may help the classification: if we find a notable VOT lag after the release of the stop, we can consider it voiceless. In total, 159 /ngs/ clusters were pronounced in the three relevant target words which produced 24 RVAs (/ngs/ → [ŋks]) and 29 /g/ deletions (/ngs/ → [ŋs]), while in the rest of the cases the voice values of the obstruents were maintained, similarly to Figure (14). Accordingly, the approximate phonetic transcription of the above realisation of *Singspiel* is [ˈsiŋɡʃpilˑə].

Finally, in Figure (15) a quite rare VT cluster is shown. The target word is *sovchoz*, and the speaker is a 21-year-old Southern Italian female informant (from Vibo Valentia, Calabria).

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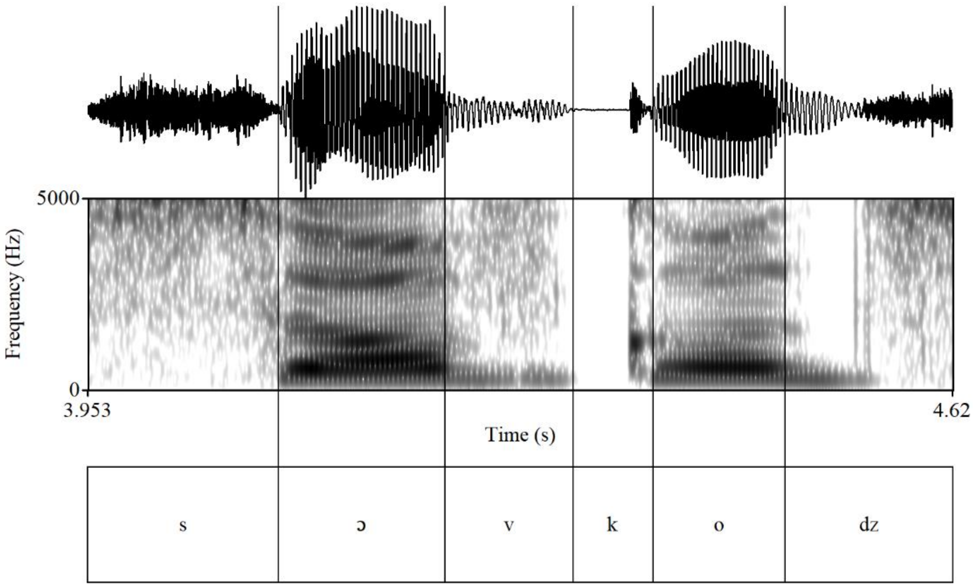
Figure (15): *Waveform and spectrogram of the target word* sovchoz



The laryngeal behaviour of the voiced labiodental fricative [v] is peculiar in some voice languages, such as in Hungarian and in certain Slavic languages, since it generally does not cause voice assimilation in TV clusters, but undergoes devoicing by RVA in VT clusters (cf. Siptár & Törkenczy 2000: 202). The medial cluster in the loanword *sovchoz* would be pronounced in classical voice languages with two voiceless obstruents (as in aspiration languages as well, because of the lack of active voice in obstruents). However, Italian seems to be exceptional again, since the informants of the study pronounced the target word with the preservation of both obstruents' voice values, as it can be seen in Figure (15): *so*[vk]*oz*. (A few informants, who first met the word in this study, pronounced the digraph *ch* with the postalveolar affricate [t͡ʃ], but always without voice assimilation: *so*[vt͡ʃ]*oz*.)

The conventional phonetic transcription of the realisation in Figure (15) is [ˈsɔːvkod͡z], where the fricative [v] appears as entirely voiced, followed by an completely voiceless [k]. The acoustic composition of [v] is different from [f] as it can be observed in Figure (15): it has simple quasiperiodic waves on the waveform (similarly to voiced stops), but its spectrum has a considerable noise (as is generally the case with fricatives), and the voice bar is filled; still, the following [k] directly starts with a voiceless closure, that is, in the above figure we can see a completely voiced fricative and a completely voiceless stop without any transition.

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2.1.1.4 Data: Clusters with affricates

Affricates are considered in traditional phonetics as the combination of two obstruent sound types: a stop closure and a fricative constriction (cf. Ladefoged & Maddieson 1996: 90); as it is also reflected in their IPA transcription, e.g. [t͡s, d͡z, p͡f]. Thus, affricate plus consonant clusters phonetically present multiple obstruent combinations, similarly to the complex clusters which we have previously seen in Section 2.1.1.2.

The use of affrication may depend on many factors for Italian speakers. First of all, spelling is quite influential, because the letter ‘z’ marks alveolar affricates in Italian orthography, so where ‘z’ appears in a loanword, affrication can be expected. At the same time, ‘z’ is the only grapheme for both voiced and voiceless alveolar affricates in Italian (i.e., [t͡s] and [d͡z]), and the conditions which determine whether the voiced or the voiceless counterpart occurs are not phonological (cf. Lepschy & Lepschy 1988: 90; Canepari 1992: 75-77, 111-113); so the distinction between the voiced or the voiceless realisation of ‘z’ in loanwords can be entirely arbitrary for Italian speakers.

Six target words appear in the corpus which contain a cluster with an affricate and a stop, where the adjacent elements may hypothetically have opposite voice values, as they are listed in Chart (16).

(16): *Obstruent clusters of affricate and stop in the target words of the corpus*
*e**cz**ema* /kd͡z/ or /kt͡s/ ‘id.’, *u**zb**eca* /t͡sb/ or /d͡zb/ ‘Uzbek, fem.’, *U**zb**ekistan* /t͡sb/ or /d͡zb/ ‘id.’, *Ma**zd**a* /t͡sd/ or /d͡zd/ ‘id.’, *sami**zd**at* /t͡sd/ or /d͡zd/ ‘id.’, *a**zt**eca* /t͡st/ or /d͡zt/ ‘Aztec, fem.’

In Figure (17) the target word *eczema* is shown in the pronunciation of a 28-year-old Southern-Italian male informant (from Naples, Campania). This word is peculiar among the others; firstly, because of the order of the marked consonants (this is the only occasion that a stop precedes an affricate); secondly, because it is a far more frequent loanword compared to the others and the ill-formed cluster is still preserved; thirdly, because the vast majority of the speakers pronounced it with differently voiced obstruents (in 83% of the total occurrences, cf. the statistics in Section 2.2.1.1), which is well illustrated by Figure (17).

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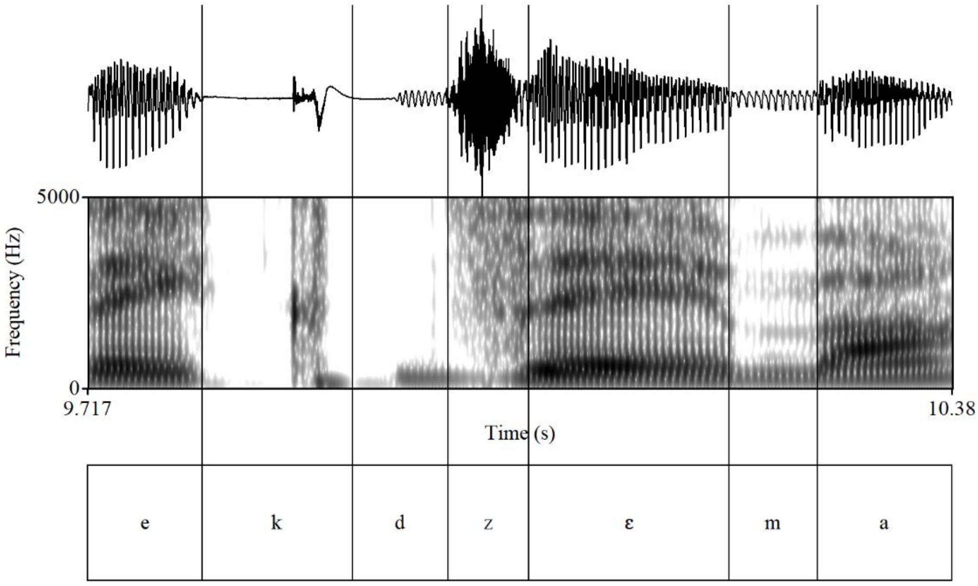
Figure (17): *Waveform and spectrogram of the target word* eczema



The approximate phonetic transcription of the realisation in Figure (17) is [ekːˈd͡zɛːma], with the lengthening of the preconsonantal stop and with stressed vowel lengthening. Similar "preconsonantal stop geminations" often characterise the pronunciation of southern informants (cf. Section 3.1.5 and Huszthy 2015a, 2015b). The geminated [k] is evidently voiceless, with a quite long VOT lag, while the positive voice value of the following affricate appears only after a small voiceless phase at the beginning of the closure part.

From a phonetic point of view, these three phenomena (i.e. the lengthening of the [k], the considerable VOT and the initial voicelessness of the affricate) may all count as different articulatory repair strategies which help the preservation of the segments' underlying voice value (cf. Section 3.1). Notwithstanding these strategies, such realisations in the corpus are seen as obstruent clusters without voice assimilation.

The other loanwords which contain affricate plus stop clusters (listed in Chart (16)) show less consistent results compared to *eczema*. One of the reasons is probably the reverse order of the consonants: in *eczema* the voicelessness of the [k] has been almost always preserved (in 51 occurrences out of 53, cf. Section 2.2.1.1 for detailed statistics), while the affricate was chiefly realised as voiced; conversely, when the affricate is the first member of the sequence, a greater tendency was found for voice variation. The most interesting loanword in this aspect is *azteca* 'Aztec, fem.', which shows significant intraspeaker and interspeaker variation in voiced and voiceless resolutions of the preconsonantal affricate. In Figure (18) the

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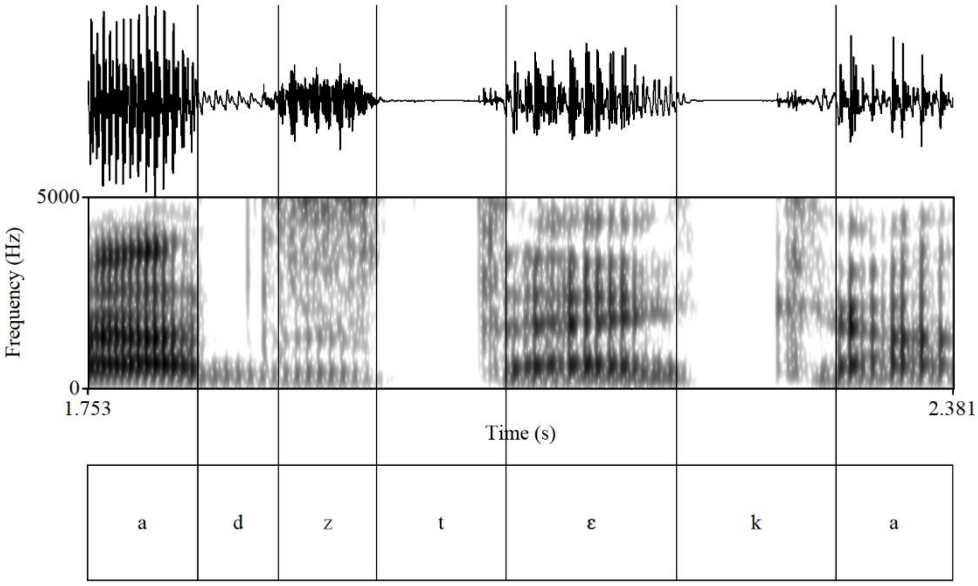
target word *azteca* is shown, in the pronunciation of a 28-year-old Northern Italian male informant (from Zevio, Veneto).

Figure (18): *Waveform and spectrogram of the target word* azteca



The approximate phonetic transcription of the pronunciation in Figure (18) is [ad͡zˈtɛːka], with a completely voiced alveolar affricate [d͡z] and an entirely voiceless alveolar stop [t], without any repair strategy. In 53% of the cases (28 occurrences out of 53, cf. Section 2.2.1.1), the relation between the affricate and the stop is similar to the one in Figure (18), while in 16 cases the affricate appears as voiceless, due to RVA or due to a simple unmotivated voiceless pronunciation of the letter 'z'.[44]

The last example for affricate plus stop cluster is shown in Figure (19): the target word *Mazda* is pronounced by a 25-year-old Central-Southern Italian female informant (from Rome).

[44] Moreover, seven deaffrications and two wrong pronunciations also occur: in the first case, the affricate loses its stop element and becomes a single fricative; in the second one, the order of the segments is inverted, probably by metathesis (*atzeca* instead of *azteca*), since the pronunciation is [aˈd͡zːɛːka], with a long [d͡z] (cf. Section 3.1.4).

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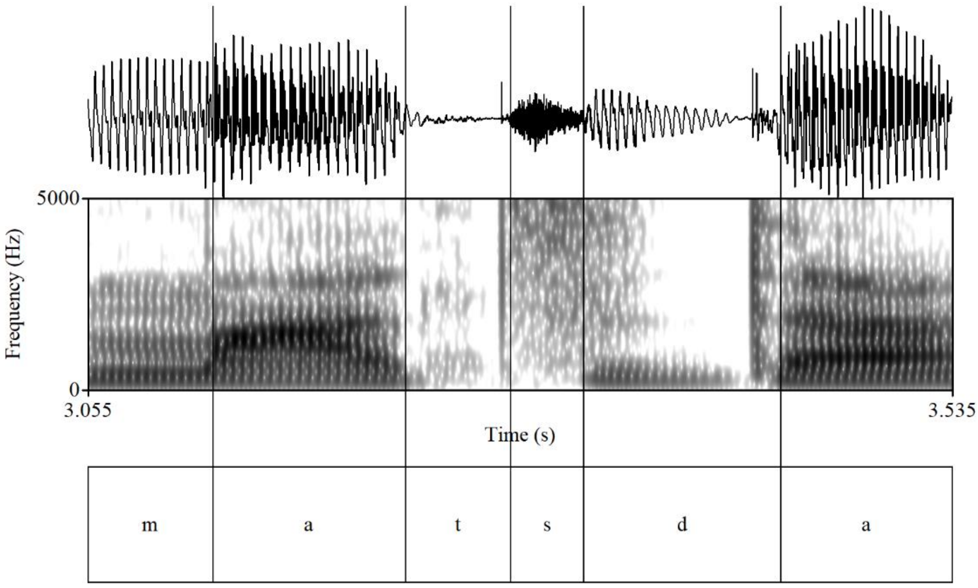
Figure (19): *Waveform and spectrogram of the target word* Mazda



The phonetic transcription of the pronunciation in Figure (19) may conventionally be [ˈmaːt͡sda], where the combination of the voiceless affricate and the voiced homorganic stop [t͡sd] shows a fine contrast with the [d͡zt] cluster which we have previously seen in Figure (18).

In the case of ‘z’ + D, however, the oppositely voiced realisations are much rarer compared to ‘z’ + T: in total 276 affricate plus voiced stop clusters were pronounced by the informants in four target words (*Uzbekistan*, *uzbeca*, *Mazda* and *samizdat*), 62% of which were realised with identically voiced consonants [d͡zd] (by RVA or by spontaneous voicing of the affricate), 16% with voiceless ones [t͡st] (considered here progressive devoicing), and only 22% with differently voiced segments (as in Figure (19) above; cf. Section 2.2.1.1 for detailed statistics). Consequently, most of the alveolar affricates in loanwords are voiced in the informants’ pronunciation. If the affricate is voiced, the adjacent stop still tends to preserve its negative voice value, but if the stop is underlyingly voiced, the affricate tends to appear as voiced as well.

In Section 2.1.1 we have seen evidence for various obstruent clusters whose elements have opposite specifications for voice. In the following section /sC/ clusters will be considered, which have to be treated differently (cf. Sections 1.2.4.3 and 3.2.3). Some particular resolutions of affricate plus stop clusters also lead us to “derived” /sC/ clusters, because in certain cases deaffrication happens (probably as a repair strategy, for solving the complex obstruent

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combination), which results in /sC/ clusters, e.g. *sami*[d͡zd]*at* → *sami*[zd]*at*, etc., as it will be discussed in detail in the following sections.

2.1.2 The case of /sC/ clusters

As it has already been described in Sections 1.1.3 and 2.1.1.1, in Italian phonology /sC/ is the only kind of obstruent cluster inherited from Latin which was not eliminated during the history of Italian (cf. footnote 28). Preconsonantal /s/ universally shows strange phonetic and phonological patterns in the languages of the world, but its behaviour is even more complicated in Italian, being the only phonotactically possible obstruent cluster. This fact motivates the choice that /sC/ clusters (and other kinds of sibilant plus consonant clusters) are treated separately from other clusters. (In Sections 3.2.2 and 3.2.3 a detailed description will be offered about the phonological specialties which concern the sibilants, and especially the /sC/ clusters.)

2.1.2.1 Data: /s/ before voiced obstruents

In the next two subsections different /s/ + voiced consonant clusters will be shown and acoustically analysed. In the corpus only one specific target word appears containing an /sD/ cluster, i.e. where /s/ precedes a voiced stop: *iceberg* /ajsberg/. The reason is that at the initial phase of the study only non-/sC/ clusters seemed to be really interesting, so the research design was built on them, while /sC/ was a “control cluster” (viz., I initially expected “no RVA” in non-/sC/ and RVA in /sC/). At a later work phase (after the recordings) it turned out that RVA is far from systematic in /sC/ as well. However, for the purposes of this dissertation even the one single target word with /sD/ (*iceberg*) will be sufficient.

In addition, various derived /sD/ clusters are present in the corpus, by the potential deaffrication of a sibilant affricate before a voiced obstruent (e.g. /t͡sd/ → /sd/), which may extend the enquiry. The target words are listed in (20).

(20): *Target words of the corpus with potential /sD/ and /sV/ clusters*
*i**ceb**erg* /sb/ or /zb/ ‘id.’, *u**zb**eca* /sb/ or /zb/ ‘Uzbek, fem.’, *U**zb**ekistan* /sb/ or /zb/ ‘id.’, *Ma**zd**a* /sd/ or /zd/ ‘id.’, *sami**zd**at* /sd/ or /zd/ ‘id.’, *Bo**tsw**ana* /sv/ or /zv/ ‘id.’

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Moreover, in (21) further combined compounds and phrases are listed which contain potential /sC/ clusters at the word boundary. The greatest part of these words was pronounced by the informants without s-voicing, which confirms the literature’s general claim, that is, s-voicing is blocked at word boundaries in Italian phonology (cf. Nespor 1993; Bertinetto 1999a, 1999b). This is another argument which weakens the status of s-voicing as RVA, since postlexical processes are not supposed to respect word boundaries (for a detailed phonological explanation cf. Section 3.2.3).

(21): */sD/ clusters at word boundary*
*silen**ce** **d**rive* /sd/ ‘id.’, *Pier**ce** **B**rosnan* /sb/ ‘id.’, *Jame**s** **B**ond* /sb/ ‘id.’, *(musica) ja**zz** **b**alcanica* /t͡sb/ or /sb/ ‘Balkan jazz music’

Among the cross-word /sD/ clusters of (21), in *silence drive* and *Pierce Brosnan* no s-voicing was detected: the default Italian pronunciation was with [sd] and [sb]; but a few occurrences of progressive devoicing also appeared (in [st] and [sp]). On the other hand, in *James Bond* 19% amount of s-voicing was measured (in 10 occurrences out of 53, cf. Section 2.2.1.1), but these results may have an explanation in the fact that the name *James Bond* is very frequently used compared to the other target words. According to the principles of Usage-Based Phonology, frequently used words may have different phonological behaviour in comparison with less frequently used words (cf. Bybee 1999, 2001). Consequently, the word boundary between the first name (*James*) and the second name (*Bond*) may phonologically become vague. Finally, in the example *jazz balcanica* there is always a small silence between the /s/ and the following consonant (in the cases when the /t͡s/ of *jazz* is deaffricated in /s/), so the fact that the sibilant is voiced or not may not depend on the next consonant’s voice value. All of these considerations may mean that s-voicing at word boundaries is not effective at all.

As far as the list in (20) is concerned, the most relevant target word of the corpus is obviously *iceberg*: it is a considerably old loanword in Italian, especially compared to other similar loanwords which contain the /sb/ cluster, such as *facebook*, *frisbee* or *baseball* (which were not included in the research design, though). In the underlying form, *iceberg* is a disyllabic word, but in the Italian pronunciation it usually surfaces in three syllables through the insertion of a schwa after the ending consonants. The etymological word boundary of the compound word has probably become vague for the speakers, so the /sC/ cluster may be analysed as word-internal in this case.

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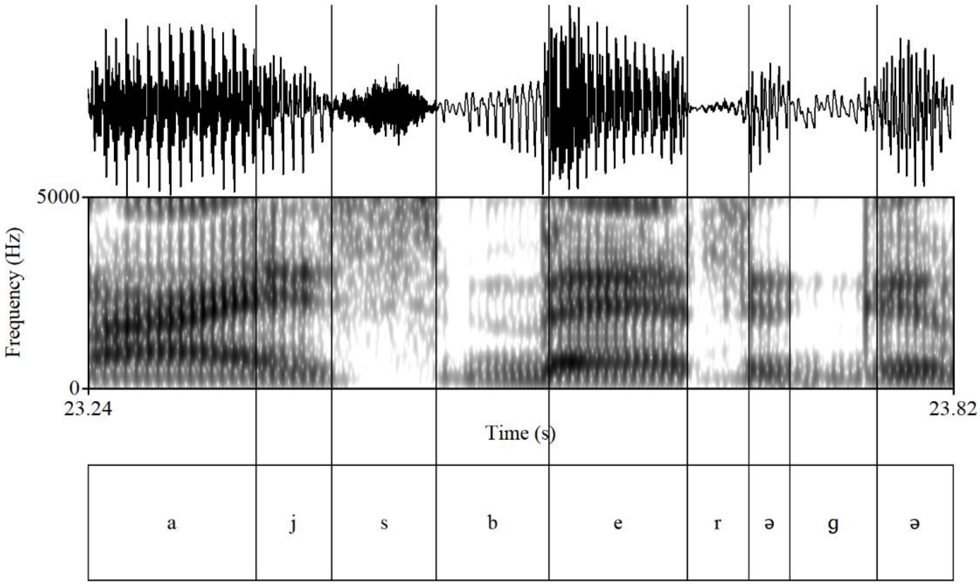
In Figure (22) we see the phonetic shape of *iceberg*, pronounced by a 27-year-old female informant from Nuoro, Sardinia.

Figure (22): *Waveform and spectrogram of the target word* iceberg



The conventional phonetic transcription of the pronunciation in Figure (22) is [ˈajsbergə][45], which corresponds to the most frequent pronunciation variant of *iceberg* among the informants (the word was pronounced 64 times, in 25 occurrences with s-voicing, in 35 occurrences without, and 4 times with progressive devoicing, for detailed statistics cf. Section 2.2.2.1).

As it can be observed in the figure, the sibilant is definitely voiceless, having an entirely clear voice bar, while the following stop is definitely voiced, as both the positively filled voice bar and the quasiperiodic waves demonstrate it. The transition between the voiceless [s] and the voiced [b] is absolutely smooth, no schwa epenthesis or silence break the contact between the two obstruents. This realisation of the /sb/ cluster is quite surprising, not only cross-linguistically, but even compared to the literature of Italian phonology itself, in which /sC/ clusters are claimed to undergo RVA.

[45] The tiny schwa between the /r/ and the /g/ belongs to the rhotic consonant (as a spontaneous release for idiolectal reasons), so it is not the result of phonological epenthesis, unlike the final schwa, whose appearance is based on syllable structure (therefore only the second schwa is indicated in the phonetic transcription).

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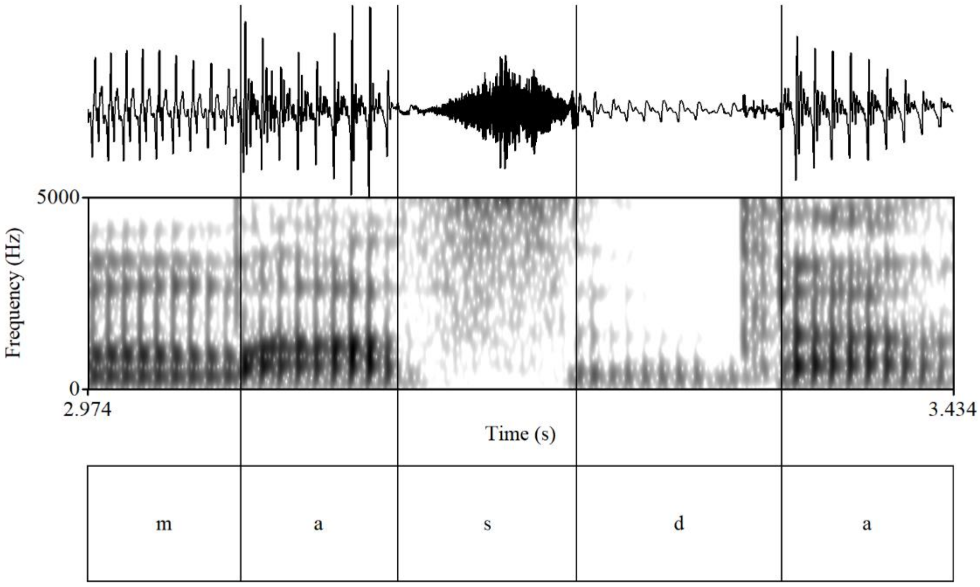
In the following figures derived /sC/ clusters will be shown, with various places of articulation of the postsibilant consonant. In Figure (23) we see the target word *Mazda*, pronounced by a 28-year-old Northern Italian male informant (from Zevio, Veneto).

Figure (23): *Waveform and spectrogram of the target word* Mazda



The sibilant affricate [t͡s] (after the usual Italian pronunciation of the letter ‘z’, cf. Section 2.1.1.4) is deaffricated here (which is deduced from other realisations of the same informant where the same sound is pronounced as an affricate), so we earn a derived /sD/ cluster in *Mazda*.

This pronunciation can be contrasted with Figure (19) in Section 2.1.1.4, where the same target word was shown without deaffrication. Accordingly, the approximate phonetic transcription of the realisation in Figure (23) is [ˈmasda], with a word-internal /sD/ cluster whose members have opposite voice values again.

In the next figure an /sV/ cluster is shown, i.e., the voiced obstruent behind the sibilant is the labiodental fricative [v]. As it has already been referred to in Section 2.1.1.3 (cf. Figure (15) and the related discussion), the relation of /v/ to RVA can be exceptional, e.g. in Hungarian it fails to cause regressive voicing, e.g. (Hun.) *ötven* [tv] (and not [dv]) ‘fifty’, (Hun.) *svéd* [ʃv] (and not [ʒv]) ‘Swedish’, *szvetter* [sv] (and not [zv]) ‘sweater’, etc. (cf. Siptár & Szentgyörgyi 2013: 18). However, in the phonology of Italian [v] usually triggers s-voicing similarly to any other voiced consonant, at least in word-initial position, e.g. *svagare* [zv] ‘to distract’, *sviluppo* [zv] ‘development’, *svedese* [zv] ‘Swedish’, etc. (cf. Bertinetto & Loporcaro 2005: 134). In

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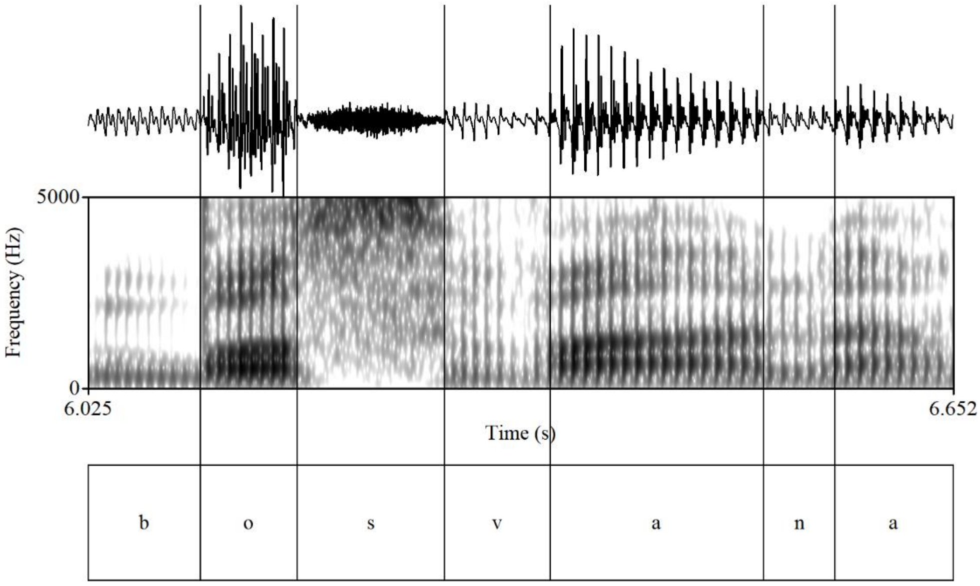
Figure (24) we have a word-internal derived [sv] cluster: the target word is *Botswana*, and the informant is the previous Northern Italian male speaker.

Figure (24): *Waveform and spectrogram of the target word* Botswana



In Figure (24) the /s/ remains voiceless before the voiced [v]. The derived [sv] cluster in *Botswana* is the result of deaffrication this time too, since the usual Italian pronunciation of *Botswana* is with the affricate [t͡s] or its voiced counterpart [d͡z], and these are the realisations which mostly occur in the data recordings. But other deaffrications also appear, both with s-voicing (i.e. *Bo*[zv]*ana*) and without, as in Figure (24), whose approximate phonetic transcription is [bosˈvaːna]. Apparently the word-internal s-voicing is optional in /sv/ clusters. Furthermore, in 40% of the occurrences of *Botswana* the informants pronounce a bilabial approximant [w] instead of the [v], in these cases voicing never occurs, the cluster is always [t͡sw]; even if the glides [j, w] may cause s-voicing in Italian (cf. Section 2.1.2.2).

Finally, a unique resolution of /sC/ cluster will be shown in Figure (25). The target word is *azteca* ‘Aztec, fem.’, and the informant is the Sardinian female speaker cited in Figure (22).

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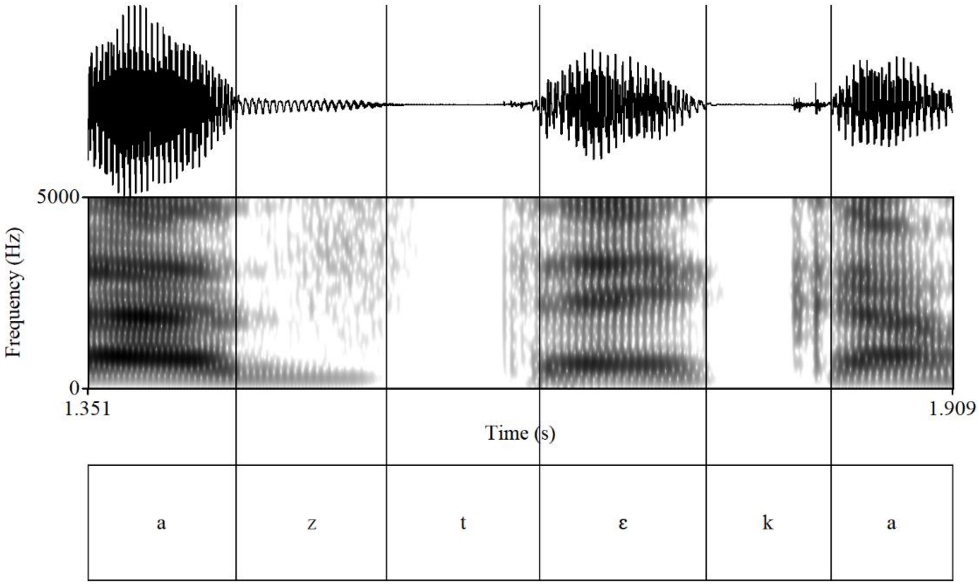
Figure (25): *Waveform and spectrogram of the target word* azteca



The target word *azteca* has already been shown (see Figure (14) in Section 2.1.1.4), with its most common Italian realisation found in the corpus (53% of the occurrences), i.e. with a voiced alveolar affricate and a voiceless alveolar stop: [ad͡zˈtɛːka]. Sometimes (in 30%) the affricate is realised as voiceless, and in a few cases deaffrication happens (in 13%), so the first member of the cluster becomes /s/: [asˈtɛːka]. But, on one occasion, when the affricate [d͡z] is deaffricated, it manages to preserve its positive voice value (see Figure (25) above), thus an exceptional [zt] cluster comes into existence: [azˈtɛːka].

2.1.2.2 Data: /s/ before sonorants

As it was visually demonstrated in the previous section, s-voicing is not consistent in the synchronic phonology of Italian in /s/ plus voiced obstruent clusters. A similar picture will be given in the case of /s/ plus sonorant clusters: according to the literature, /s/ becomes voiced when it precedes the sonorants [m, n, l, r], e.g. *cosmo* [zm] ‘universe’, *bisnonno* [zn] ‘great-grandfather’, *slancio* [zl] ‘jump’, etc. (Krämer 2009: 209). However, this kind of presonorant s-voicing was not as regular in the loanwords of the corpus as in the native vocabulary of Italian or in older loanwords. In (26) the target words are listed which create the context of derived or lexical /s/ plus sonorant clusters in the corpus.

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(26): *Target words of the corpus with potential /sN/ clusters*

*Bildungs**sr**oman* /sr/ 'id.', *back**sl**ash* /sl/ 'id.', *(Pierce) Bro**sn**an* /sn/ or /zn/ 'id.', *kala**shn**ikov* /ʃn/ or /sn/ 'id.', *kri**shn**a* /ʃn/ or /sn/ 'id.', ***sw**imming* /sw/ 'id.', *gu**zl**a* /dzl/, /sl/ or /zl/ 'gusle', *gri**zzl**y* /dzl/, /sl/ or /zl/ 'id.'

Besides the target words in (26), other /sN/ clusters in sandhi position were tested as well. The word combinations are listed in (27).

(27): */sC/ clusters at word boundary*

*Champion**s L**eague* /sl/ 'id.', *Thoma**s M**ann* /sm/ 'id.', *Wolfgang Amadeu**s M**ozart* /sm/ 'id.'

Furthermore, the potential voicing of the postalveolar sibilant fricative /ʃ/ before sonorants was also an important issue for the research, since the literature on Italian dialectology documents the phenomenon of sibilant voicing even in the case of postalveolar and palatal sibilant fricatives (cf. Maturi 2002; Ledgeway 2009; Loporcaro 2009). For instance, /sN/ clusters in several Italian dialects may undergo both s-palatalisation and s-voicing in loanwords, e.g. in Neapolitan: *asma* [ˈaːʒmə] 'asthma', *smartphone* [ʒmartəˈfɔnːə] 'id.', etc. (cf. Huszthy 2017b).

In this study we have to verify too whether [ʃ] is able to undergo voicing before sonorants similarly to [s]. The target words *kalashnikov* and *krishna* also served this enquiry, and other target words as well, such as *ka**shm**ir* /ʃm/ 'id.', *establi**shm**ent* /ʃm/ 'id.' and *Bo**sch l**avastoviglie* /ʃl/ 'dishwashers Bosch'; however, these last target words were not listed in (26), because eventually no depalatalisation was found in their pronunciation, so they did not end up as derived /sN/ clusters.

Altogether, the realisations of all /sN/ clusters of the corpus are characterised by variation between voiceless and voiced sibilants, each target word occurred with both solutions. Unexpectedly, s-voicing resulted much less frequently compared to the voiceless pronunciation of the preconsonantal /s/: in total, 330 /sN/ clusters were pronounced by the informants (170 in word-internal and 160 in sandhi position), and s-voicing was found only in 28% of the occurrences (35% in word-internal and 20% in sandhi position).

As far as the /ʃN/ clusters are concerned, the voicing of the /ʃ/ before sonorants resulted critically infrequently, it happened only before [n], in 22% of the occurrences (22 times out of 99), and it was unattested before [m] and [l] (0% out of 107 [ʃm] clusters and 59 [ʃl] clusters). Further statistical analyses will be offered in Section 2.2.2.2.

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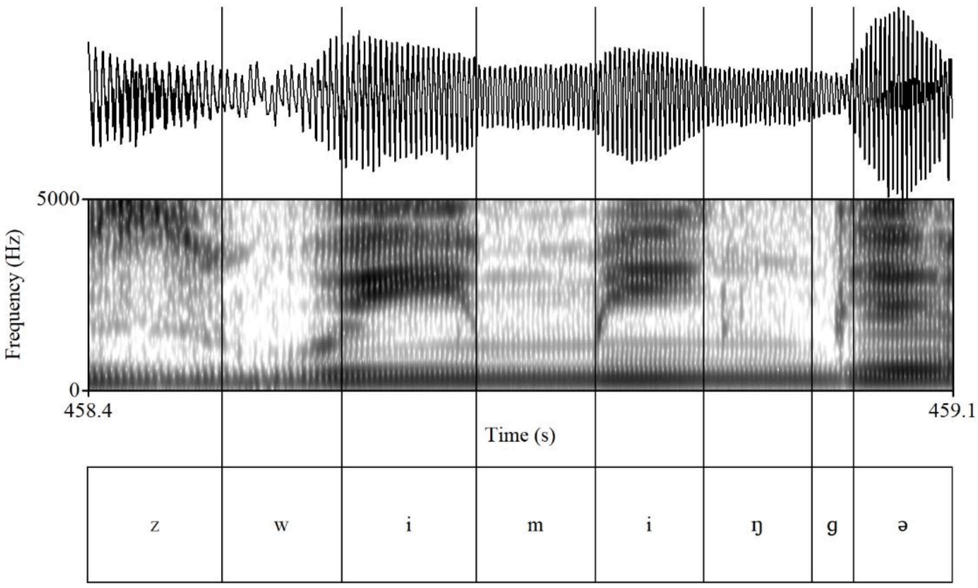
Word-initial /sC/ clusters were not tested in the research (for a phonological argumentation cf. Section 3.2.3), with the only exception of the target word *swimming*, where the glide /w/ (seen here as a sonorant consonant) may surprisingly trigger voicing to the preceding /s/. The literature does not mention the role of glides in Italian s-voicing, but it was previously discovered in relation to the foreign accent of Italians (cf. Section 1.2.4.3) that the bilabial approximant /w/ is able to trigger s-voicing, at least in word-initial position. The target word *swimming* was pronounced 53 times by the informants, and in 53% of its occurrences it was affected by s-voicing. Figure (28) shows the pronunciation of a 40-year-old Central Italian female speaker (from Pisa, Tuscany).[46]

Figure (28): *Waveform and spectrogram of the target word* swimming



The word-initial /sN/ cluster clearly involves s-voicing in Figure (28), as it can be observed through the continuously filled voice bar on the spectrogram. The approximate phonetic transcription of this realisation is [ˈzwiˑmiŋgə]. However, the voicing of the presonorant /s/ is

[46] The recording shown in Figure (28) is slightly more noisy compared to the other recordings shown previously: this one has been made at the Scuola Normale Superiore of Pisa with a classical standing microphone, which receives more noise than the headset microphone used at the Research Institute for Linguistics in Budapest (cf. Section 1.3). Nonetheless, the relevant features of the recordings (like the voice bar) are measurable in the same way in both cases.

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not generally regular in the case of *swimming*, unlike in other word-initial /sN/ clusters; on the other hand, it is much more representative than in word-internal /sN/ clusters.

The case of this [zw] cluster helps to discover about the productivity of Italian s-voicing: the voicing turning up in presonorant environment is categorical, because its result is a completely voiced [z], but the process seems to be optional, since it affects barely more than half of the possible inputs. These issues are similar to presonorant s-voicing found in Spanish (cf. Bárkányi 2014: 35). In summary, Italian s-voicing as a phonological process seems to be a tendency rather than a rule; accordingly, this kind of voicing is phonologically more similar to lenition processes than to RVA (cf. Section 3.2.3).

The target word *Bildungsroman* has already been considered in Section 2.1.1.3 among the non-/sC/ obstruent clusters, since it offered [ɡs] clusters where the positive voice value of the [ɡ] was preserved before [s]. Now we reconsider its case because of the /sr/ cluster, since in 8 occurrences out of 53 it is pronounced with presonorant s-voicing: these pronunciations can be approximately transcribed as [ˌbilduŋɡzˈrɔːman]. In comparison with *swimming*, we have definitely fewer s-voicings (15% only), probably in correlation with the word-internal position of the cluster, but the phenomenon is still attested, and it is categorical and optional again. Moreover, in 39 cases the /s/ remains voiceless before the /r/ (even if it stands after the voiced [ɡ]), while in 6 cases it gets deleted from the /ŋɡsr/ cluster, thus it surfaces as [ŋɡr].

As far as the derived /sN/ clusters of the list in (26) are concerned, in *kalashnikov* and *krishna* 4 depalatalisations happen altogether, 2 of which are also followed by s-voicing (transcribed as [kaˈlaːznikov]). In *grizzly* and *guzla* more s-voicings arise, probably because the informants have spontaneously chosen the voiced [d͡z] affricate to realise the ‘z’ grapheme which underwent deaffrication; for that reason, these two target words are perhaps less relevant from the point of view of the productivity of s-voicing. In either way, *grizzly* has 4 [sl] clusters, 11 [zl] clusters, 2 [t͡sl] clusters and 36 [d͡zl] clusters, while *guzla* has 9 [sl] clusters, 9 [zl] clusters, 9 [t͡sl] clusters and 24 [d͡zl] clusters (cf. the detailed statistics in Section 2.2.2.2).

What also seems interesting is the kind of s-voicing found in the non-depalatalised pronunciations of *kalashnikov* and *krishna*: indeed, in 22% of their occurrences the /ʃ/ surfaces as a voiced [ʒ] before the [n]; these realisations can be transcribed as [kaˈlaːʒnikof] and [ˈkriːʒna]. As a consequence, s-voicing as a categorical and optional phonological process may in some minor proportion affect even other sibilant fricatives apart from /s/, for instance the postalveolar /ʃ/ (cf. Section 3.2.3).

The most interesting examples of /sN/ clusters in the corpus are offered by the pronunciation variants of the target word *backslash* when it is affected by s-voicing. The (Eng.)

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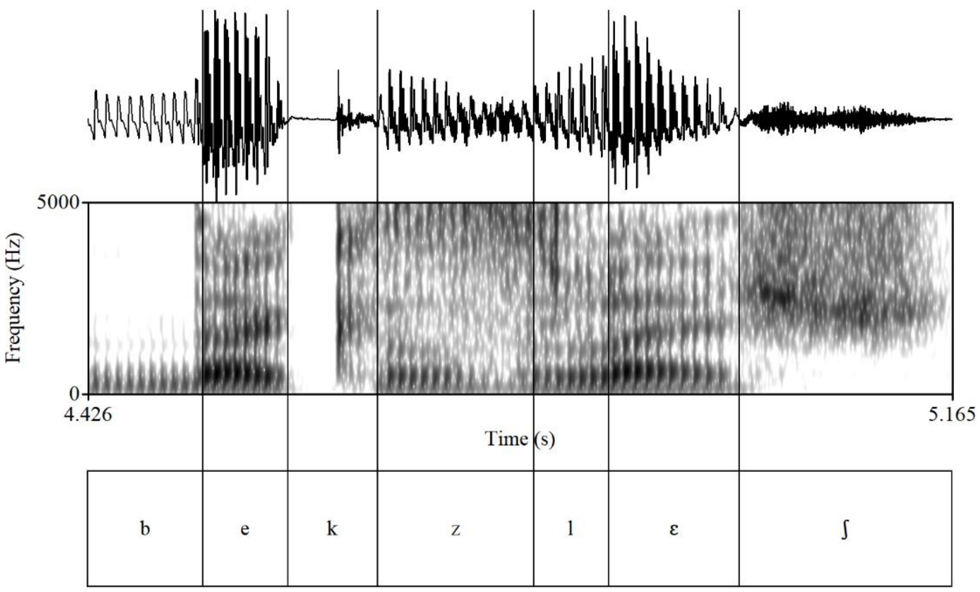
loanword *slash* is usually pronounced in Italian with presonorant s-voicing, similarly to other Germanic loanwords with a word-initial /sN/ cluster, e.g. [z]*niffare* 'to sniff', [z]*moking* 'dinner jacket', [z]*logan* 'slogan', etc. (cf. Repetti 1993, 2006). However, when *slash* appears in the compound word *backslash*, the /sN/ cluster finds itself in word-internal position, moreover, after a voiceless /k/. By virtue of classical RVA, the complex /ksl/ cluster, when also affected by s-voicing, should surface as [gzl]. However, this variant does not appear in the corpus at all.

The majority of the pronunciations occurring in the corpus does not have any voice in the obstruents: *ba*[ksl]*ash* (65% of the occurrences). But 8 times (in 15%) s-voicing happens, alongside with the preservation of the voicelessness of the previous [k]: *ba*[kzl]*ash*. In addition, on 7 occasions the /s/ is deleted from the cluster (/ksl/ → [kl]), and 4 times the word became the victim of mispronunciation (e.g. by metathesis: [ˈbaksalʃ], cf. Section 3.1.4) – these latter cases testify that the complex /ksl/ cluster is a pronunciation challenge to the speakers. In Figure (29) a variant with s-voicing is shown, the informant is our 28-year-old Southern Italian male informant (from Soriano Calabro, Calabria).

Figure (29): *Waveform and spectrogram of the target word* backslash



The pronunciation in Figure (29) (transcribed as [bekˈzlɛʃː]) is rather peculiar from both phonetic and phonological points of view: it represents a complex consonant cluster /ksl/, two members of which do not behave at all as it would be expected. Firstly, the /s/ before the sonorant /l/ is realised as a voiced [z], secondly, the /k/ before the voiced [z] remains voiceless.

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The first event is somewhat understandable, as a manifestation of presonorant s-voicing; the second one is quite surprising, though, but it helps us understand why we do not consider Italian preconsonantal s-voicing as RVA. If the voicing of /s/ before /l/ were an actual assimilatory process, the /k/ before the voiced [z] would also be voiced by the same assimilation. However, in Figure (29), we see a moderately aspirated voiceless [kʰ][47] before the entirely voiced [z], so voicing does not spread leftwards.

At the same time, we may observe in the spectrogram that the voiced [z] is not simply voiced in this case, but almost sonorised, since it has a visible formant contour, similarly to vowels or sonorants, and it is also slightly lengthened. If we treated [z] here as a sonorant, all the strange laryngeal activity attested in the cluster would acquire an explanation, since sonorants are not specified for [voice]; that is, the voicing of /s/ can be considered passive (e.g. by lenition), and RVA could not work in the case of the /k/.

There are also proposals in phonology to treat /z/ as a sonorant, rather than an obstruent, due to its strange phonological behaviour which causes problems in many languages (cf. Baroni 2014; and also cf. Section 3.2.3). However, in our case this explanation would not be totally satisfactory, since it would leave other issues unanswered, for instance the frequent voiceless appearance of /s/ in other occurrences, mostly before obstruents, as in the examples of Section 2.1.2.1. I will return to this question during the OT analyses in Sections 3.3.1 and 3.3.3.

Our most important conclusions at the end of this section are undoubtedly those regarding the optional nature of s-voicing in word-internal position. Apparently, preconsonantal s-voicing is “stabilised” in Italian phonology in word-initial position (cf. the issue of *lexicalisation* in Section 3.2.3.3), and word-internally it applies as an optional lenition process and not as RVA.

2.2 “Countable” evidence for the lack of voice assimilation

In the previous sections we have seen “visible” evidence that Italian speakers are capable of preserving opposite underlying voice values in obstruent clusters. Now we will concentrate on statistical issues, that is, on the frequency of this “ability” of Italian speakers. In fact, in order

[47] The aspiration consists of a VOT lag of 35 ms, which almost coincides with the duration of the closure phase of the consonant (cf. Figure (29)). This aspiration may also be interpreted as a phonetic repair strategy which helps the laryngeal change between opposite voice values (cf. Section 3.1.2).

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to prove the general absence of voice assimilation in Italian phonology, we have to exclude the factor of coincidence, which is possible with the aid of numbers.

Statistics and diagrams have been produced mostly with Excel and in a few cases with R (R Development Core Team 2011). In Section 2.2.1 overall and detailed statistics will be offered about all obstruent clusters of the corpus other than /sC/, while in Section 2.2.2 statistics regarding /sC/ clusters will be presented.

2.2.1 Statistics regarding non-/sC/ clusters

In Section 2.2.1 different statistical results will be shown regarding non-/sC/ obstruent clusters, from various aspects. The /sC/ category here includes every sibilant consonant, irrespective of place or manner of articulation (so even the postalveolar [ʃ] and the affricates [t͡s, d͡z]), since all sibilants may have distinct phonological behaviour compared to other obstruents (cf. Sections 2.1.2.1 and 3.2.3).

First, in Section 2.2.1.1 overall statistics will be presented with the participation of each target obstruent cluster of the corpus, which ends with a comparison between the results of the Italian informants and the Hungarian control informants. In the next subsections detailed statistics will be provided in connection with single target words, single informants and special characteristics of certain clusters which may affect the lack of voice assimilation. In Section 2.2.1.2 the possible effects of the places of articulation of the marked obstruents will be concerned; then effects of word stress (Section 2.2.1.3) and word frequency in language use (Section 2.2.1.4). Finally, in Section 2.2.1.5 dialectal results will be shown with the informants divided into northern, central and southern.

2.2.1.1 Overall statistics

In this section all occurrences of obstruent clusters will be summed up which are present in the target words of the corpus, with the exception of sibilant plus obstruent clusters. In total, 32 target words are considered relevant in this regard, which have already been listed in different charts of Section 2.1.1 (cf. the lists shown in (3), (7), (11) and (16)). Each relevant target word contains one marked obstruent cluster: among the 32 target obstruent clusters we have 11 DT

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clusters, 11 TD clusters,[48] 9 clusters with fricatives and only one with an affricate (the rest have been excluded for being sibilant plus consonant clusters).

The complete list is offered in Chart (30), including all relevant numerical information as well; i.e., the number of the total occurrences of the word in the corpus recordings (abbreviated in the chart as “Occurr”), the realisations without RVA or progressive devoicing (abbreviated as “NoVA”), the realisations with regressive voice assimilation (abbreviated as “RVA”), the realisations with progressive devoicing (abbreviated as “PD”); and finally, other realisations (abbreviated as “Other”), such as progressive voicing (abbreviated as “PV”), realisations with consonant deletion (abbreviated as “del”) and mispronunciations (abbreviated as “err”).[49] The number of schwa epentheses is also considered in the last column of the chart, which is an additional variable, so its numbers are counted separately from the total occurrences (as well as its percentages).

The data shown in Chart (30) derives from manually counted results, so a small percentage of miscounting factor cannot be excluded; however, the occurrence-magnitude of the relevant phenomena is certainly reliable. The counting procedure was carried out the following way: all recordings were loaded into Praat, the relevant target words were acoustically analysed multiple times, they were segmented and provided by annotation, then classified according to the attested phenomena. The data were introduced in Excel and in R, but the counting of the single occurrences was manual. Results were double checked. According to the data extraction procedure just described, the unit of measurement of the numbers shown in the cells of Chart (30) is “piece”.

[48] Two target words, *hotdog* and *juke-box* have been excluded from the statistics, because apparently both are lexicalised in Italian with a fixed pronunciation (and hence are used uniformly by all informants, while in the other loanwords variation was attested): *hotdog* has a stabilised coalescence of the homorganic cluster [odˈːɔgːə], and *juke-box* has a stabilised deletion of the first stop [dʒuˈbɔksə].

[49] The glosses of the target words are not given in Chart (30), in order to see them cf. the lists in (3), (7), (11), (16).

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Chart (30): *Statistics regarding the target words presenting non-/sC/ obstruent clusters*

Cluster	Target word	Occurr	NoVA	RVA	PD	Other	Schwa
DT	*su**dc**oreano*	57	45	11		1 err	22
	***BigT**asty*	53	28	25			13
	*vo**dk**a*	63	35	28			14
	*Sü**dt**irol*	53	28	24		1 PV	5
	*Su**d T**irolo*	53	37	16			15
	*nor**dc**oreani*	54	37	9		8 del	26
	*su**bc**ultura*	57	51	5		1 PV	19
	*o**bc**ordate*	53	45	8			15
	*pin**gp**ong*	53	17	1		35 del	2
	*su**bt**ropicale*	53	44	9			17
	*ra**gt**ime*	4	4				2
TD	*u**pg**rade*	53	47	3	3		16
	*M**cD**onald's*	65	52	10	3		8
	*M**cB**acon*	53	50		3		1
	*Sam**pd**oria*	64	39	9	9	7 del	9
	*foo**tb**all*	58	40	8	10		8
	*rön**tg**en*	54	20	3	23	7 err, 1 del	2
	*ca**tg**ut*	53	34		17	2 err	9
	*gin**kg**o*	53	9		3	39 del, 2 err	5
	*ou**td**oor*	106	59	22	15	10 del	18
	*so**ftb**all*	53	48	1	4		12
	*bac**kg**round*	4	2	2			2
DF, FD, VT	*gan**gs**ter*	53	28	9		16 del	1
	*Bildun**gs**roman*	53	24	8		16 err, 5 PV	
	*Sin**gs**piel*	53	36	7		10 del	7
	*A**fg**anistan*	53	43		10		1
	*a**fg**ana*	70	55	7	8		9
	*Wol**fg**ang*	53	11		20	22 del	
	*sur**fb**oat*	53	45	3	5		3
	*so**vch**oz*	55	34	16		5 err	5
	*a**bs**ide*	4	4				
TD͡Z	*e**cz**ema*	69	45	2	22		4
Total	*32*	1685 100%	1096 65%	246 15%	155 9%	188 11%	270 16%

Due to the circumstances of the data collection procedure (detailed in Section 1.3), discrepancies can be found among the summarised occurrences of the target words. The most common number is 53, since most of the sample sentences of the corpus were read out 53 times by the informants.

Numbers which go beyond 53 (regarding the occurrences) derive from spontaneous repetitions of the target words by the informants (every valuable pronunciation is added to the overall statistics); in addition, some specific target words (i.e., *vodka*, *McDonald's*, *Sampdoria*, *afgana*, *eczema*) were present in certain pilot experiments which preceded the sample text

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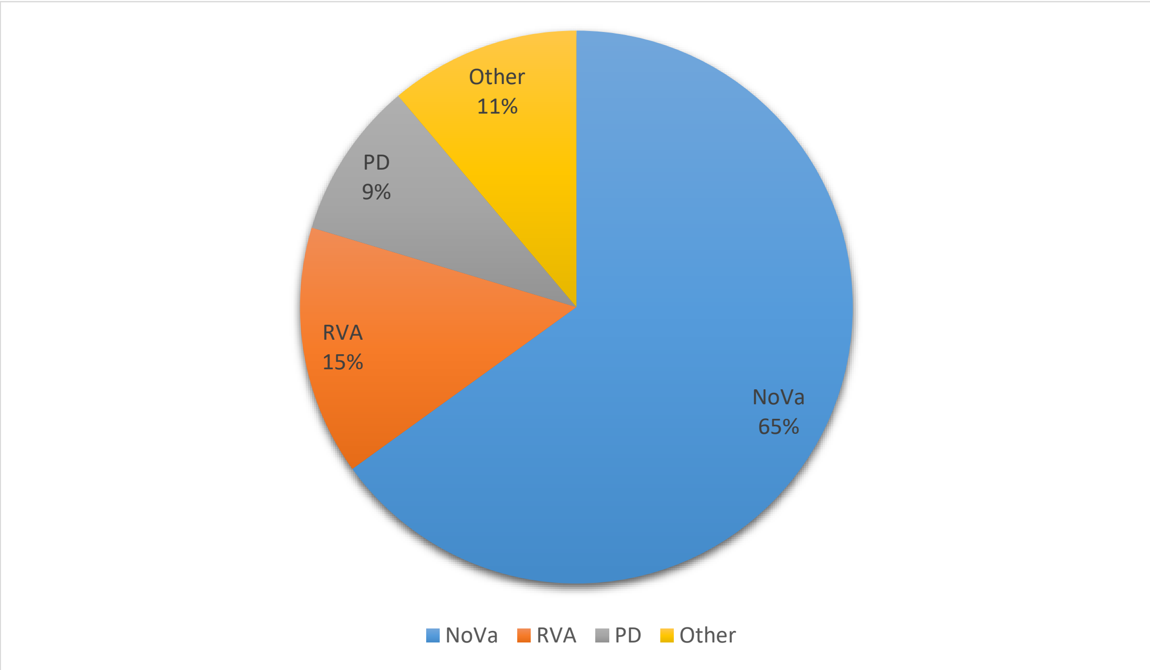
reading,[50] so we gained more occurrences in their case; while *outdoor* appeared in the same sample sentence twice, which explains its duplicate appearance compared to the other words. The last target word of each of the first three groups of Chart (30) (*ragtime*, *background*, *abside*) derives from another pilot study, so these words are pronounced only 4 times by 3 informants.[51]

Below, in a simple pie diagram, we can see the distribution of the four relevant strategies of Italian speakers for resolving differently voiced obstruent clusters in the 32 target words (namely, NoVA, RVA, PD and other strategies).

Diagram (31): *Overall statistics about non-/sC/ obstruent clusters of the corpus*



On the whole, the relevant target words of the corpus were pronounced 1685 times. As Diagram (31) presents – as well as the last line called "Total" of Chart (30) –, the most common solution of the informants for realising obstruent clusters with differently voiced members is the preservation of the underlying voice values: in 1098 cases no assimilation of any kind happens,

[50] These pilot experiments consisted in a pre-recording of certain sample texts (containing the above listed target words) which was carried out in the same studios and with the same informants presented Section 1.3.

[51] This other pilot study was the first among all of the studio recordings, made for an MA course in experimental phonetics in the Research Institute for Linguistics. Two of the three informants who participated in it, were already introduced in Section 1.3 (the male speaker from Veneto and the female speaker from Calabria), while the third informant was a 20-year-old female speaker from Calabria. The limited results of this pilot study would be insignificant per se, but they are added here to the overall examination of Italian obstruent clusters.

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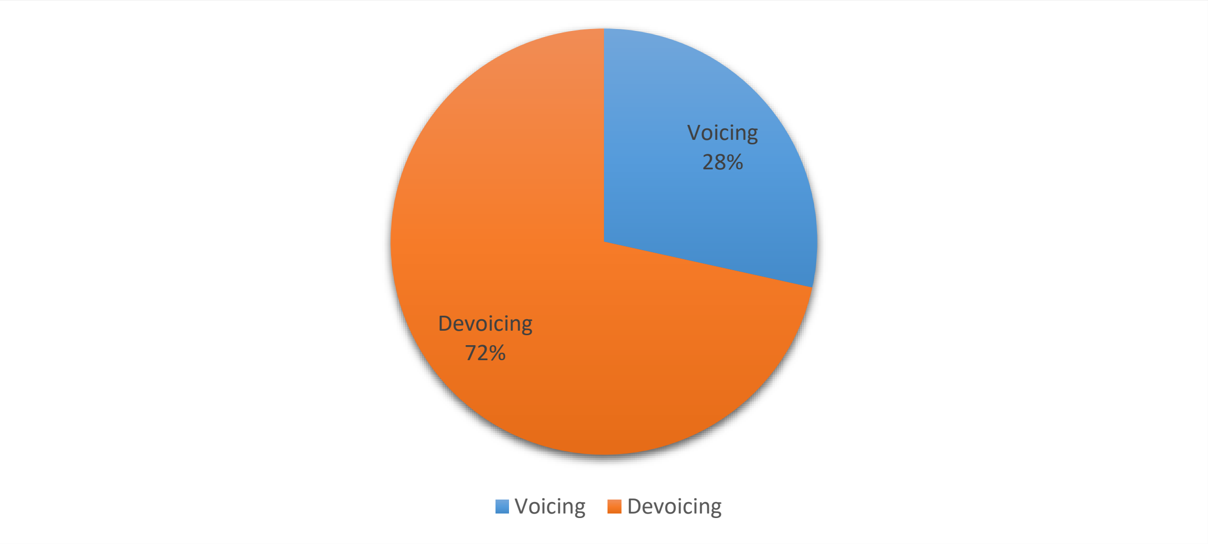
which is 65% of the total occurrences. This two-thirds majority seems to be very convincing in order to confirm the basic hypothesis of the research, i.e. Italians tend to avoid voice assimilation in obstruent clusters other than /sC/.

The fact that other strategies also occur is fortunate, since they contribute to the classical case of the Latin saying *exceptio probat regulam* ('the exception proves the rule'). In fact, other strategies attest that choosing assimilation can be an option for Italian speakers, but they rather avoid it. The presence of other strategies in the data legitimises the idea that the tendency to avoid voice assimilation can be considered a real phonological strategy for Italian speakers (cf. Chapter III).

The 15% amount of regressive voice assimilation is not insignificant in the data: RVA seems a real, but suboptimal strategy for Italians to resolve obstruent clusters (in fact, every speaker uses it in some measure). However, if we zoom into this phenomenon, it seems rather unbalanced as far as voicing or devoicing aspects are concerned: among the 246 occurrences of RVA 70 voicings (28%) and 176 devoicings (72%) happen, as it is shown in Diagram (32).

Diagram (32): *The division of RVAs according to voicing and devoicing*



The clear majority of cases of devoicing against voicing can be relevant later, from a phonological perspective (cf. Section 3.2). According to Laryngeal Realism, indeed, the surfacing of two adjacent obstruents as voiceless is not necessarily the result of assimilation, it may derive from the lack of the voiced source element already in the underlying representation, as in several Germanic languages (cf. Harris 1994; Honeybone 2002, Balogné Bérces 2017).

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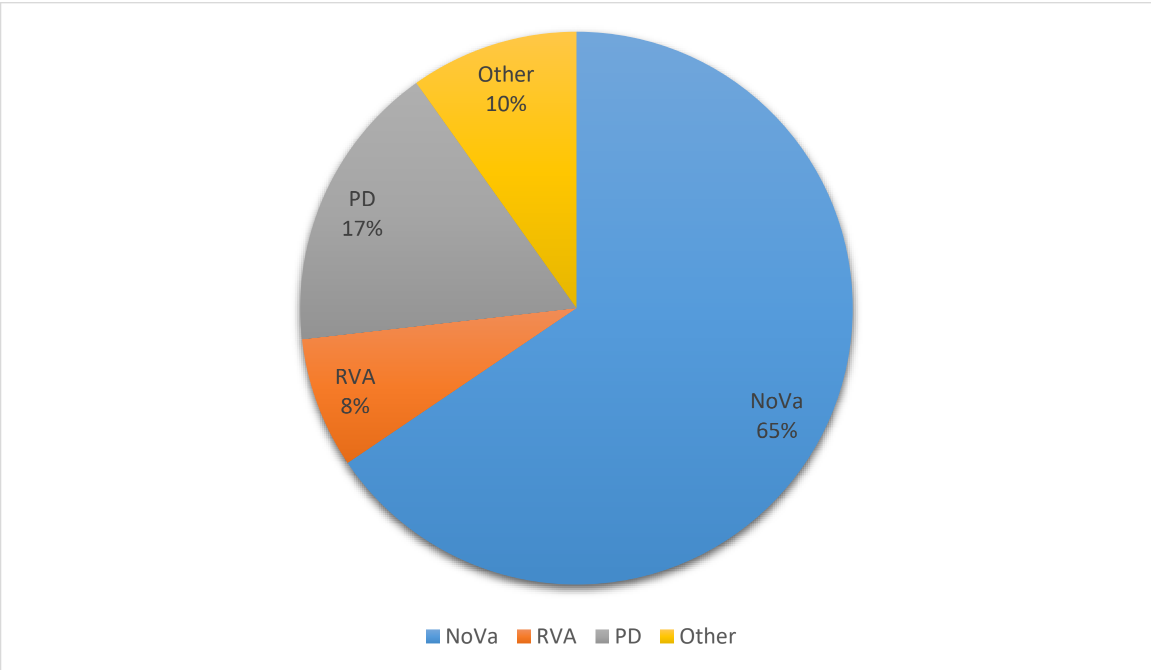
So, clear proof for RVA in a language is offered only by regressive voicing, while devoicing is a phonologically ambiguous phenomenon.

As far as progressive devoicing (PD) is concerned, in the view of LR this phenomenon also stems from the lack of the voiced source element; i.e, it is not assimilation, but the voiceless surfacing of underlyingly marked obstruents in voiceless environments. Even if the denomination of the phenomenon (*progressive devoicing*) suggests an assimilatory process, it is only used here for conventional reasons as a descriptive term, and it does not phonologically interpret the phenomenon in question (phonological explanations concerning progressive devoicing will be offered in Sections 3.1.1 and 3.2).

PD occurs several times in the overall examination of the data, which may be surprising in the first place, since it mostly characterises aspiration languages and not voice languages (Romance languages are considered voice languages in LR, cf. Section 1.2.2). Although it seems to be the least used strategy in the overall examination of the data (9% of all occurrences, cf. Diagram (30)), we must notice that PD cannot be possibly present in every target word. In fact, PD is relevant only in the TD environment, i.e. when in the cluster the voiceless obstruent precedes the underlyingly voiced one. In Diagram (33) all relevant target words are collected whose pronunciation permits the appearance of PD.

Diagram (33): *PD in the relevant target words only, compared to the other strategies*



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If we take a look only at the target words which allow for the strategy of PD (i.e., words with TD, FD and TD͡Z clusters, cf. Chart (30)), we can see it in inverse ratio to RVA. In total, 914 such obstruent clusters are pronounced by the informants, in which 155 PDs (17%) and only 70 RVAs (8%) happen (the previously seen 70 cases of regressive voicing), while in 599 times no processes are attested (the same 65% of NoVA). Consequently, if speakers have the chance to choose between the two processes (in the TD context), they clearly prefer PD to RVA. This observation will gain significance during the phonological analyses (cf. Sections 3.2 and 3.4).

The column of the “other strategies” in Chart (30) is composed by three factors: “del” (deletion), “err” (mispronunciation) and “PV” (progressive voicing). Firstly, the informants sometimes used consonant deletion from the marked cluster (mostly in clusters of three consonants). When two obstruents were preceded by a sonorant, the first obstruent could be deleted, which also eliminated the marked obstruent cluster: *nor*<d>*coreani* [norkoreˈaːni], *pin*<g>*pong* [ˈpimpoŋgə], *gan*<g>*ster* [ˈgãːster], *Sam*<p>*doria* [sanˈdɔːrja] (while in two words the rightmost obstruent was deleted: *gink*<g>*o* [d͡ʒiŋko], *Wolf*<g>*ang* [ˈvolfaŋgə]). Such deletions occurred 148 times in the corpus recordings (9% of the total occurrences), but half of the cases are related to two words only: *pingpong* (35 cases) and *ginkgo* (39 cases), so this strategy cannot generally be considered common among the informants.

Secondly, a few mispronunciations also occurred (33 times which is 2% of the total occurrences), mostly in the case of less common and complicated target words, such as *Bildungsroman*, *röntgen*, *sovchoz*, etc. The most interesting form of mispronunciation is metathesis, when speakers spontaneously invert the order of some consonants in the word, so as to dispose of the marked obstruent cluster, e.g. *röntgen* → *rönteng* (Section 3.1.4 will be entirely devoted to the phenomenon of metathesis as a phonetic repair strategy to resolve the ill-formed obstruent clusters).

Thirdly, a very small amount of progressive voicings also occurred (7 times), when in the DT case the T element of the cluster became voiced, probably by influence of the preceding D element: *subcultura* [subgulˈtuːra], *Südtirol* [ˈsudːirol]. However, in the target word *Bildungsroman* the judgement of the phenomenon is uncertain, because it refers to the voicing of /s/ which is in presonorant position: *Bildun*[gzr]*oman*, so this voicing process is maybe presonorant s-voicing and not PV (even if it is labelled PV in Chart (30) for convenience). As a consequence, since it technically occurs only 2 times in the dataset, we exclude PV as a relevant strategy of Italian speakers to resolve differently voiced underlying obstruent clusters.

The number of schwa epentheses is relatively less than expected (cf. the last column of Chart (30)). The informants applied schwa insertions very frequently in the case of

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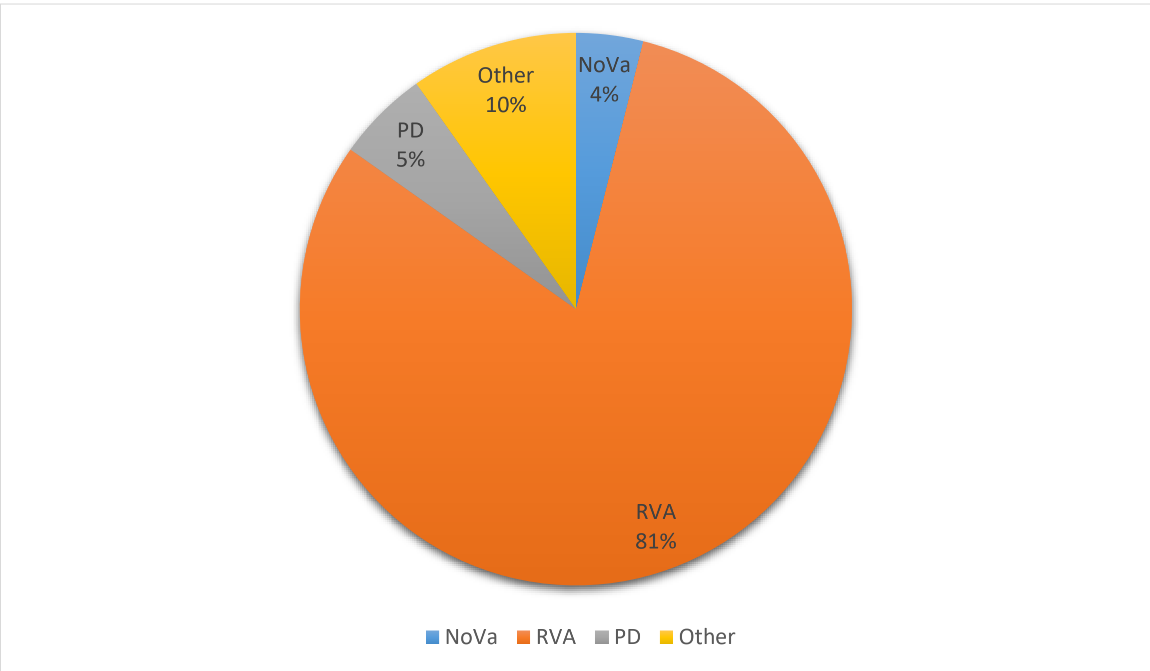
consonant-final words before a pause or at sentence boundaries (these are not considered in the statistics), but in the middle of obstruent clusters far fewer voiced schwas were found (270 in total, which is only 16% of the total occurrences). The case of voiced schwa epentheses will be reconsidered more in detail in Section 2.2.1.5, while for voiceless schwas cf. Section 3.1.2.

At the end of this subsection we will illustrate the results of the Hungarian control group as compared to the results of the Italian informants seen in Chart (30) and Diagram (31). The control group was needed because of Cavirani (2018)'s observation who drew attention to the potential influence of spelling to the pronunciation of loanwords (cf. Section 1.3). We presumed, however, that laryngeal phonology, especially the use of voice assimilation, cannot be influenced by spelling pronunciation. In order to support this presumption, five Hungarian control informants have been recorded (fluent speakers of Italian as L2) reading out the Italian sample texts of the corpus. That is, the relevant obstruent clusters of the corpus (which appear in the target words listed in Chart (30)) are recorded with Hungarian foreign accent as well.

Foreign accents appropriately reflect the laryngeal phonology of L1 (cf. the considerations about FAA in Section 1.2.4), and since Hungarian is a classical voice language (cf. Balogné Bérces & Huber 2010a), obstruent clusters (which are differently voiced in the underlying representation) are supposed to undergo RVA in Hungarian FA, too. The results of the control group are summarised in Diagram (34).

Diagram (34): *The results of five Hungarian control informants*



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As it can be seen in Diagram (34), the effects of spelling pronunciation cannot be considered a relevant influencing factor in the data collection method, at least for the Hungarian control informants. In fact, the overwhelming majority of the differently voiced underlying obstruents surfaces with identical voice values in the pronunciation of the Hungarian speakers: in 81% by RVA and in 5% by PD.

If we focus on the cases of RVA, we find devoicing (e.g. /DT/ → [TT]) in 92% of the target clusters, while voicing (e.g. /TD/ → [TT]) appears only in 74% of the possible occurrences. In fact, as far as the phonetic manifestations of RVA are concerned, the devoicing type of RVA is generally more frequent than voicing (cf. Markó, Gráczi & Bóna 2010; and also cf. Section 2.1.1.2 and Diagram (32)).

The 10% of the "other strategies" is exclusively composed by deletions from complex clusters, which is also usual in Hungarian phonology (cf. Siptár & Törkenczy 2000: 293-294).[52] Moreover, if we consider only the target words with complex clusters, the Hungarian control informants applied deletion in 59% of their occurrences, e.g. *Sam*<p>*doria*, *pin*<g>*pong*, *rön*<t>*gen*, *gin*<k>*go*, *sof*<t>*ball* (in this last case, however, RVA took place in the word after all, between the /f/ and the /b/: (Hun. FA) [ˈsovbalː]).

Finally, the 4% of NoVA cases is also important from the point of view of the "exception that proves the rule": indeed, even among the Hungarian pronunciations were discovered some sporadic cases of the adjacency of differently voiced obstruents, e.g. *u*[pg]*rade*, *nor*[dk]*oreani*, *ca*[tg]*ut*. At the same time, all of these NoVA cases occurred during slower phases in the pronunciation of the given sample texts; for the rest, the speakers used a normal speech tempo during the recordings. Besides the results shown in Diagram (34), 1% of schwa insertions also appear in the Hungarian data (e.g., *soft*[ə]*ball*); however, their number is irrelevantly scarce, so we cannot consider schwa epenthesis a real repair strategy, unlike in Italian.

In conclusion, the results of the Hungarian control group testifies that spelling does not necessarily influence the laryngeal behaviour of the speakers; it certainly does not in the case of obligatory postlexical processes (like RVA in Hungarian), but it may in the case of optional processes – the type s-voicing seems to be in Italian phonology.

[52] According to Siptár & Törkenczy (2000: 293), "fast cluster simplification is an optional deletion process that targets consonants flanked by consonants on both sides, i.e. it deletes the middle one of a sequence of three consonants".

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2.2.1.2 The effects of the places of articulation

In the previous section we have seen that the order of the adjacent obstruents (voiced-voiceless and vice versa) and their manner of articulation (plosive, fricative or affricate) do not relevantly affect the proportions of the informants' repair strategy selection. In this small section we are going to inspect the possible effects of the places of articulation; particularly, whether the informants treat homorganic clusters differently from others, or if there is any importance regarding the articulatory "distance" of the adjacent obstruents.

In Chart (35) three times 6 target words are sorted into three groups. In the first group homorganic clusters are collected, i.e. adjacent obstruents which share places of articulation (e.g. coronal as in /dt/, velar as in /kg/, labial as in /fb/[53]).

The clusters of the second group (called "Small distance") have relatively close places of articulation, because in the articulatory gesture the same "articulator" is involved (which is the tongue in this case); i.e., in the articulation of one of the obstruents the tip of the tongue is used, while in that of the other one the back of the tongue, e.g. /dk/, /tg/.

Finally, the clusters of the third group (called "Large distance") have relatively distant places of articulation, because in the articulatory gesture different articulators are involved; i.e., one of the obstruents is articulated with the aid of the lips (and the teeth, in the case of the labiodentals, cf. footnote 53), while in the other one the tongue is used, e.g. /bk/, /fg/. In the latter case there is no direct connection between the places of articulation, that is, the articulation of the adjacent consonants is practically independent, which may permit the vocal cords to reconfigure more easily.

Consequently, we presume that in the clusters of the first group more assimilations may happen compared to the other two groups, while among the clusters of the third group we will probably have more NoVA cases (due to the independence of the articulators).

[53] /fb/ is also listed here, even if it is only a "near" homorganic cluster (i.e., bilabial and labiodental places of articulation cooccur in sequence).

Chart (35): *6-6 target words sorted according to the distance between places of articulation*

Places of articulation	Target words	Occurr	NoVA	RVA	PD
Homorganic	*Sü**dt**irol*	53	28	24	
	*Su**d T**irolo*	53	37	16	
	*ou**td**oor*	106	59	22	15
	*bac**kg**round*	4	2	2	
	*gin**kg**o*	53	9		3
	*sur**fb**oat*	53	45	3	5
	total:	322	180 (56%)	67 (21%)	23 (7%)
Small distance (alveolar + velar)	*su**dc**oreano*	57	45	11	
	*vo**dk**a*	63	35	28	
	*M**cD**onald's*	65	52	10	3
	*ca**tg**ut*	53	34		17
	*gan**gs**ter*	53	28	9	
	*e**cz**ema*	69	45	2	22
	total:	360	239 (66%)	60 (17%)	42 (12%)
Large distance (labial + alveolar/velar)	*su**bc**ultura*	57	51	5	
	*o**bc**ordate*	53	45	8	
	*u**pg**rade*	53	47	3	3
	*foo**tb**all*	58	40	8	10
	*so**ftb**all*	53	48	1	4
	*a**fg**ana*	70	55	7	8
	total:	344	286 (83%)	32 (9%)	25 (7%)

Apparently, there is a moderate correspondence between the distance of the places of articulation of the clustered obstruents and the proportion of NoVA and RVA in the data, which confirms our above hypotheses.

Chart (35) suggests that a greater articulatory distance between the adjacent obstruents helps the preservation of their original voice values, e.g. *football* shows far more cases of NoVA than *outdoor*, and vice versa, *outdoor* shows far more cases of RVA than *football*. At the same time, the lack of voice assimilation is always in significant majority compared to the cases of RVA in the overall examination of the data; while the proportion of PDs seems to be irrelevant in this respect. These small but not insignificant differences of NoVA and RVA (caused by the places of articulation of the obstruents) are also shown in Diagram (36) below.

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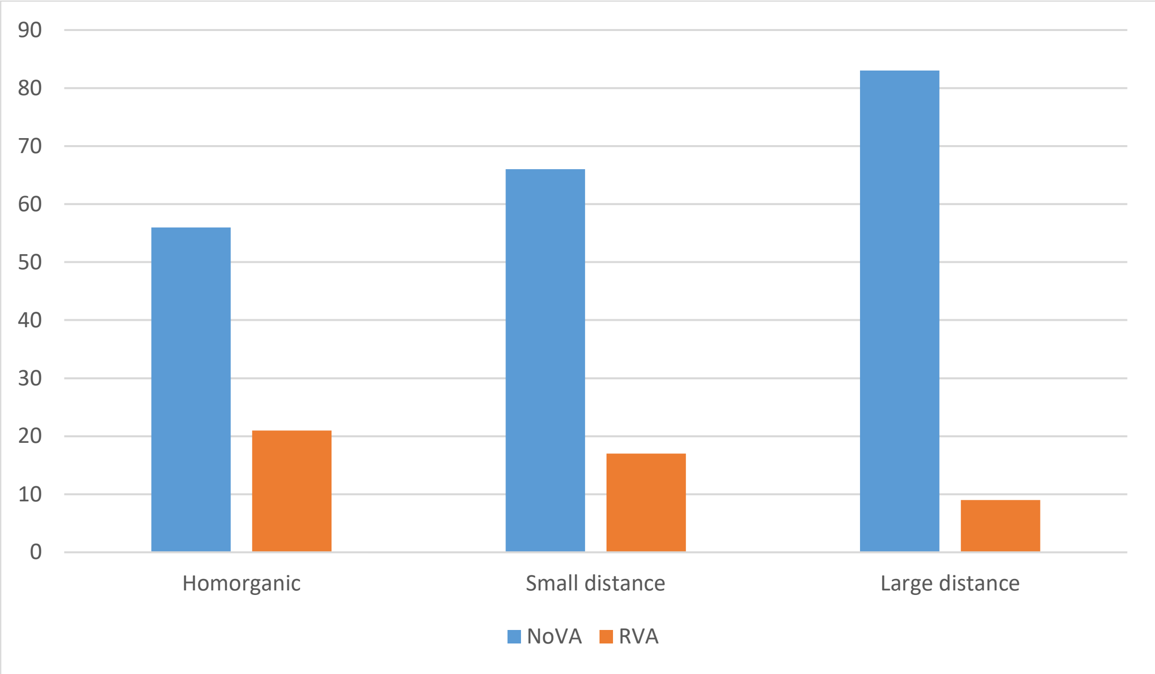
Diagram (36): *The proportion of NoVA and RVA according to the articulatory distance*



As the bar graph in (36) shows, NoVA columns are increasing across the three groups, while RVA columns are decreasing. This variation verifies a phonetic supposition, that is, the possibility for the single articulatory organs to be independently moved helps the preservation of the different voice values in the obstruents. On the other hand, when in the obstruction of the two segments the same articulator is involved, RVA is more likely to happen. Nevertheless, Chart (35) and Diagram (36) testify that the more common Italian pronunciation of differently voiced obstruent clusters is still without voice assimilation.

2.2.1.3 The effects of word stress

Another relevant question may arise concerning the phonetic factors which affect the case of obstruent clusters: does the position of word stress play any role in the preservation of the opposite voice values? In fact, in the phonology of Italian the location of word stress is particularly important, because several phonological phenomena may depend on it (cf. Krämer 2009: 156-202).[54]

[54] According to several Italian phonologists' opinion, secondary stress does not have any phonological relevance in Italian, it is only a phonetic manifestation (cf. Saltarelli 1970; Nespor 1993; Bertinetto & Loporcaro 2005; Krämer 2009; etc.), so we restrict our attention to main stress here.

In Chart (37) 5-5 target words of the corpus are classified according to the position of word stress. In the words of the first group, the informants placed the word stress on the first syllable, so the first obstruent of the cluster is in the coda of the stressed syllable. In the words of the second group, the informants placed the word stress on the second syllable, so the second obstruent of the cluster is in the onset of the stressed syllable. In contrast, the words of the third group had their word stress on a syllable other than the two containing the obstruent cluster in question, so the cluster was far from the word stress.

Chart (37): *Target words sorted according to the position of word stress*

Word stress	Target words	Occurr	NoVA	RVA	PD
Post-stress cluster	*vòdka, ùpgrade, fòotball, gàngster, sòvchoz*	282	184 65%	64 23%	13 5%
Pre-stress cluster	*BigTàsty, McDònalds, Sampdòria, afgàna, eczèma*	321	219 68%	53 17%	42 13%
Unstressed cluster	*sudcoreàno, nordcoreàni, subcultùra, subtropicàle, obcordàte*	274	222 81%	42 15%	

Our phonetically (and functionally) based hypothesis was that the informants might pay more attention to the pronunciation of the clusters which compare next to word stress, so they could pronounce them more carefully, which may help the tendency to preserve the original voice values of the obstruents. This is also supported by the fact that stressed position is phonologically strong.

Our other hypothesis was that the obstruent which is in the onset of the stressed syllable (like in the words of the second group) is more likely to preserve its original voice value. This also agrees with the default regressive direction of assimilations, since the onset position is phonologically stronger than the coda position (cf. Section 1.1.3 and footnote 7). Subsequently, the greatest amount of NoVA cases was expected in the words of the second group, and the smallest in the third group.

As we can see in Chart (37), these hypotheses are verified only in part, since the differences across the three groups are modest. Basically, the informants are capable of preserving voice values in differently voiced obstruent clusters independently of the position of

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word stress. Moreover, in the second group several PDs appear, which means that the obstruent in stressed onset position may often be affected by devoicing, as opposed to the second hypothesis. We can observe the results in Diagram (38) as well.

Diagram (38): *The distribution of NoVA and RVA according to word stress*

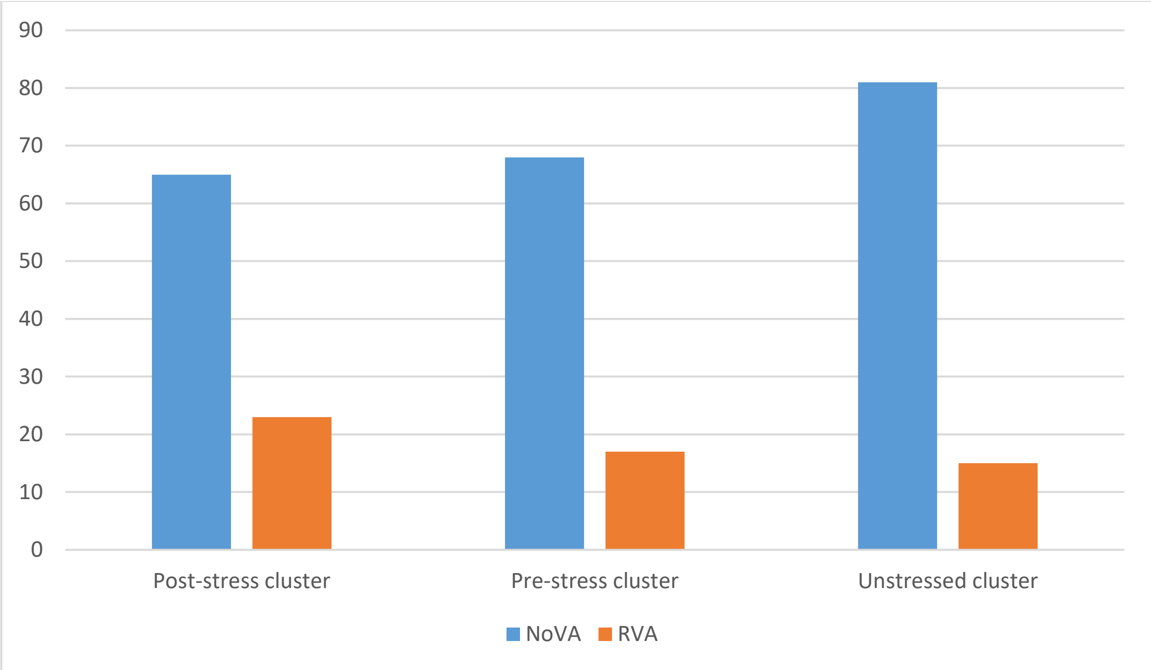

Diagram (38) is very similar to Diagram (36) seen in the previous section, that is, NoVA columns are increasing across the three groups, while RVA columns are decreasing. However, the differences are not so acute in this comparison; the most important ones regard the rise of NoVA cases in the third group compared to the others, and the higher number of RVAs in the first group compared to the other two groups.

A further factor which may be related to word stress in laryngeal phonology is aspiration. We have already seen in various figures shown in Section 2.1.1 that voiceless stops are moderately aspirated in the pronunciation of the Italian speakers. In “classical” aspiration languages (like English, German, Mandarin Chinese etc.) the aspiration of voiceless stops is usually heavier in the onset position of a stressed syllable (cf. Balogné Bérces & Huber 2010a). On the other hand, in the Italian data of the corpus no similar correspondences were found between word stress and aspiration. The role of aspiration in Italian will be phonologically analysed later (see Section 3.2.5).

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2.2.1.4 The effects of word frequency in language use

Many laboratory phonologists examine their data from points of view which go beyond phonetics and phonology, for instance, in terms of social, psychological and other factors (cf. Section 1.2.1). Similar examinations are beyond the scope of the present discussion, except the potential effects of word frequency in language use. Since the target words of the corpus are loanwords and foreign proper names, they may have differing token frequency in language use. In theory, the frequency of the target words may be considered a relevant factor in the realisation of the obstruent clusters, that is, more common words may have a different phonological behaviour compared to less common ones (which is a principle of usage-based phonology, as we have already seen in Section 2.1.2.1; cf. Bybee 1999, 2001).

However, the categorisation of the loanwords of the corpus by token frequency is quite a difficult task. It will be necessarily relative, since we cannot have exact data about the actual frequency of these words in spoken Italian. A very important tool which may help us to gain relevant information about this issue is the PAISÀ corpus (Lyding et al. 2014). It is a collection of Italian web texts, which has a dimension of 250 million tokens harvested from authentic contemporary Italian texts found on the internet. PAISÀ also has a freely available token frequency list, which provides a simple classification of the lemmas in descending frequency order, with the count of their occurrences in the database.

In Chart (39) I give the list of the target words in the frequency order indicated by PAISÀ. Therefore, in the first column of the chart the target words are listed in a descending frequency order, in the second one their count is given according to their occurrences in the PAISÀ corpus, while in the other columns the three most relevant values of the target words are indicated (NoVA, RVA, PD), together with the percentages of the single words calculated on the basis of their occurrences in our corpus.

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Chart (39): *Target words ordered according to token frequency*

Target words	Occurrences in PAISÀ	NoVA	RVA	PD
1. *abside*	4718	4 (100%)		
2. *football*	3954	40 (69%)	8 (14%)	10 (17%)
3. *Sampdoria*	1854	39 (61%)	9 (14%)	9 (14%)
4. *Wolfgang*	1394	11 (21%)		20 (38%)
5. *McDonald*	917	52 (80%)	10 (15%)	3 (5%)
6. *gangster*	769	28 (53%)	9 (17%)	
7. *background*	651	2 (50%)	2 (50%)	
8. *subtropicale*	580	44 (83%)	9 (17%)	
9. *afgano*	432	55 (79%)	7 (10%)	8 (11%)
10. *vodka*	298	35 (56%)	28 (44%)	
11. *nordcoreano*	273	37 (69%)	9 (17%)	
12. *upgrade*	253	47 (88%)	3 (6%)	3 (6%)
13. *Afganistan*	206	43 (81%)		10 (19%)
14. *outdoor*	185	59 (56%)	22 (21%)	15 (14%)
15. *subcultura*	163	51 (89%)	5 (9%)	
16. *Südtirol*	138	28 (53%)	24 (45%)	
17. *ragtime*	129	4 (100%)		
18. *sudcoreano*	124	45 (79%)	11 (19%)	
18. *softball*	124	48 (91%)	1 (2%)	4 (8%)
19. *eczema*	78	45 (65%)	2 (3%)	22 (32%)
20. *Sudtirolo*	74	37 (70%)	16 (30%)	
21. *röntgen*	59	20 (37%)	3 (6%)	23 (43%)
22. *ping-pong*	48	17 (32%)	1 (2%)	
23. *Singspiel*	39	36 (68%)	7 (13%)	
24. *ginkgo*	36	9 (17%)		3 (7%)
25. *Bildungsroman*	18	24 (45%)	8 (15%)	
26. *sovchoz*	10	34 (62%)	16 (29%)	
27. *catgut*	4	34 (64%)		17 (32%)
28. *obcordata*	3	45 (85%)	8 (15%)	
29. *surfboat*	0	45 (85%)	3 (6%)	5 (9%)
29. *McBacon*	0	50 (94%)		3 (6%)
29. *BigTasty*	0	28 (53%)	25 (47%)	

The classification in Chart (39) is not without problems. In token frequency lists spelling is a crucial factor, since words differing in one character (including capital letters and special symbols) are counted as different tokens, so one target word may occur several times in the same list with different spellings (e.g. *röntgen*/*rontgen*, *pingpong*/*ping-pong*, *McDonald's*/*McDonald*, etc.). Therefore, the most usual Italian spellings of the loanwords are considered in the above list, and adjectives are transformed to the masculine form in 3sg (e.g. *afgana* > *afgano*, *nordcoreani* > *nordcoreano*, etc.).

If we attempted to sort the target words into different groups according to their frequency indicated in Chart (39), we would not be able to show any significant correlation between token frequency and the instances of NoVA, RVA or PD. However, if we take certain

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"word pairs" for contrast, we can achieve relevant results. In the following part of this section various comparisons will be made of phonetically similar (or identical) obstruent clusters which show different laryngeal values probably on the basis of word frequency in language use.

The first target word pair we compare is *McDonald* and *McBacon*: the former is a very popular brand name (it is frequently pronounced by Italians, also being in 5th place in the above list), while the latter is a fictional sandwich name invented by the same company, which is much less common in language use (at least in the PAISÀ corpus it has 0 occurrences). The phonetic properties of their clusters are similar (e.g. both are pre-stress TD clusters); nevertheless, in the case of *McBacon* no RVA is attested in the corpus recordings, in contrast to the 15% of RVA found in *McDonald*. Furthermore, the pronunciation model of *McBacon* seems to be more conservative compared to *McDonald*: in the former 94% of NoVA is found, while in the latter 80%: all of these results are probably due to the frequency in language use.

A similar situation arises when we compare other more frequent words with less frequent ones which contain phonetically similar target clusters, e.g. *football* and *softball*. In *football* (in 2nd place in the above list) we find 69% of NoVA compared to the 91% of *softball* (in 18th place); moreover, in *football* we also find 14% of RVA, while in *softball* only 2%. If we compare *football* with *catgut* (in 27th place), we can see a similar proportion in the values of NoVA, but in *catgut* no RVA happens at all. Consequently, RVA is apparently more likely to happen in more frequent words than is less frequent ones; furthermore, the preservation of the input voice values is often more frequent in less common words.

The word pair of *subtropicale* (8th) and *subcultura* (15th) might be a further example of the correlation between RVA and word frequency: in the former 17% of RVA appears, while in the latter 9%. The case of *afgano* (9th) and *Afganistan* (13th) is also interesting: the adjective *afgano* is probably a more frequently pronounced word than the proper noun *Afganistan*, at least the informants never use RVA in the case of the noun, but they use it in 10% in the adjective (e.g. *afgana* [avˈgaːna]). In addition, the target words *Sampdoria* (3rd) and *röntgen* (21st) both contain a postnasal TD cluster, but the former has 14% of RVAs compared to the 6% of the latter. Finally, the outstanding number of RVAs in the case of *vodka* can also be explained through word frequency, even if RVA is also facilitated here by the TD order of the obstruents (as we have seen in Section 2.2.1.1, devoicing by RVA is more frequent than voicing, even in the Hungarian control informants' data).

In Diagram (40) some of the previous target word pairs are shown in a bar graph, so as to offer a comparison between the percentage distribution of the three major strategies used to surface the target obstruent clusters (NoVA, RVA and PD).

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Diagram (40): *Comparison of more/less frequent target words with similar clusters*

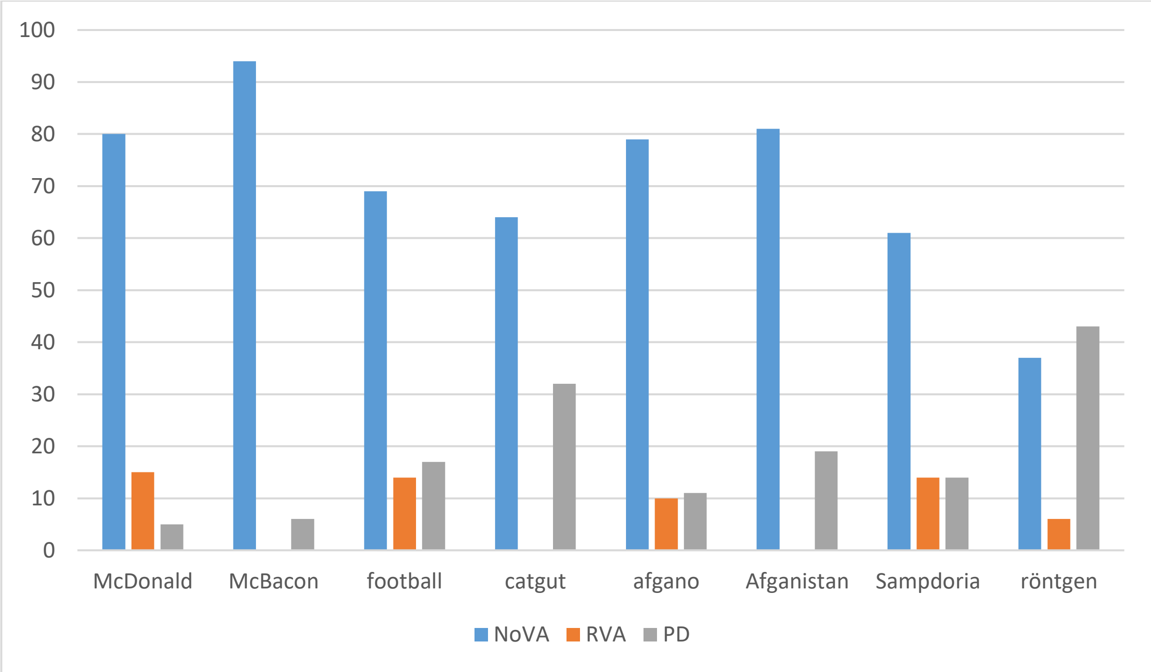

Diagram (40) clearly shows the possible correlations between word frequency and laryngeal phonology. In the case of the first three word pairs (*McDonald*/*McBacon*, *football*/*catgut*, *afgano*/*Afganistan*) the more frequent word of the pair does have some realisations with RVA (more precisely regressive voicing, since the target clusters are all TD or FD), but the less common one does not have any cases of RVA at all; while in the last pair (*Sampdoria*/*röntgen*) the less frequent word has less than a half of RVAs compared to the more frequent one. If we take a look at the grey columns of PD, we may also notice a difference between the word pairs: in the less frequent words generally more PDs appear compared to the more frequent ones.

As we can see even on the basis of these few examples, infrequent words are much sooner subject to the Italian tendency of input preservation, that is, we may find more occurrences of NoVA in their case. On the other hand, changes in the laryngeal properties (e.g. RVA) seem to happen more easily in frequently used words, which agrees with the claims of usage-based phonology, i.e., optional phonological processes are more likely to happen in the case of high word frequency, in contrast with low frequency (Bybee 1999: 220-222).

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2.2.1.5 Statistics regarding the dialectal zones (north-centre-south)

The final comparison of the results we carry out here regards the major dialectal zones the informants derive from, i.e. the pronunciations of northern, central and southern speakers will be confronted. The hypothesis which requires this comparison is based on the extreme dialectal fragmentation of the Italian language (cf. Section 1.1.1), which probably manifests itself even in the proportion of the different repair strategies the speakers use to resolve the obstruent clusters in question. On the basis of the dialectal literature (cf. Rohlfs 1966; Maiden & Parry 1997; Radtke 1997; Repetti 2000; Loporcaro 2009, 2011; Ledgeway 2009; Huszthy 2017b; etc.) we expect southern speakers to allow fewer assimilatory processes (like RVA and PD) and fewer consonant deletions compared to non-southern speakers.[55]

Before proceeding, we have to note that a few problems emerge around the dialectal (and idiolectal) categorisation of the informants (cf. Section 1.3). The first problem regards our Sardinian female speaker (who is from Nuoro, Central Sardinia). Sardinian is officially considered a Romance language and not a dialect of Italian, but Sardinian accented Italian is a dialectal accent of Italian (cf. Loporcaro 2009: 159). However, Sardinian Italian cannot be considered either a northern or a southern or central variety. Still, we classified our Sardinian speaker among the Central Italian informants, firstly for geographical reasons, secondly because the results of southern speakers are quite homogeneous, and the Sardinian speaker's results are not in compliance with them. A similar problem concerns the three informants of Rome, since the dialects of Rome can be considered Southern Italian for several reasons, even if the capital is geographically in the centre of Italy. Nonetheless, other linguistic arguments link the accents of Rome to the Central Italian dialects, and the main isoglosses which separate central and southern dialects are all south of Rome (cf. Pellegrini 1977; Loporcaro 2009: 17). Accordingly, we will classify these informants as central speakers, too, as their results notably diverge from the very homogeneous southern results.

A further problem regards the "twin sisters" from Rome (labelled in Chart (41) as "Rome_f_1" and "Rome_f_2"), one of whose parents is Hungarian, but they are not simultaneous bilinguals, only near-bilinguals. They grew up in Rome and never lived in Hungary, so they speak Hungarian with a strong Italian accent, while in their Italian no foreign

[55] The two main isoglosses which determine the three major dialectal zones of Italy are the La Spezia-Rimini axis and the Rome-Ancona axis: between the two we can speak about central dialects, the others are northern and southern, respectively (cf. Loporcaro 2009: 17).

accent can be detected. All the same, their results are quite different from all the other informants, since they apply RVA much more compared to the other Italians. I hypothesised that this fact is connected to their Hungarian, and that RVA may be acquired through language contact. We will return to this issue in Section 4.2, but for the present purposes these speakers will be classified among the Central Italian informants. The last problem concerns the Tuscan male informant, who did not read out all of the sample texts of the corpus; therefore his results are not considered in this section.

In Chart (41) the personal results of every single informant are summed up, who are sorted into three groups: Northern Italy, Central Italy and Southern Italy. In Italian dialectology six larger dialectal zones are distinguished (two in the north, two in the centre and two in the south, cf. Pellegrini 1977; Loporcaro 2009: 68-70) which are all represented in the sample: there are northern informants from the Gallo-Italian territory and from Veneto, from Tuscany and outside Tuscany, and from the mid-south and the extreme south.

The informants are labelled in the chart with the region of origin, with the initial letter of their sex and with a number if there are several informants with the same data. The column after the informants' label contains the number of their pronounced target obstruent clusters (these numbers differ across the informants; for the reasons of the differences cf. Section 1.3). The following four columns show the distribution of the four relevant resolutions of the clusters (NoVA, RVA, PD and consonant deletion). Finally, the column called "Schwa" indicates the schwa epentheses which appeared between the members of the obstruent cluster.[56] The percentage values of the schwa epentheses are independent of the other percentages shown in the chart, since they refer to the overall pronunciation number, and not to the various repair strategies. The category of mispronunciations is not included in this chart, so nearly 2% will be lacking from the overall results.

[56] These schwas are short, voiced, central-mid vowels found in the middle of the clusters. Voiceless schwas and other schwa insertions (such as word-final) are not considered.

Chart (41): *Personal results of single informants sorted into dialectal groups*

Dialectal zone	Informant's label	Pron. num.	NoVA	RVA	PD	Delet.	Schwa
Northern Italy	Trentino_f	150	65	18	32	34	0
	Emilia_f_1	90	54	14	8	12	11
	Emilia_f_2	90	36	22	25	7	4
	Veneto_m	158	106	22	8	21	29
Total:	4 informants	488	261 53%	76 16%	73 15%	74 15%	44 9%
Central Italy	Rome_f_1	91	33	50	1	7	1
	Rome_f_2	90	42	35	10	3	10
	Rome_f_3	116	68	28	11	9	10
	Tuscany_f	87	60	13	3	10	6
	Sardinia_f	150	97	14	6	30	1
Total:	5 informants	534	300 56%	140 26%	31 6%	59 11%	28 5%
Southern Italy	Apulia_f	151	133	8	6	0	72
	Calabria_f	161	134	3	6	12	48
	Calabria_m	150	132	4	1	10	50
	Campania_f	90	51	19	13	6	15
	Campania_m	92	81	4	3	2	20
Total:	5 informants	644	531 82%	38 6%	29 5%	30 5%	205 32%

As it is apparent in Chart (41), there is a clear dialectal difference between the results of southern and non-southern informants. One of the most important differences regards the number of schwa epentheses which is considerably higher in the south. Generally, we can observe that the number of the NoVA cases is increasing towards the south. On the contrary, the numbers of PDs and deletions are decreasing towards the south. The columns of RVA and Schwa show categorical, not gradual differences between the south and the non-south: in the pronunciation of southern speakers much fewer RVAs are detected compared to central and northern informants, and much more schwa epentheses. The high number of southern schwa epentheses is certainly connected to the high number of NoVA cases, since when speakers divide adjacent obstruents with schwa epenthesis, the obstruents can better preserve their original voice values; at the same time, there are cases which show voice assimilations alongside with schwa epenthesis, so the two phenomena do not necessarily go hand in hand. Diagrams (42) and (43) below illustrate the statistics of northern and southern informants.

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Diagram (42): *Results of northern informants on pie chart*

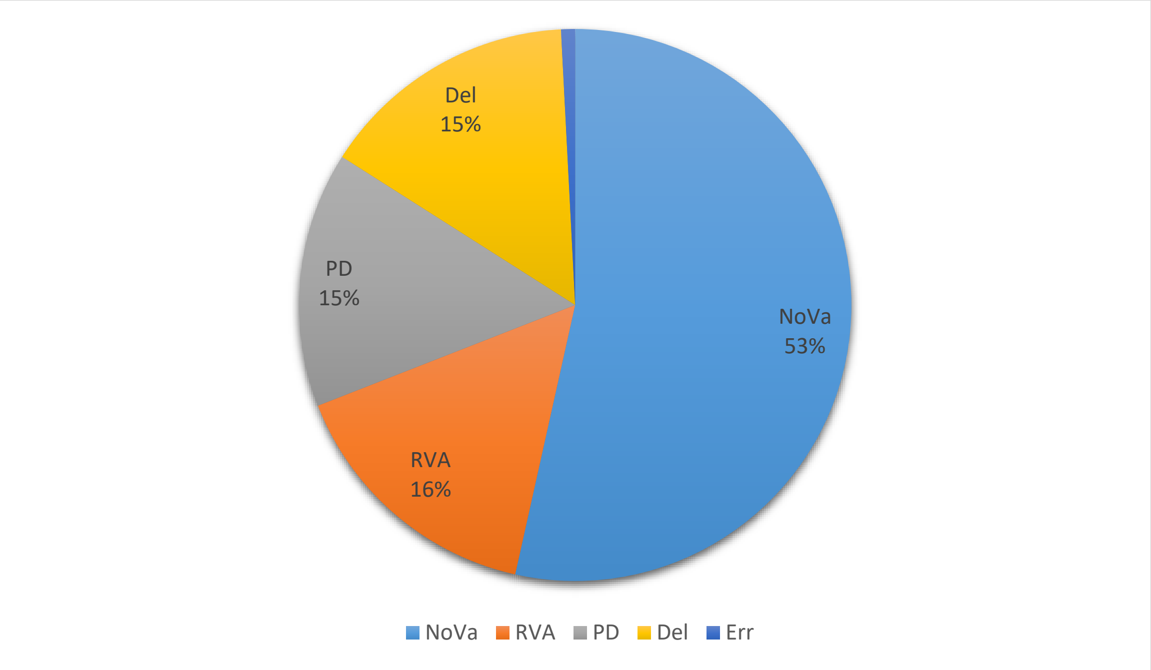
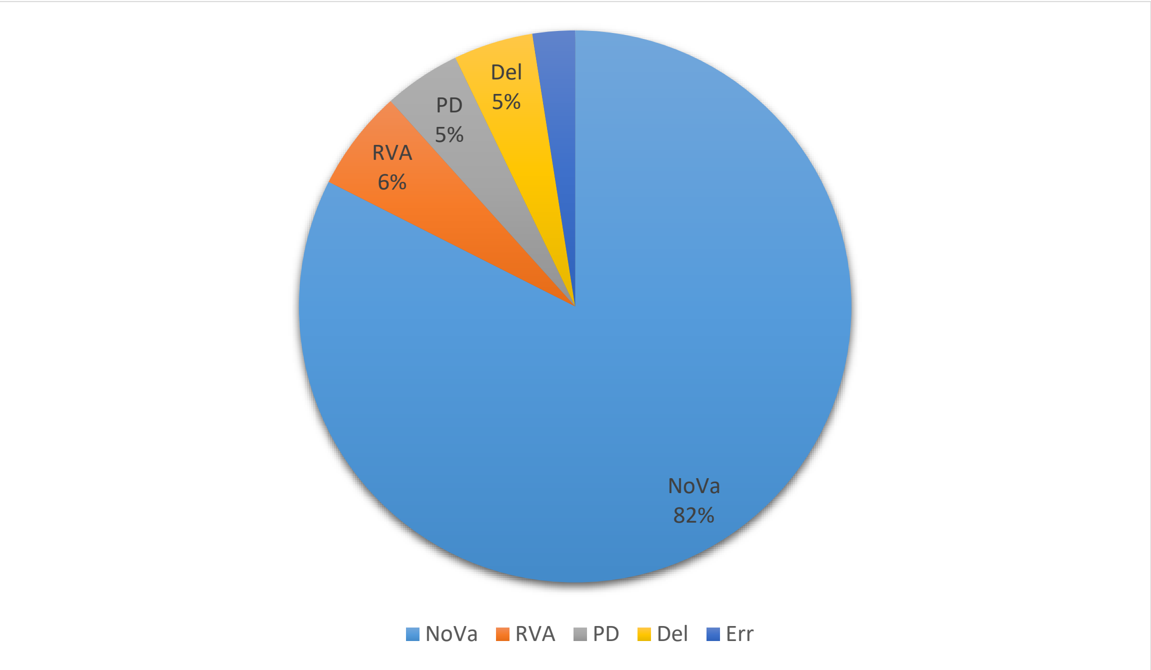


Diagram (43): *Results of southern informants on pie chart*



A little over the half of the Northern Italian informants do not use assimilation or deletion to resolve oppositely voiced obstruent clusters, as it is shown by the blue slice of Diagram (42) (53% NoVA), while the other three strategies (RVA, PD and deletion) are broadly balanced. As far as the Southern Italian informants are concerned, they do not apply assimilation or deletion in the overwhelming majority of the cases (82% NoVA), while the three repair strategies are balanced again, even if to a lesser extent.

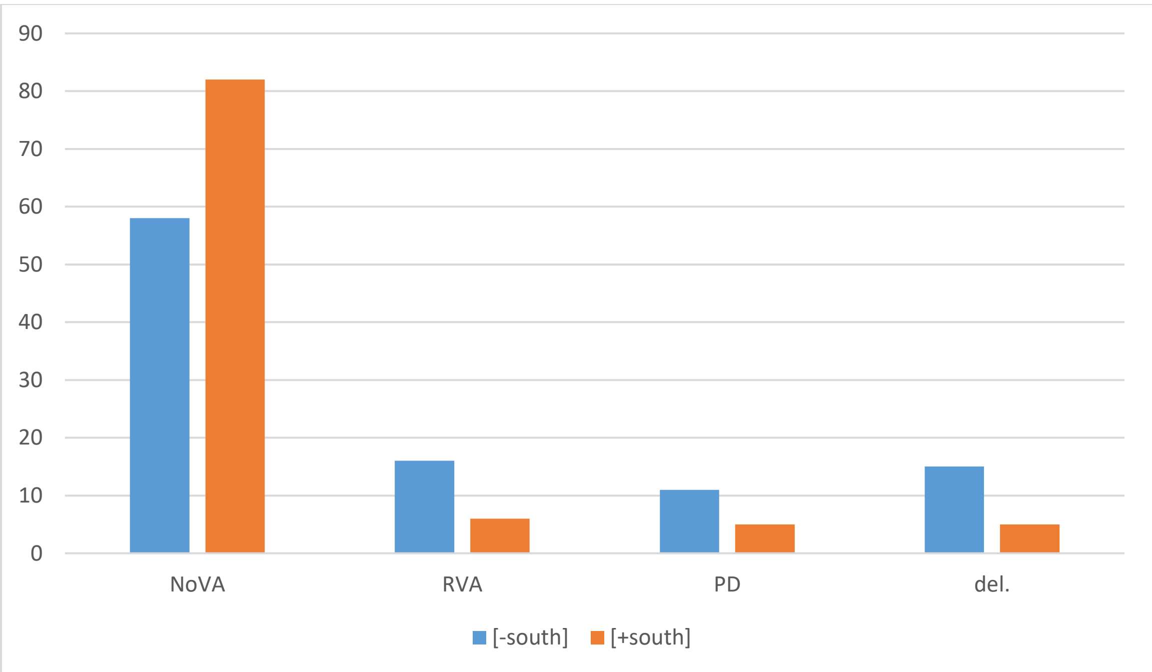
The case of the Central Italian informants is more complicated because of the presence of the two near-bilingual informants. But, if we remove their results, the proportion of Central Italian RVAs will equal that of the northern informants: 16%. In Chart (44) the results of the northern and the central speakers are added together (without the two near-bilinguals, Rome_f_1 and Rome_f_2) and are contrasted with the results of the southern speakers.

Chart (44): *Comparison between the south and the non-south without the bilingual informants*

Dialectal zone	Spea-kers	Pron. num.	No VA	RVA	PD	Del.	Schwa
North & Centre	7	841	486 58%	131 16%	93 11%	123 15%	61 7%
South	5	644	531 82%	38 6%	29 5%	30 5%	205 32%

The difference between southern and non-southern informants is even more salient on the basis of the comparison in Chart (44). Basically, the two groups systematically differ in every contrasting aspect (NoVA, RVA, PD, deletion and schwa epenthesis), which is well illustrated in Diagram (45) as well (without the schwa insertions, which will be considered later).

Diagram (45): *Comparison between the south and the non-south on bar graph*



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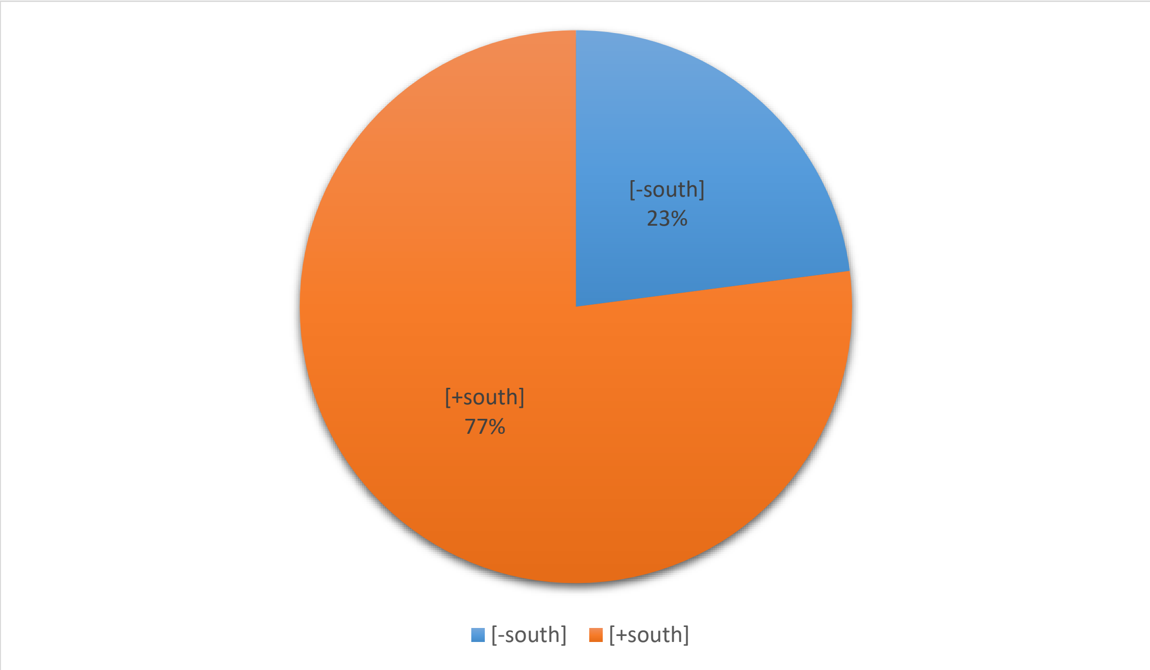
The amount of the NoVA cases is in absolute majority both in the case of southern (indicated as [+south]) and non-southern (indicated as [-south]) informants, but the relation between the components of the first column pair and the other three column pairs is the converse. In the first comparison (NoVA), the orange [+south] column is significantly higher (82%) than the blue [-south] column (58%), but in the other three comparisons, the orange columns are shorter than half of the blue columns (in the case of RVA and deletion they are practically one third).

At the same time, as far as schwa epentheses are concerned, more than three quarters of the epenthetic schwas found between the members of the obstruent clusters derive from southern informants, as it is shown in Diagram (46) as well (the percentages here refer to the overall amount of schwa insertions, i.e. 266 schwas).

Diagram (46): *Comparison of schwa epentheses between the south and the non-south*



Apparently, southern informants opt more for the preservation of the input elements compared to non-southern speakers. In order not to change the qualities of the input consonants they also turn to apply much more schwa insertions. They typically use another epenthetic strategy as well, which is the gemination of the first obstruent of the cluster: from a phonological point of view this is also a conservative repair strategy which helps to avoid deletion in exchange of insertion (cf. Section 3.1.5). Therefore, the southern Italian pronunciation variants seem to be phonologically more conservative compared to non-southern variants.

As a conclusion of Section 2.2.1, we may affirm that, with respect to every phonetic and non-phonetic factor considered in the various subsections, the most important pronunciation pattern of Italian speakers is to avoid assimilation or deletion in obstruent clusters. The occasional occurrence of other strategies (such as RVA, PD, deletion) is important, because they show that the general absence of assimilations (NoVA) can be considered a phonological tendency, rather than a casual lack of processes (cf. Chapter III).

2.2.2 Statistics regarding /sC/ clusters

A long section has already been dedicated to /sC/ clusters (Section 2.1.2), by presenting data from the corpus for /s/ plus obstruent and /s/ plus sonorant clusters (Sections 2.1.2.1 and 2.1.2.2). In this part of the dissertation detailed statistics will be offered about every type of /sC/ cluster which appears in the research corpus. In Section 2.2.2.1 /s/ plus obstruent clusters, while in Section 2.2.2.2 /s/ plus sonorant clusters will be taken into account.

For a specific reason, in the sample sentences of the corpus quite few /sC/ clusters are present. The main motivation is that during the collection of the target words (this work-phase preceded the actual composition of the dissertation by years) the most important hypothesis to test was the absence of voice assimilation in non-/sC/ obstruent clusters; even so, a few /sC/ clusters were taken into consideration in the corpus as assets of direct comparison (cf. the first paragraph of Section 2.1.2.1). However, at a later stage of the work, the synchronic verification of the current phonological behaviour of /sC/ clusters acquired importance, mostly in loanwords and not in the native Italian vocabulary. But when this problem arose, the speech recording procedures had already been concluded. Fortunately, some /sC/ clusters were also tested in the corpus, moreover, many other sibilant (e.g. sibilant affricates [t͡s, d͡z] and postalveolar sibilants [ʃ, ʒ]) plus consonant clusters were present in the sample sentences, which offered numerous derived /sC/ clusters (e.g. by spontaneous deaffrication [t͡s]→[s] or depalatalisation [ʃ]→[s]). These derived /sC/ clusters have been added to the non-derived /sC/ clusters in the overall examination, so altogether 358 pronounced /sC/ clusters are found in the corpus. The forthcoming statistics will concern the different laryngeal realisations of these total occurrences.

2.2.2.1 /s/ before voiced obstruents

The only target word of the corpus which contains a non-derived /s/ plus obstruent cluster is *iceberg*, whose underlying form was hypothesised as /ajsberg/. The word was pronounced 64

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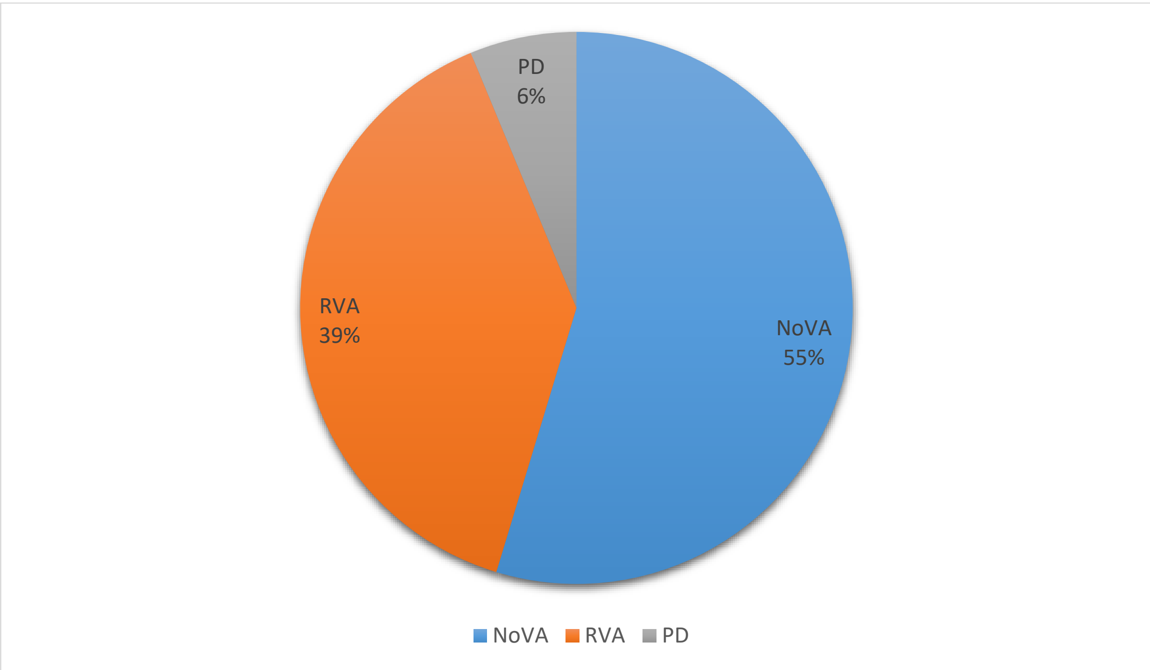
times in total by 14 informants, with various surfacing realisations, such as: [ˈajsbergə], [ˈajzbergə], [ˈajspergə]; [ˈajsberk], [ˈajzberk], [ˈajsperk] (besides, other realisations also occurred, e.g. with stress-shifting). In these examples a number of strategies appear, namely NoVA, RVA and PD, with potential schwa insertion after the final consonant cluster, or potential final devoicing in absence of the schwa. In Chart (47) the 64 pronunciations of the word are grouped according to the three strategies to surface the underlying /sb/ cluster, while Diagram (48) shows the distribution of the proportions.

Chart (47): *Statistics of the only non-derived /sC/ cluster in the target word* iceberg

Target word	Occurr.	[sb] NoVA	[zb] RVA	[sp] PD
iceberg	64 100%	35 55%	25 39%	4 6%

Diagram (48): *Proportions of the repair strategies found in* iceberg



The relation between assimilations (RVA and PD) and escaping assimilations (NoVA) is roughly equal in the Italian realisations of the loanword *iceberg*, as Diagram (48) shows. The small majority of NoVA cases (55%) is not as convincing here as it was with the non-/sC/ obstruent clusters, because we find assimilations in counterbalance (45%), while other solutions do not occur (like deletion or mispronunciations). Apparently, the /sC/ cluster in the middle of *iceberg* is a well formed obstruent cluster that does not need “drastic” repair strategies to be

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"properly pronounced", which is also attested by the general absence of schwa epentheses between the adjacent obstruents.[57]

The proportions shown in Chart (47) and Diagram (48) actually correspond to the few claims found in the literature about the case of word-internal /sC/ clusters. According to Bertinetto (1999a, 1999b, 2004), the laryngeal specification of /s/ in some compound words or loanwords may vacillate between voiced and voiceless realisations (in our case, between NoVA and assimilations), for instance, in *gasdotto* 'pipeline', *facebook*, *baseball*, *frisbee*, etc.[58] The case of *iceberg* also shows a sort of vacillation between NoVA on the one hand (55%) and assimilations (RVA and PD) on the other (45%).[59] In Charts (49), (50) and (51) the derived /sC/ clusters of the corpus are presented, with respect to every possible pronunciation variant of the clusters in question (e.g. affricated versions too).

Charts (49), (50): *Derived /sC/ clusters of the corpus*

Target word	Occurr.	[t͡sw]	[t͡sv]	[t͡sf] PD	[sv] NoVA	[zv] RVA
Botswana	53 100%	23 55%	16 31%	7 13%	2 4%	1 2%

Target word	Occurr.	[d͡zt] NoVA	[t͡st] RVA	[zt] NoVA	[st] RVA
azteca	53 100%	29 55%	22 42%	1 2%	6 11%

[57] Only 3 minor schwas were found in the dataset (in the pronunciation of a single informant), which derive from a kind of release of the /s/ before the /b/, but are significantly smaller (around 1 ms) compared to other schwas found between the members of non-/sC/ clusters.

[58] Besides the examples which are actually mentioned in the papers (e.g. Bertinetto 1999b: 280, 283), the information has been confirmed through personal conversation with professor Bertinetto at the SNS of Pisa. His works only contain the example of *gasdotto* – the loanwords cited above have been added to the list following spoken communication.

[59] It is interesting to note that Bertinetto (1999a, 1999b) makes a dialectal difference between northern and southern solutions of *gasdotto*, and claims that the pronunciation variant with voiceless [s] is more typical of southern speakers. However, in the case of *iceberg* no significant dialectal differences have been found, i.e., a similar vacillation has been discovered in the pronunciation of both southern and non-southern speakers.

Chart (51): *Derived /sC/ clusters of the corpus*

Target word	Occurr.	[t͡sD] NoVA	[d͡zD] RVA	[t͡sT] PD	[zD] RVA	[sD] NoVA	[sT] PD
Uzbekistan	53	19	29	5	11	4	
uzbeca	53	20	31	2	8	2	
Mazda	106	13	90	20	26	1	5
samizdat	53	8	22	17	12	4	13
Total:	265 100%	60 23%	172 65%	44 17%	57 22%	11 4%	18 7%

Charts (49, 50, 51) demonstrate that the appearance of derived /sC/ clusters is in absolute minority compared to the preservation of the affricate realisation of the preconsonantal sibilants in the above clusters. We can note that RVA and PD may be present even in the affricates (e.g. /t͡sD/ → [d͡zD]), however, these occurrences are not added to the overall statistics, seeing that the first consonants of the clusters are still sibilants whose phonological behaviour differs from that of non-sibilants (moreover, in the case of sibilant affricates we do not have evident inputs, since ‘z’ may stand for both voiced and voiceless affricates in Italian, even independently of the dialects; cf. Section 2.1.1.4). The last two columns of Charts (49, 50) and the last three of (51) include the derived /sC/ clusters. The overall results regarding derived and non-derived /sC/ clusters are summarised in Chart (52).

Chart (52): *Total results of derived and non-derived /sC/ clusters*

/sC/ clusters	Occurr.	NoVA	RVA	PD
Derived	95	13 14%	64 67%	18 19%
Non-derived	64	35 55%	25 39%	4 6%
Total:	159	48 30%	89 56%	22 14%

The difference between the results of derived and non-derived /sC/ clusters is quite outstanding, as it is highlighted in Diagram (53) as well. In derived /sC/ clusters, the solutions with assimilations (RVA and PD) are in absolute majority compared to the 14% of NoVA cases. These results are in compliance with the behaviour expected from classical voice languages (cf. Section 3.2), at least as far as the high number of RVAs is concerned, but the proportion of PDs is also large (19%), which is not expected from a classical voice language, though. By all means,

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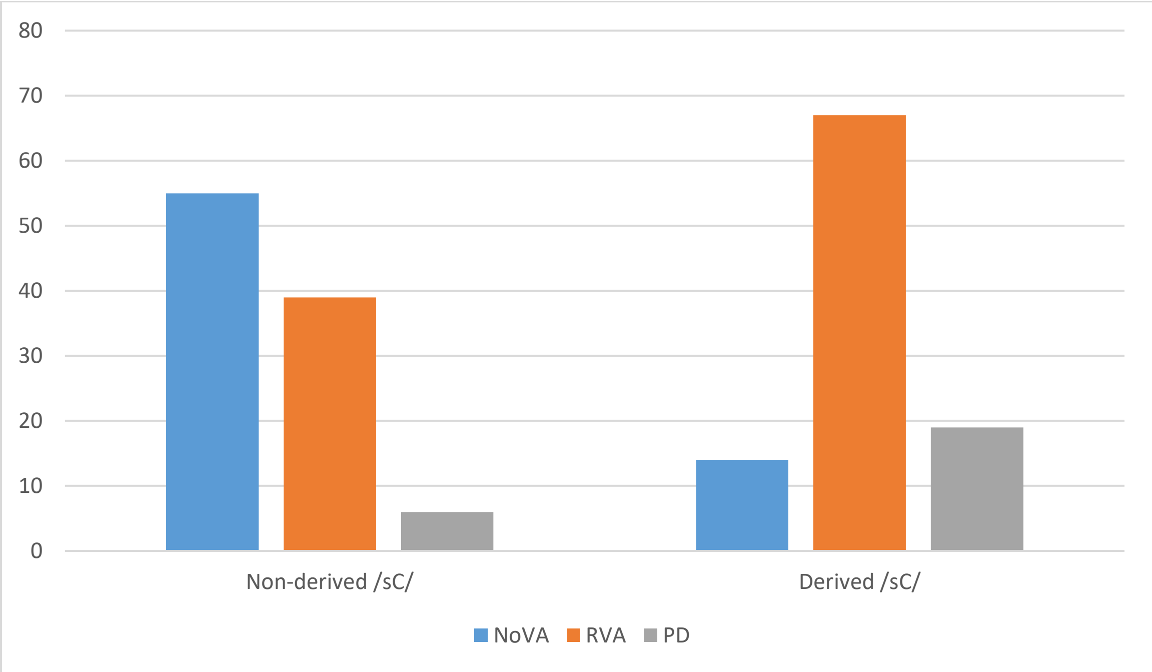
the NoVA cases are in significant minority in derived /sC/ clusters compared to any other obstruent cluster seen before.[60]

Diagram (53): *Differences between derived and non-derived /sC/ clusters*



However, the low percentage of NoVA cases in derived /sC/ clusters may bring some phonological benefit for our cause. We may assume that in cases when other transformations also happen between input and output (such as deaffrication: /t͡s/ → [s]), the informants may pay less attention to laryngeal variables, so they cannot preserve the original voice values of the obstruents as effectively as in other clusters. This assumption means that NoVA can actually be seen as a strategy whereby Italian speakers surface differently voiced adjacent obstruents.

As a conclusion of Section 2.2.2.1, we also consider the case of /sC/ clusters in sandhi position. Nespor (1993) and Bertinetto (1999a, 1999b) claim that preconsonantal s-voicing does not take place in Italian at the word boundary; their examples are (It.) *rebus **d**ifficilissimo* [sd] 'a very hard riddle' and (It.) *autobus **b**ianco* [sb] 'white bus'. In Nespor (1993: 74)'s explanation s-voicing is exclusively lexical in Italian, and independent of morphological structure. In Bertinetto (1999a)'s view s-voicing may be due to the hypothetical tautosyllabicity of /sC/ clusters: that is, when the cluster is evidently tautosyllabic (as word-initially), /s/ undergoes voicing; when the syllabification of /sC/ vacillates between tautosyllabic and

[60] These results would require the testing of more target words with non-derived /sC/ clusters (as in *iceberg*): I leave this for further research.

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heterosyllabic (as word-internally), s-voicing also vacillates (cf. the example of *iceberg*); and when the /sC/ cluster is heterosyllabic (as in sandhi position), s-voicing is blocked. This discussion will be reconsidered in Section 3.2 from a Laryngeal Realism approach. In Chart (54) three examples are shown for sandhi /sC/ clusters.

Chart (54): */sC/ clusters in sandhi position in the target words of the corpus*

Target words with sandhi /sC/	Occurr.	NoVA	RVA	PD
silence drive	53	46		7
Pierce Brosnan	54	52		2
James Bond	53	38	10	5
Total:	160	136 85%	10 6%	14 9%

As it is obvious on the basis of the results shown in Chart (54), Italian preconsonantal s-voicing is truly blocked at word boundaries. The only example which allows a few occurrences of RVA is *James Bond* (where 19% of RVA arises) whose reason can certainly be found in word frequency (cf. Section 2.2.1.4). If we make a comparison between the results in Chart (54) and those of the Hungarian control group, we find a completely different outcome. The five Hungarian speakers use RVA in 81% of the occurrences of the above target words, while 14% of PD and 5% of NoVA also occur. This brief comparison suggests again that the process of Italian preconsonantal s-voicing is a different phonological phenomenon than RVA found in classical voice languages, such as Hungarian.

2.2.2.2 /s/ before sonorants

The regular voicing of /s/ before sonorants (i.e. /sN/ → [zN]) is found in a few classical voice languages too, e.g. in some varieties of Spanish, Portuguese and Catalan (cf. Section 3.4.1). This process is phonologically problematic to be analysed as voice assimilation, since sonorants do not have distinctive voice, so they cannot act as the triggers of spreading. Therefore, this is rather interpreted as a spontaneous phonetic process without phonological consequences (cf. Cyran 2014). Be that as it may, this question is not of any relevance in this subsection, where we will only explore the presence of presonorant s-voicing in the data of the corpus.

The phonological literature of Italian considers presonorant s-voicing a regular phenomenon (cf. Bertinetto & Loporcaro 2005: 134; Krämer 2009: 209; moreover, Section

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3.2.4), and the process was frequently found even in Italian FA, e.g. in the Italian accented pronunciation of the English words [z]*nake*, [z]*moke*, [z]*lide* etc. (cf. Section 1.2.4.3). Accordingly, we hypothesised that /s/ would undergo voicing before sonorants in the research corpus, too. The relevant target words were mostly unusual loanwords in order for us to test the productivity of presonorant s-voicing. In this examination we also have derived /sN/ clusters again, by deaffrication (/t͡sN/ → [sN]) and by depalatalisation (/ʃN/ → [sN]). The target words are listed in Charts (55) and (56) with results.

Charts (55, 56): *Target words with derived and non-derived /sN/ clusters*

Target word	Occurr.	[sN]	[zN]	[ʃN]	[ʒN]	del	err
swimming	53	25 47%	28 53%				
Bildungsroman	53	39	8			6	
backslash	55	36	8	6		7	4
Total:	108 100%	75 69%	16 15%	6 6%		13 12%	4 4%
kalashnikov	53	1	2	36	12		2
krishna	54	1		43	10		
kashmir	54			54			
establishment	53			53			
Total:	214 100%	2 1%	2 1%	186 87%	22 10%		2 1%

target word	occurr.	[d͡zl]	[t͡sl]	[sl]	[zl]	err
guzla	53	24	9	9	9	2
grizzly	53	36	2	4	11	
Total:	106 100%	60 57%	11 10%	13 12%	20 19%	2 2%

The target word which is principally compliant with the examples known from the literature is the first of Chart (55), *swimming*: in fact, in this word the target cluster is word-initial. Since most of the relevant Italian examples which participate in presonorant s-voicing have word-initial /sN/ clusters, we may believe that this process is limited to a special environment, the beginning of words (cf. Sections 2.1.2.2 and 3.2.3.3). Furthermore, the sonorant in *swimming* is a glide [w], and the "consonantal classification" of glides is problematic (cf. Section 1.2.4.3). In the phonology of Italian the two glides [j, w] are not recognised among the sonorants which may cause s-voicing (cf. Krämer 2009: 209) – indeed, the few examples of /s/ plus glide clusters in the native Italian vocabulary generally lack s-voicing, e.g. (It.) *siamo* [ˈsjaːmo] 'to be, 1Pl', *pensiero* [penˈsjɛːro] 'thought', *suono* [ˈswɔːno] 'sound', (It.) *persuadere*

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[perswaˈdeːɾe] ‘to convince’, etc.[61] At the same time, the “dual behaviour” of glides is a well known fact in Romance phonology, at least in Italian and in French, where in certain circumstances they behave as vowels, in others as sonorants (cf. Durand & Lyche 1999).

We have to mention here another target word of the corpus which was not included in previous charts, being a fictional surname, which was coined in order to test the otherwise unattested word-internal /sj/ cluster: *Basjad*.[62] This /sj/ cluster was mostly pronounced by the informants with coalescence as [ʃ] or [ʒ], but when the members of the cluster remained separately preserved (in 43% of the occurrences), the realisations of the /sj/ cluster were vacillating between presence and absence of s-voicing, similarly to the case of *swimming* (in 19% of the cases s-voicing was attested, e.g. [baˈzjadːə], while in 24% of the cases the cluster was realised as [sj]). As a conclusion, the /s/ before the glides /j, w/ seems to behave similarly to the previously seen /s/ of *iceberg*, so far as the proportions between assimilation and NoVA are split roughly in the same measure.[63] Apart from *swimming* and *Basjad*, in the other target words containing non-derived /sN/ clusters s-voicing is much rarer than NoVA.

The target words of the second row of Chart (55), *Bildungsroman* and *backslash*, have word-internal /sN/ clusters in postconsonantal position: in this context s-voicing is more difficult to happen, in fact, it appears only in 15% of the occurrences. In *Bildungsroman* we have previously found occasional RVAs of the /ɡs/ cluster (→ [ks]), and 8 occurrences of s-voicing (/ɡsr/ → [ɡzr]) which in Section 2.2.1.1 were categorised as progressive voicing (PV) by virtue of the preceding [ɡ], but they are here reconsidered as examples of presonorant s-voicing.[64] The peculiarity of s-voicing in *backslash* [bekˈzlɛʃːə] was already discussed in Section 2.1.2.2, where it was claimed that this optional voicing process is certainly not RVA, since it does not affect the first obstruent of the cluster, which always remains a voiceless [k].

The third row of Chart (55) contains very few derived /sN/ clusters and postalveolar sibilant (/ʃ/) plus sonorant clusters. The testing of s-voicing in /ʃN/ clusters was motivated on the basis of the Italian foreign accent, since in previous studies postalveolar sibilants were found as affected by voicing in presonorant environment, e.g. (Fr.) *franchement* ‘clearly’ [fʀɑ̃ʃmɑ̃] → (It. FA) [fʁɑ̃ʒˈmɔ̃] (Huszthy 2013b: 174; cf. Section 1.2.4.3). However, the presonorant voicing

[61] A few counterexamples can be found as well, e.g. *Asia* [ˈaːzja] ‘id.’, *entusiasta* [entuˈzjasta] ‘enthusiastic’, *casuale* [kaˈzwaːle] ‘random’, etc.

[62] In this only occasion the loan-test actually became a nonce-test (cf. Section 1.2.4.1).

[63] If we add the results found in *swimming* (25 [sw] and 28 [zw]) and in *Basjad* (13 [sj] and 10 [zj]), we have 76 occurrences of /sN/ clusters, out of which 38 are [sN] and 38 are [zN]: so, the ratio of s-voicing is exactly 50%.

[64] From a phonetic point of view, the labelling of this phenomenon is irrelevant (viz., PV or s-voicing).

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of the postalveolar /ʃ/ seems to be rather sporadic in the loanword test, it appears only in 10% of the total occurrences of /ʃN/ clusters. In the four relevant target words /ʃ/ is followed by /n/ and /m/, but its voicing (/ʃ/ → [ʒ]) is triggered only by /n/, in *kalashnikov* and *krishna* (in 21% of the /ʃn/ clusters, cf. Chart (55)).

Finally, the two target words of Chart (56), *guzla* and *grizzly*, contain sibilant affricate plus sonorant clusters. In these words the letter 'z' is mostly realised as a voiced [d͡z] (in 57%), and in 10% as a voiceless [t͡s]. Moreover, in 31% of its occurrences deaffrication happens (e.g. /t͡s/ → [s]), and 61% of the deaffricated sibilants get voiced before the /l/ (which is 19% of the total occurrences of the above clusters). The results of derived and non-derived /sN/ clusters are summarised in Chart (57) (including the 23 /sN/ clusters found in the target word *Basjad*).

Chart (57): *Summarised results of derived and non-derived /sN/ clusters*

/sN/ clusters	Occurr.	NoVA	RVA (s-voi)
Non-derived	167	113	54
Derived	37	15	22
Total	204	128 63%	76 37%

Due to the few examples of derived /sN/ clusters, we cannot draw here any significant conclusions about the relation between derived and non-derived clusters – unlike about the total results, which show an approximately two-third majority of NoVA cases compared to RVA (i.e., s-voicing). However, this majority is not surprising in the case of /sN/ clusters, since presonorant s-voicing is a much rarer phenomenon in languages than traditional RVA in obstruent clusters. The summarised results are shown in Diagram (58).

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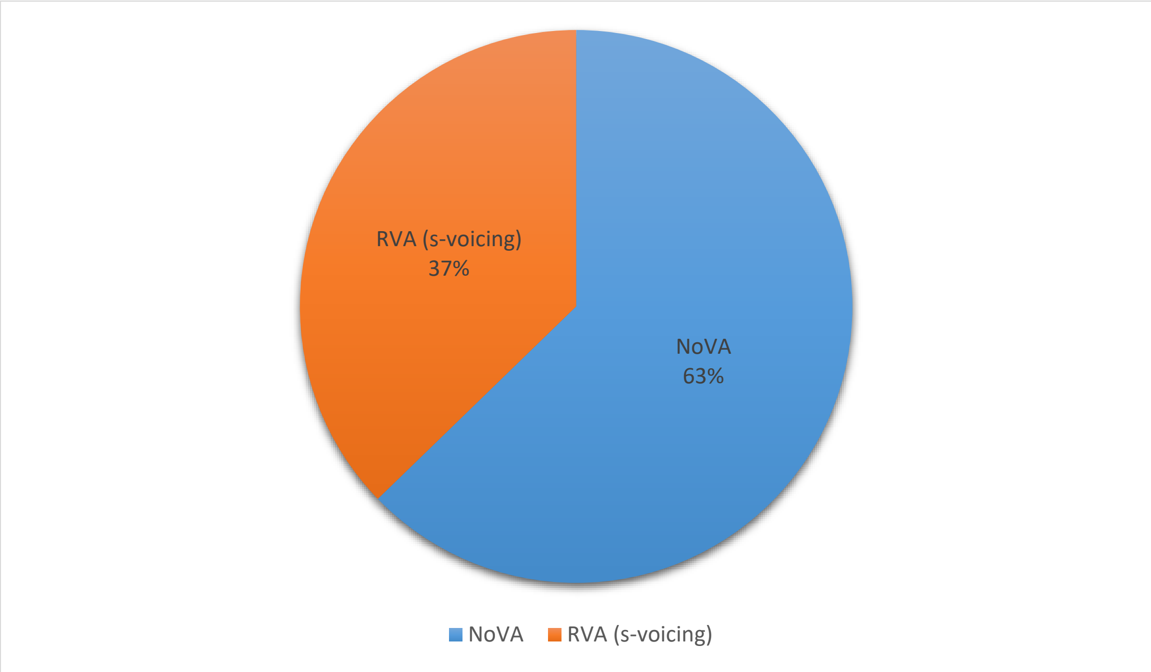
Diagram (58): *Summarised results of the 204 /sN/ clusters in pie chart*



To sum up, the proportions seen in Diagram (58) more or less correspond to the state of affairs expected from Romance languages. Presonorant s-voicing seems to be a categorical, but optional phonological process in Italian, at least according to the current experiment, which also weakens the assumption to identify s-voicing with RVA, since RVA is not supposed to be optional in voice languages. After all, these conclusions are similar to the effects of presonorant s-voicing found in Spanish, Portuguese and Catalan (cf. Section 3.4.1), which also implies that the optional nature of presonorant s-voicing may be a characteristic of Southern Romance languages. Certain conditions may obviously help the efficiency of the process, particularly word frequency in language use, and also the word-initial position of /sN/ clusters: since most /sC/ clusters are word-initial in Italian, the /sN/ clusters are much more likely to undergo voicing in this position.

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Chapter III

3. Phonological issues: How to explain the lack of voice assimilation in Italian?

Subsequent to the phonetic and statistical examination of the data of the corpus, the previous practical considerations receive a structural treatment in Chapter III, settled in a more theoretical context. We shall continue to operate in a strictly phonetically-based phonological approach, since our point of departure is phonetically analysed "raw" data. Moreover, according to Cavirani (2018), the case of Italian RVA can be captured only at the phonetics-phonology interface; at the same time, later we will arrive at more theoretical interpretations as well.

Accordingly, Section 3.1 begins with a Laboratory Phonology approach to the lack of RVA in Italian, i.e. phonetically-based strategies to avoid or replace RVA will be inspected. In Section 3.2 we will attempt to reconcile the case of Italian laryngeal phonology with Laryngeal Realism, remaining still on the ground of the phonetics-phonology interface. Finally, in Sections 3.3 and 3.4 we will leap from this ground and arrive at a more theoretical atmosphere, so Italian laryngeal phonology will be first analysed in the framework of Optimality Theory (OT), then in that of Government Phonology's Element Theory (ET).

3.1 A LabPhon-approach: Phonetically-based repair strategies to avoid RVA

As a conclusion of Chapter II and an introduction to Chapter III, the first sequence of subsections under 3.1 offers a phonetically-based "pre-solution" to the question posed in the title of the dissertation, understood as follows: how can Italians replace RVA? This section will also represent a sort of transition between the phonetic and the phonological interpretations regarding the lack of voice assimilation in Italian, since it will raise several theoretical issues.

As we have previously seen, the general Italian linguistic treatment of differently voiced obstruent clusters involves the tendency to avoid RVA. Even if NoVA can phonologically be considered a strategy in order to preserve underlying voice values on the surface, this solution is phonetically problematic, which is shown by the fact that the informants generally seek to

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repair the clusters somehow. This need arises from phonotactic reasons as well, since obstruent clusters (apart from /sC/) are ill-formed in Italian, so they must be avoided.

In the subsections of Section 3.1 various "phonetically-based repair strategies" will be listed which often appear instead of RVA in the informants' pronunciation. *Repair strategy* is "an operation that applies to a phonological unit or structure in order to repair the violation of a structural or segmental phonological constraint" (Paradis 1986: 71). In our case the violation is the adjacency of a voiced and a voiceless obstruent, which is normally repaired by voice assimilation (at least in the case of voice languages). But when voice assimilation is not the optimal choice for the speakers, they need other strategies so as to resolve the ill-formed clusters. Often these are only small phonetic effects which appear at the contact of the adjacent obstruents, but they may acquire phonological relevance as well; by all means, they testify that the lack of RVA is not completely satisfying for the speakers.

3.1.1 Progressive devoicing

The solution labelled *progressive devoicing* (PD) is the first of the list. This phenomenon may have various phonological interpretations, for instance, progressive voice assimilation (cf. Wetzels & Mascaró 2001) or the lack of the voiced source element (cf. Honeybone 2002). Phonetically, PD has only been examined until now as the voiceless realisation of a voiced input obstruent after a voiceless one (/TD/ → [TT]). This solution has been found surprisingly frequent in the Italian data (cf. Diagram 33 in Section 2.2.1.1).

When we interpret PD as a phonetically-based strategy to avoid (or replace) RVA, its motivation stems from the attitude to retain the underlying voicelessness of the first member of the obstruent cluster, which may result in the spontaneous devoicing of the following obstruent. From the point of view of usage-based phonology, we will observe in other strategies too (listed in the following subsections) that the speakers may articulatorily pay more attention to the left-aligned member of the clusters compared to the other consonants (cf. Sections 3.1.2, 3.1.5, 3.1.6, 3.1.7).[65] For instance, the left-aligned obstruent is rarely deleted from complex clusters in the data; obstruents are often released, too, when standing before another one (generally followed by a release burst as well), which helps their preservation. Furthermore, an interesting and unique strategy has been discovered in the pronunciation of mostly Southern Italian

[65] However, from a theoretical point of view this usage-based interpretation is problematic, since coda-consonants are phonologically weaker than onset-consonants (cf. Sections 1.1.3, 2.2.1.3 and footnote 7).

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speakers, who often tend to geminate the first obstruent of the clusters (this is a fortition process which aims to emphasise C_1 before C_2, so the former cannot be deleted or modified). From an articulatory point of view, the frequent PD cases can be interpreted similarly to the previous strategies. That is, as an inclination to fully preserve the first obstruent of the cluster, while to the following one the speakers pay less articulatory attention, so it spontaneously takes over the voicelessness of the previous segment.

An interesting comparison is offered by the results of the Hungarian control group. In fact, a non-irrelevant amount of PD cases was found in the Hungarian control informants' data as well, precisely 5%. However, PD is only a marginal process in the phonology of Hungarian which occurs exceptionally, in the case of the phenomenon called *j-obstruentisation* (cf. Siptár & Törkenczy 2000: 186). If we focus only on the relevant clusters (whose first obstruent is underlyingly voiceless) in which PD is able to appear, we find 75% of voicing by RVA in contrast to 9% of PD cases.[66] This high proportion in the Hungarians' data is completely unexpected, but it can be explained through the same articulatory or usage-based reasons which we have seen above for the case of the Italian speakers. At the same time, we can affirm that the optimal strategy to resolve differently voiced obstruent clusters for the Hungarian control informants is definitely RVA. On the other hand, the Italian speakers of the corpus use the strategy of PD much more than voicing by RVA (17% of PD vs 8% of RVA; cf. Diagram (33) in Section 2.2.1.1), and also much more than the Hungarian control informants. We will return to the theoretical phonological interpretation of PD in Section 3.4.

3.1.2 Schwa epenthesis and aspiration

The number of intrusive schwas between differently voiced adjacent obstruents is surprisingly low in the data, as we have already seen in Chart (30) and in Section 2.2.1.5. Schwa epentheses appear only in 16% of the overall data, but their distribution also shows dialectal patterns, since most of the epenthetic schwas derive from Southern Italian informants (205 schwas out of 277, i.e. 74% of the schwa epentheses, cf. Chart (41)). Conversely, schwa epentheses are abundant in other expected positions, for instance utterance-finally, after consonants (in most of these situations an epenthetic schwa appears, independently of the informants' dialect).

[66] As far as the other obstruent clusters are concerned (viz., whose first obstruent is underlyingly voiced), the Hungarian control informants apply RVA in 92% of their occurrences vs. 1% of NoVA and 7% of deletions (cf. Section 2.2.1.1).

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The role of schwa epenthesis in the absence of voice assimilation is interesting, because it apparently helps to maintain the original voice values of the consonants. At the same time, we must note that the principal motivation of schwa epenthesis is not the lack of voice assimilation, but the ill-formedness of the obstruent clusters in Italian phonotactics. Indeed, schwa epenthesis is a usual repair strategy of Italian speakers to also resolve clusters of obstruents of the same voice value, this process is frequently present in the Italian foreign accent as well (cf. Section 1.2.4.3). Furthermore, in the data of the present study schwa epenthesis sometimes appears alongside RVA or PD as well, i.e. the assimilation may take place even if the adjacent obstruents are separated by a schwa, e.g. *vodka* → (It.) [ˈvɔːtəka], *McDonald's* → (It.) [megəˈdɔːnal͡ts], [mekəˈtɔːnal͡ts].

The appearance of a schwa between two obstruents can be explained both phonetically and phonologically. From the point of view of phonology it is an epenthetic process, required by phonotactics and syllable structure, which arises in order to resolve ill-formed clusters (mostly TC) by the addition of a new syllable whose nucleus is the intrusive schwa (e.g., /VT.CV/ → [V.Tə.CV]). Phonetically, schwa epenthesis can be seen as the result of the release of a stop before another consonant. Preconsonantal stops are usually released in Italian (as we have seen in various sections of Chapter II) which may manifest not only in a considerable VOT lag, but in small schwas as well. Three similar schwas (which were born from the release of the preconsonantal stop) appeared in the data of the Hungarian control informants too. However, from the point of view of Laboratory Phonology, we claim that schwa epenthesis is phonologically motivated in Italian (given the ill-formedness of TC clusters), and it is not in Hungarian (where TC clusters are well-formed).

At this point another phonetic question may arise, that is, whether we can reckon with *voiceless schwas* between the members of the obstruent clusters? In phonetic terms, voiceless schwa is a sort of aspiration following the release of a plosive (i.e., a long lag VOT, usually transcribed as a [ʰ] or a [h]), which generally appears in the place of an epenthetic voiced schwa, e.g. *foot*[ə]*ball* or *foot*[h]*ball* (cf. Urbanczyk 2001). In some languages aspiration and voiced schwa are in complementary distribution (in these cases aspiration is interpreted as a voiceless schwa, cf. Urbanczyk (2001: 77-78)), but apparently they are not in the Italian data; that is, voiced schwa epenthesis and aspiration seem to be different phenomena in the case of Italian. In the following two figures we will see TD clusters in which the aspiration of the preconsonantal voiceless stop is followed by a voiced schwa epenthesis. The target word in Figure (59) is *upgrade*, and the informant is the Calabrian male speaker of the corpus.

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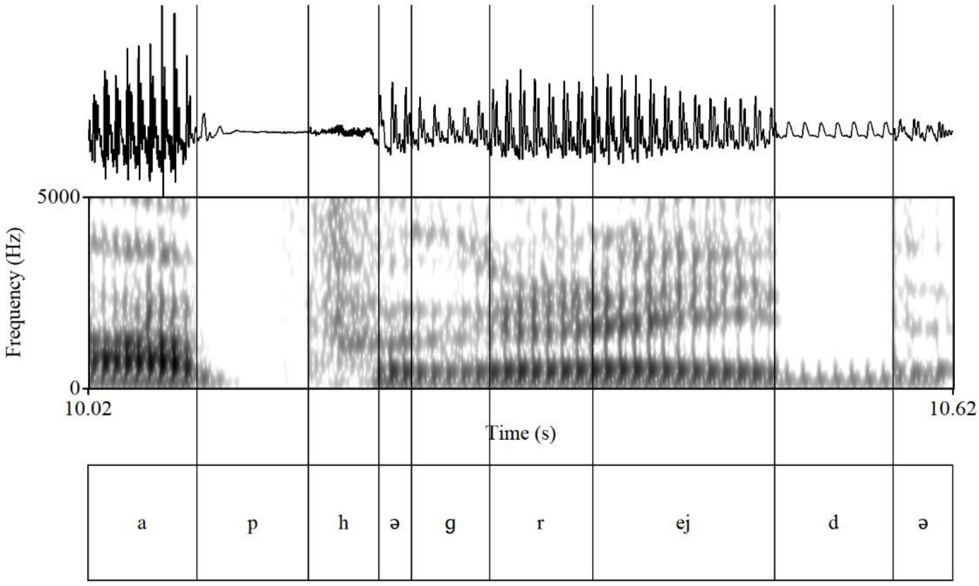
Figure (59): *Aspiration and schwa in the Italian pronunciation of* upgrade



The pronunciation in Figure (59) represents a TD cluster in the target word *upgrade* in which the original voice values of the obstruents remain preserved, but the cluster is split up by schwa epenthesis; moreover, the voiceless bilabial stop gets heavily aspirated before the schwa and the voiced obstruent: *u*/pg/*rade* → *u*[pʰəg]*rade*. The duration of the aspiration is 48 ms which is quite huge compared to the usual VOT lag of an unaspirated /p/ (which is usually under 10 ms; cf. Section 3.2.5). The schwa is much smaller than the aspiration, only 22 ms, but this is a regular duration for the epenthetic schwas which appear between obstruents in the data.[67] The collective presence of aspiration and schwa in the realisation seen in Figure (59) tells us that this long lag VOT cannot be phonetically interpreted as a voiceless schwa in this case. Several other examples could be cited which present both aspiration and schwa epenthesis in the data, where aspiration cannot be phonetically identified as a voiceless schwa.

From a phonological point of view, however, the interpretation of this H-element (seen phonetically as aspiration) may depend on various factors; for instance, in a Government Phonology approach it is widely accepted that /h/ is a voiceless vowel (cf. Honeybone 2002; Balogné Bérces 2017). The same approach does not exclude that aspiration and schwa are connected when occurring together, that is, the first half of the epenthetic schwa is voiceless,

[67] The epenthetic schwas which appear between obstruents are generally shorter in the corpus than word-final schwas, as it can also be seen above in Figure (59).

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while the second half is voiced. Consequently, the presence/absence of voiceless schwas are irrelevant from a phonological point of view. Phonetically, we claim here that aspiration is probably an inherent phonetic characteristic of Italian voiceless stops, and it is not the result of an epenthetic process, unlike the insertion of voiced schwas between the members of the clusters. The aspiration of Italian voiceless obstruents will be phonologically reconsidered in Sections (3.2.5) and (3.4).

3.1.3 Partial voicing and potential pauses

We have to spare a few words for two special cases found in the data: partial voicing (which has already been mentioned in Section 2.1.1.2 as “increasing” or “decreasing” sonority of certain voiced stops) and potential small silences left between the members of the clusters. We will claim that these resolutions are phonologically irrelevant, they are only small phonetic attendant phenomena, so they actually cannot be considered strategies to avoid RVA.

Partial voicing generally means that the closure phase of the current obstruent is not entirely voiced.[68] Partial voicing can be relevant only in phonetic terms, partially voiced obstruents found in the data have been categorised as voiced for the phonological purposes of the research. Fortunately, the data of the corpus did not contain disputable cases, practically every pronounced obstruent could be quite unequivocally categorised as voiced or voiceless (cf. the statistics of Section 2.2.1.1). However, a certain part of the voiced obstruents showed non-entirely voiced closure phases; on the average, the voice bars of these sounds were filled at a two-thirds ratio. Furthermore, we could observe falling or rising sonority in many of these cases which lasts from the voiceless part of the closure phase towards the fully voiced part and vice versa, as it is illustrated in Figure (60) below.

[68] Partially voiced outputs of voice assimilation are frequently found in classical voice languages, such as in Hungarian (cf. Markó, Gráczi & Bóna 2010: 225-230, 232-236). Basically, three types of partial voicing may occur: firstly, when the first obstruent is partially voiced, e.g. (Hun.) *hogyha* [ˈhoɟ̥hɒ] ‘if’; secondly, when the second obstruent is partially voiced, e.g. (Hun.) *úgyhogy* [ˈuːcɦ̥oɟ] ‘so’; and thirdly, when both obstruents of the cluster are partially voiced, e.g. (Hun.) *hogyha* [ˈhoɟ̥ɦ̥ɒ] ‘if’.

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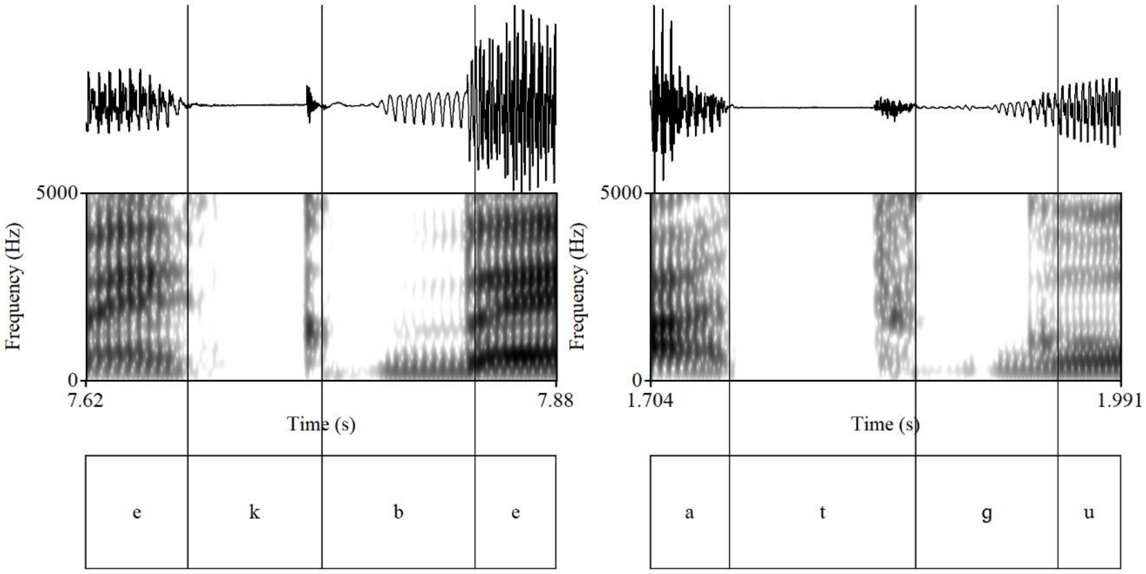
Figure (60): *Increasing voicing in oppositely voiced obstruent clusters*



In Figure (60) two intervocalic TD clusters are shown: /ekbe/ and /atgu/ (from the target words *McBacon* and *catgut*). As it can be observed both on the waveforms and on the voice bars of the spectrograms, the voicing in the closure phase of the second obstruent is gradually increasing after the VOT of the first, entirely voiceless obstruent. In these occasions the encounter of the voiced and the voiceless consonant is not direct, since a small voiceless or less voiced transition phase is left between the two elements. However, phonologically these resolutions are still classified as cases of NoVA without epenthesis, the phonetic phenomenon of partial voicing does not make a difference. Other similar clusters (with the rising voicing of the voiced obstruent after the voiceless one) could be seen in Sections 2.1.1.2 and 2.1.1.3, e.g. *McDonald's* [kd̥] in Figure (8), *softball* [ftb̥] in Figure (9), *afgana* [fg̊] in Figure (12), *surfboat* [fb̥] in Figure (13).

As far as DT clusters are concerned, in Sections 2.1.1.1, 2.1.1.3 and 2.1.1.4 we have seen examples of the opposite situation, when the voice of the first obstruent is decreasing towards the following voiceless obstruent. The target word *Südtirol* (cf. Figure (6)) is an example of this phenomenon, where the voice values of the homorganic /dt/ cluster are preserved, but the voice of the /d/ is gradually decreasing, from a very high amplitude, too. Similarly decreasing voice values were shown in the examples of *vodka* [d̥k] in Figure (4), *subcultura* [b̥k] in Figure (5), *sovchoz* [ɣ̊k] in Figure (15) and *eczema* [kd̥͡z] in Figure (17).

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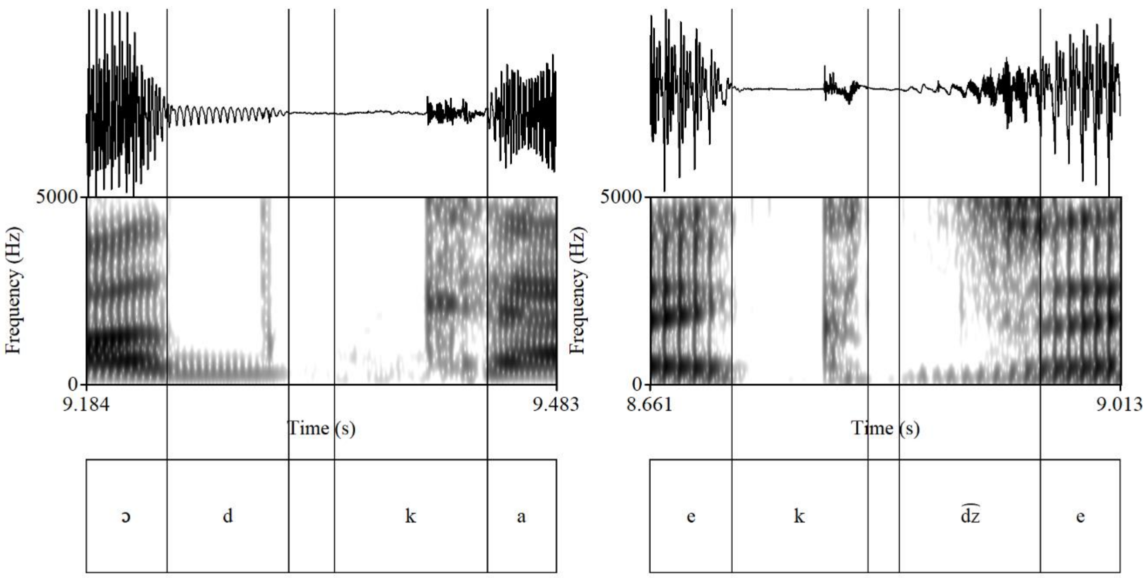
Phonologically, it is interesting to see that the partial voicing of an underlyingly voiceless obstruent before a voiced one (/TD/ → [D̥D]) is never found in the corpus. From a phonological point of view, only regressive voicing offers convincing evidence of RVA (cf. Section 3.4), that is, we cannot speak about “partial voice assimilation” in the cases of partial voicing in the Italian data of the corpus. At the same time, these modest transitions between voiced and voiceless elements can be perhaps considered as phonetic repair strategies to facilitate the articulatory accomplishment of the preservation of the opposite voice values. In conclusion, from a phonological point of view they are actually irrelevant, and so partially voiced realisations were classified as voiced during the processing of the corpus.

Besides partial voicing another similar phonetic repair strategy can be observed in the data: very small blank fields between the release of the first obstruent and the closure of the second one, which could also be interpreted as short phases of silence. However, these apparent pauses cannot be surely identified, since the blank field on the spectrogram and the straight line on the waveform may also belong to the beginning of the closure of the following consonant.

Figure (61): *Apparent pauses left between differently voiced obstruents*



In Figure (61) intervocalic DT and TD clusters are shown, extracted from the target words *vodka* and *eczema*. In the first case, the blank field in the spectrogram can actually seem a small

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silence (of 30 ms),[69] since no noise appears in that spot (usually even the closure phase of a voiceless obstruent is slightly noisy, as the rest of the /k/ as well); moreover, if we added this blank section to the closure phase of the /k/, this closure would be surprisingly long (89 ms) compared to that of the preceding /d/ (58 ms). The silence in the second example is more questionable, since it can also be seen as the increasing voice of the [d͡z] after the release of the [k] (similarly to Figure (60) and the other examples listed above); moreover, it is significantly shorter than the former silence, so it does not reach the minimum duration of prosodic pauses (cf. footnote 69).

After all, we will reject the interpretation of these blank fields as silences (i.e., considering them a kind of silence epenthesis as a repair strategy), for a double reason: first, it is phonetically uncertain whether they are actually pauses between the consonants or they belong to the closure of the second obstruent; second, phonologically they are irrelevant, because similar blank fields also appear alongside RVA in the data (for instance, in the target word *Sampdoria*, where similar silence-like sections were found four times, together with the voicing of the /p/ as [b] before the [d]).[70]

In conclusion, partial voicing and the lack of RVA when the obstruent clusters are interrupted by pauses are strictly phonetically-based approaches to voice assimilation. Several similar LabPhon studies claim that the appearance of RVA in voice languages is not as straightforward as the phonological literature wishes (cf. Markó, Gráczi & Bóna 2010; Mády & Bárkányi 2015). At the same time, the data found in Italian (presented in Chapter II) shows categorical differences between the cases of NoVA in Italian and other voice languages. The question whether RVA can be considered a "rule" in Italian that is phonological, rather than phonetic. So, even if cases of partial voicing and accidental pauses often occur in the data, I claim that Italian phonologically lacks voice assimilation (for detailed explanations see Sections 3.2 and 3.3), and I consider these occurrences as "phonetic repair strategies" which help the speakers to retain the underlying voice values of the obstruents in clusters.

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[69] From a prosodic point of view, phoneticians determine a minimal duration of silences which can actually be perceived as a pause in speech production. The exact value of this duration is disputed, the threshold in the identification of a silence used to be generally considered 250 ms, but recently the minimum value was decreased to 30 ms (cf. Gósy 2004: 207-208); in these terms, the blank field seen in Figure (61) could actually be a silence.

[70] Similar cases are also found in the data of the Hungarian control informants; for instance, one of the informants left a pause between the obstruents of the target word *nordcoreani* [d|k] which thus preserved their underlying voice values; vice versa, in the target word *Sud Tirolo* [t|t] every Hungarian speaker left a pause between the obstruents, yet they always applied RVA as well.

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3.1.4 Metathesis

Metathesis is a phonetico-phonological process which refers to the reordering of segments (chiefly consonants) in a word (cf. van Oostendorp 2004: 25-29). It is often a spontaneous phenomenon (practically a pronunciation mistake), but it may acquire phonological relevance as well, if it serves ease of articulation. For instance, the phenomenon frequently characterises child language, that is, children often reorganise consonants in words so as to spontaneously acquire an easier pronunciation.[71]

Metathesis is also present in the diachronic phonology of many languages, including Italian and its dialects, e.g. (Lat.) *sĕmper* 'always'> (It.) *sempre*, (It.) *palude* 'swamp' > (Tuscan) *padule*, (Lat.) *pĕtra* 'rock' > (Neapolitan) *preta*, (Sardinian) *perda*, etc. (cf. Rohlfs 1966). Metathesis occurs in spontaneous speech as well, and it is always an exciting phenomenon, because it seems casual (cf. performance errors, slips of the tongue, spoonerisms, etc.), though it is often phonologically motivated.

In the data of the corpus a few mistaken pronunciations occurred (cf. the statistics in Section 2.2.1.1), many of which were caused by metathesis, i.e. the inversion of the marked consonants in the target words. With the help of metathesis the informants were often able to avoid the adjacency of differently voiced obstruents, or they simply eliminated the ill-formed obstruent clusters by the spontaneous reordering of the consonants. The metathetic processes found in the data can be regarded as "functional metathesis" as long as they actually facilitated the pronunciation of the target words. In Chart (62) we illustrate such functional metatheses, whose phonological function is explained below.

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[71] A few examples from Japanese child language metathesis: (Jap.) *nezumi* 'mouse' → (child l.) *nemuzi*, (Jap.) *nemaki* 'pajamas' → (child. l.) *menaki*, (Jap.) *sakippo* 'tip' → (child l.) *sapikko* (Fukazava & Miglio 2008: 31). Two further examples of Hungarian child language metathesis from my personal experience: (Hun.) *pendrive* [ˈpɛndrajv] 'USB flash drive' → (child l.) [ˈprɛndajv], where the medial three-member cluster /ndr/ is removed in exchange for two double clusters: [pr] and [nd]); (Hun.) *tejbegríz* [ˈtɛjbɛgriːz] 'Hungarian type of semolina porridge' → (child l.) *tejgevíz* [ˈtɛjgɛviːz], where the two stops /b/ and /g/ have changed places the former having lenited to a /v/, while the /r/ was deleted from the cluster.

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Chart (62): *Examples of functional metathesis in the data*

	Input	**Occasional outputs**
a)	*rö*/ntg/*en*	*rö*[nt]*e*[ŋg], *rö*[ŋg]*e*[nt], *rö*[ŋgt]*en*
	ca/tg/*ut*	*ca*[tː]*u*[g]
	Bildun/gsr/*oman*	*Bildun*[zgr]*oman*
	Wol/fg/*ang*	*Wol*[kf]*ang*
	so/vk/*oz*	[ˈsovt͡sokː], [ˈsokːovt͡s]
b)	*Ma*/zd/*a*	*Ma*[d͡zː]*a*
	sami/zd/*at*	*sami*[d͡zː]*at*
	a/zt/*eca*	*a*[d͡zː]*eca*
	Bo/tsw/*ana*	*Bo*[t͡sn]*a*[v]*a*
	gu/zl/*a*	[ˈd͡zuːgla], [ˈglud͡zːa]

The metathetic examples of Chart (62) were spontaneously produced by the informants,[72] still, they are often phonologically motivated, and so metathesis is interpreted in this section as a repair strategy. Metathesis as a repair strategy will acquire importance even during the phonological analyses (cf. Section 3.3), since it seems a conservative phenomenon which aims to preserve all input elements, and – in order to avoid deletion – the critical elements are reordered in the word in a more optimal arrangement. Accordingly, metathesis does not violate some high ranked faithfulness OT-constraints of Italian phonology. (However, Krämer (2009: 143) assumes a constraint for Italian which does not allow metathesis (namely, LINEARITY); for the function of this constraint cf. Section 3.3.2.)

Group a) of Chart (62) presents obstruent clusters in which s-voicing is not involved, while *Group b)* presents obstruent clusters with sibilants. In most of the examples the phonotactically ill-formed (i.e., marked) clusters are transformed into less marked ones. For instance, in *röntgen* → *rönteng*, *röngent* and *Botswana* → *Bo*[t͡sn]*a*[v]*a* the obstruent plus obstruent clusters are converted into sonorant plus obstruent clusters, while in *guzla* → [ˈd͡zuːgla], [ˈglud͡zːa] the affricate plus sonorant cluster is changed into a sonorant plus obstruent cluster too. In a similar way, in *Bildungsroman* → *Bildun*[zgr]*oman* the ill-formed T + /s/ cluster is transformed into a well-formed /sC/ cluster.

[72] Most of the metathetic examples in Chart (62) are not unique manifestations, but were produced independently by several speakers.

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When a sibilant affricate (/t͡s/ or /d͡z/) is followed by a homorganic stop (/t/ or /d/), as in *Mazda*, *samizdat* and *azteca*, the order of the input consonants is often spontaneously inverted, so as to gain a long affricate only instead of a more complex cluster (/dzd/ → /ddz/ [d͡zː]). In some other cases the word-internal cluster is transformed into a geminate, and the second consonant of the cluster is transferred to the word-edge, e.g. *catgut* → *cattug*, *sovchoz* → *so*/kk/*ovz*.[73] Finally, in other examples the ill-formedness of the clusters is not changed, but the articulatory process is facilitated in a way that, with the transfer of the respective consonants, a "more easily pronounceable" ill-formed cluster is created. For instance, if the marked cluster is made of an anterior and then a posterior consonant, their order can be changed (e.g. /tɡ/ → [ɡt], /fk/ → [kf]), probably because the articulation of a similar cluster is easier if the posterior consonant precedes the anterior one (cf. a phonetic study with similar results in Huszthy (2015a)), e.g. *röntgen* → *röngten*, *Wolfgang* → *Wol*[kf]*ang*.

We may note that in many of the previously cited cases RVA also loses its inputs (if we describe the situation in classical SPE terms, we have a bleeding order between RVA and metathesis). Accordingly, metathesis may also be phonologically motivated in the Italian data; furthermore, it has a double reason to appear in the above examples: obeying phonotactics and avoiding voice assimilation.

3.1.5 Preconsonantal obstruent gemination

In an earlier investigation (Huszthy 2015a, 2015b) I drew attention to a sporadic, but not irrelevant phonological phenomenon produced mostly by Southern Italian speakers: the typical gemination of preconsonantal stops, called "TC gemination" (as it has already been mentioned in Sections 1.2.4.3, 2.2.1.4 and 2.2.1.5).

TC clusters are ill-formed in Italian phonotactics (cf. Morelli 1999: 160-165), and were diachronically resolved in the native vocabulary by deletion or regressive place assimilation (cf. footnote 28). However, in a few words (mostly Latinisms or Greekisms) TC clusters have been preserved, e.g. *tecnico* 'technical', *optare* 'to opt', *abside* 'apse', *cactus* 'id.', *Etna* 'id.', *ipnosi* 'hypnosis', *autopsia* 'autopsy', etc. Southern Italian speakers tend to geminate the first

[73] However, the motivation of metathesis is not always to escape RVA, since in some of the affected words the newly realised obstruent clusters still exhibit NoVA, e.g. [ˈsokːovt͡s], *rö*[ŋgt]*en*.

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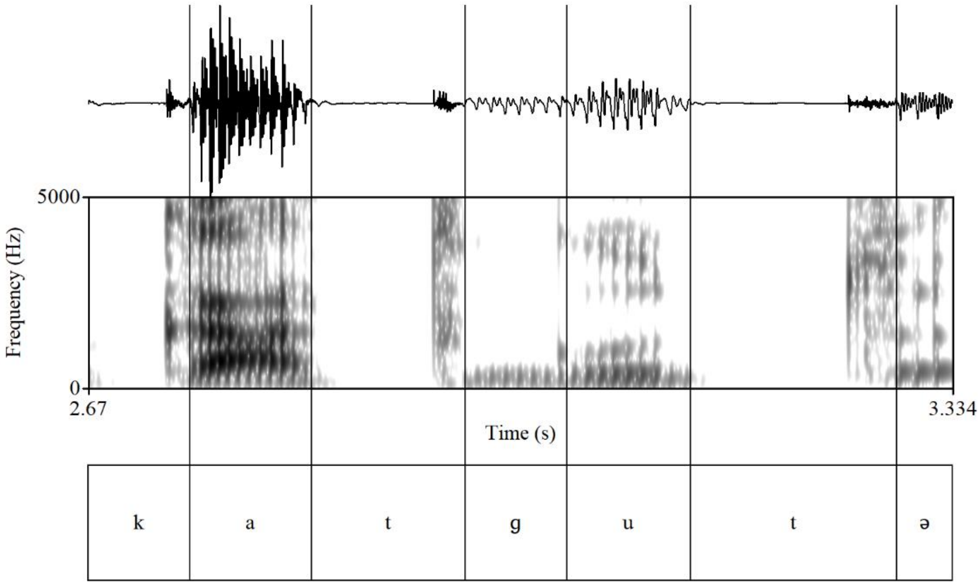
stop in these words (both with or without schwa epenthesis between the two consonants), e.g. *te*[kː]*nico*, *E*[tː]*na*, *i*[pː]*nosi*, etc.[74]

A similar tendency has been observed in the foreign accent of Southern Italian speakers as well, e.g. (Eng.) *kept* → (Southern It. acc.) *ke*[pː]*t*, (Eng.) *selected* → (Southern It. acc.) *sele*[kː]*ted*, (Ger.) *gibt es* 'there is' → (Southern It. acc.) *gi*[bː]*t es*, etc. (cf. Section 1.2.4.3.3; also cf. Huszthy 2015a: 246). The phenomenon has been phonologically analysed in an OT-account as a synchronic conservative process which aims to maintain the input consonant instead of deleting or assimilating it (contrary to the diachronic strategies), and gemination helps the preservation in this case (Huszthy 2015a: 260; 2015b: 133-139).

The phenomenon of preconsonantal stop gemination has been identified in the corpus of the present study as well, e.g. *u*[pː]*grade*, *vo*[dː]*ka*, *M*[ekː]*Donald's*, *e*[kː]*zema*, *su*[bː]*tropicale*, etc.; the gemination in some of these examples has already been shown in previous figures as well (e.g. Figures (17) and (59)). In Figure (63) below a prototypical example is shown – the target word is *catgut*, and the informant is from Naples.

Figure (63): *A typical Southern Italian pronunciation of the target word* catgut



[74] TC gemination is independent of the position of word-stress (cf. Huszthy 2015a, 2015b), as it is also testified by the example of *ipnosi* [ipːˈnɔːsi] 'hypnosis', where the stress is placed on the second syllable.

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As it may be noticed, the pronunciation in Figure (63) – which could be transcribed as [ˈkatˑgutːə] – presents two different stop geminations: a semi-long preconsonantal [tˑ] and a quite long final [tː], accompanied by schwa epenthesis. The length difference between these two voiceless stops is not surprising, since word-final stop gemination is regularly longer than gemination in the TC context. According to the previous study mentioned above (Huszthy 2015a: 257), in the case of Southern Italian informants the duration of singleton intervocalic stops has a mean value of 65 ms, while both lexical word-internal geminates and word-final geminated stops have a mean of 134 ms, compared to the mean duration of preconsonantal stop-gemination which is 123 ms. That is, gemination in the TC context is somewhat shorter than in the others, but it is categorical. As far as *catgut* in Figure (63) is concerned, the word-initial /k/ is 70 ms (similarly to a regular singleton stop), the /g/ in the cluster is 77 ms; on the other hand, the preconsonantal /t/ is 117 ms, and the final /t/ is 155 ms. Considering the previously cited mean values, this preconsonantal semilong [tˑ] is subject to TC gemination.

Several similar geminations occur in the target words of the corpus. From a phonological point of view (as it is argued in Huszthy 2015a, 2015b), the occurrences of TC gemination can be considered repair strategies. If we recognise every lengthened preconsonantal stop whose duration is over 100 ms as an instance of TC gemination, the following results are offered by the data: in the pronunciation of Southern Italian informants 171 occurrences are found, while 12 in the case of Central Italians and 4 in the case of Northern Italians.

These results show that TC gemination is not the absolute privilege of southern speakers, but they are the ones who principally use it (91% of the total occurrences of TC geminations are produced by Southern Italians). Another development found in the corpus regarding TC gemination (compared to the results published in Huszthy (2015a) and (2015b)) is that not only stops may be geminated before another consonant but fricatives as well, such as in the target word *afgana* [afːˈgaːna] (cf. Figure (12)). Moreover, alveolar affricates /t͡s, d͡z/ are inherently long in Italian phonology, even in preconsonantal position (cf. Sections 1.2.4.3 and 2.1.1.4). Consequently, the process called TC gemination could be renamed as “preconsonantal obstruent gemination”, as the title of the present subsection also suggests.[75]

Preconsonantal obstruent gemination is certainly in correlation with the lack of voice assimilation. In fact, this gemination process does not even once occur together with RVA in

[75] The target word with the most frequent preconsonantal obstruent gemination is *eczema* (the [k] before the [d͡z] is geminated 21 times), followed by *catgut* and *Afganistan* (20-20 geminations), while in other relevant target words 13 similar geminations occur on average.

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the corpus, and only 8 times with PD. Furthermore, it has been detected that, in the case of certain informants who occasionally use gemination and/or assimilations, these processes are in complementary distribution. That is, these informants tend to geminate the preconsonantal obstruent only when they also preserve the original voice values of the consonants (i.e., in certain pronunciations of the sample sentences they use RVA or PD, but not gemination, then in another pronunciation of the same sentence they use gemination, but not RVA or PD).[76] Accordingly, the gemination of preconsonantal obstruents can be actually considered a conservative repair strategy, since it without doubt helps the preservation of the underlying voice values of the adjacent obstruents.

3.1.6 Release burst

The articulatory gesture which accompanies stop consonants is characterised by a complete closure of the vocal tract, preceded by a "shutting movement" and followed by a plosion, when the air is finally released. This third stage of the articulation of stops is called *release burst* (cf. Johnson 2003: 135). Stops are always released before vowels, and frequently before other consonants, but in certain cases stops are not released, when they are perfectly coarticulated in stop plus stop clusters, or word-finally.

Since Italian phonotactics does not tolerate TC clusters (cf. Morelli 1999: 160-165), stops in Italian are usually released before another consonant (this is the reason why Muljačić (1972: 91) calls TC clusters "pseudo groups" in Italian, given that they are not coarticulated). In the figures which were shown in Section 2.1, most preconsonantal stops were released.[77] Similarly, preconsonantal stops are often released in the data of the corpus, but not always. At the same time, TC clusters are sometimes perfectly coarticulated in the pronunciation of the informants; but, very surprisingly, RVA does not generally take place even when the first stop is not released before an oppositely voiced consonant. Such an example is shown below in Figure (64) which represents the sequence /ubku/ of the target word *subcultura*.

[76] They may also use NoVA without preconsonantal obstruent gemination, of course.

[77] The release burst is indicated in the figures by the vertical grey line on the spectrogram which splits the blank spot of the closure part, like the [d] of *vodka* in Figure (4) (cf. Section 2.1.1.1).

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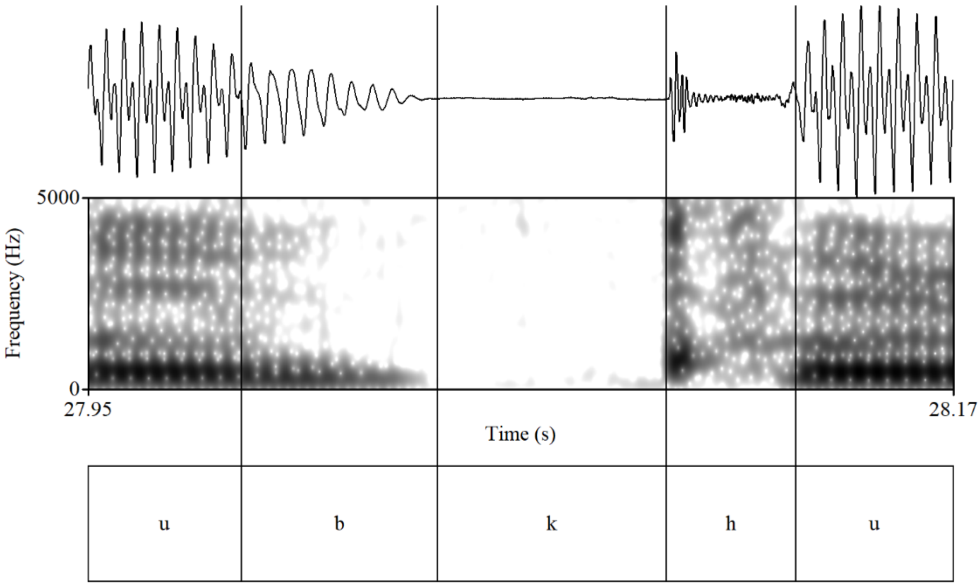
Figure (64): *TC cluster without release burst after the first stop*



The /bk/ cluster in Figure (64) is coarticulated, since the voiced [b] is not released before the voiceless and mildly aspirated [kʰ]. The lack of the plosion of the [b] is surprising, because the two stops of the cluster have the maximum articulatory distance compared to Italian phonetics (bilabial and velar). Several informants pronounced this cluster without a release burst (in total 3 northern and 2 central speakers), and also other similar clusters, so Figure (64) is not a unique occasion. On the waveform and the spectrogram the decreasing voice of the [b] is also well identifiable (cf. Section 3.1.3), which characterises every occasion of missing release burst. Apparently, when a voiced preconsonantal stop is not released, its voice must decrease before the following voiceless stop; and vice versa, when the voiceless preconsonantal stop is not released, the voice of the following stop must increase (other examples have been shown in Sections 2.1.1.1 and 2.1.1.2, with homorganic /td/ and /dt/ clusters, cf. the target words *Südtirol* and *outdoor* in Figures (6) and (10)).

In spite of this, I argue that the release burst is phonologically irrelevant in the case of Italian TC clusters. The first argument is that TC clusters in the data undergo phonological processes independently of the release burst, e.g., RVA also characterises clusters whose first stop is released. The second argument is the opposite of the first: RVA is often absent even in perfectly coarticulated TC clusters, as in Figure (64) above. Therefore, I claim that adjacent stops may form “real” clusters even if the first member is released. This consideration is not

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new in phonology, for instance, the generative literature labels Polish geminates “fake”, because they are split up by a release burst (cf. Rubach 1986); still, Zembrzuski, Karwacka & Szewczyk (2016) argue that Polish geminates are synchronically true geminates despite the release burst of the first stop, since phonological processes target them both. Another argument is offered by Cavirani (2018), who shows data with evident RVA in the Emilian dialects of Italian, but his examples contain release bursts as well. That is, even in the dialectal varieties of Italian which permit obstruent clusters (and so RVA), assimilation targets released obstruents (for a further discussion of this topic cf. Section 4.3).

3.1.7 Fricativisation

A further interesting phonetically-based repair strategy appears in the corpus which is somewhat connected to the issue of release burst seen previously, namely *fricativisation*. In 16 occurrences on the whole, some of the speakers “fricativise” one of the stops in TD and DT clusters. This means that in place of a released stop they pronounce a homorganic fricative obstruent, i.e., [x] instead of [k], [β] instead of [b], [ɸ] instead of [p], [θ̠] instead of [t][78], and [ɣ] instead of [g]. The affected words are: *McDonald’s* [mexˈdɔːnalt͡s], *upgrade* [aɸˈgrejdə], *obcordate* [oβkorˈdaːte], *subcultura* [subxulˈtuːɾa], *ginkgo* [ˈdʒiŋkɣo], *outdoor* [ˈawθ̠dor], *Sud Tirolo* [sudθ̠iˈɾɔːlo].

This interesting process may have various motivations, both phonetically and phonologically. When the fricativised stop is the first of the cluster, the reason for its appearance may be the better coarticulation of the adjacent obstruents (with the avoidance of the release burst), since fricative plus obstruent clusters are apparently well-formed in Italian phonotactics (cf. Section 2.1.1.3). In this approach fricativisation is one of the phonetic repair strategies applied by the informants, given that it is phonetically a kind of simplification, since stops are articulatorily more complex consonants than fricatives (cf. Johnson 2003: 135).

From a phonological point of view, this type of fricativisation is lenition. One of the main trajectories of lenition is sonorisation, i.e., consonants become more sonorous, while they preserve their place of articulation (cf. Szigetvári 2008b: 561). The term sonorisation might suggest that the affected segments become more complex if more sonorous; however, in an ET-approach the opposite is claimed to happen, that is, the consonants undergo

[78] The fricativised [t] transcribed here as [θ̠] is not interdental, rather a realisation between [s] and [θ].

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"decomplexification" in all forms of lenition including sonorisation, in the sense that they lose privative phonological primes during the path of lenition (Szigetvári 2008b: 562).

Apparently, fricativisation is not a dialectal phenomenon in the data, since it occasionally appears in the pronunciation of certain northern, central and southern speakers as well, so we can add it to the list of the repair strategies presented in these subsections. The most surprising fact about fricativisation is that it does not once cooccur with RVA in the corpus. Therefore we can deduce that speakers do not fricativise stops in TD or DT contexts to avoid or replace RVA, but in order to further simplify the oppositely voiced obstruent clusters, since the adjacency of a fricative and a stop is a less marked structure compared to that consisting of two stops.

3.1.8 Consonant deletions

In the data of the corpus not many deletions occurred (cf. the statistics of Section 2.2.1.1), which may be surprising in light of the history of Italian phonology. In fact, in the evolution of Italo-Romance varieties from Latin several deletions were involved, which for the most part targeted word final consonants, obstruent clusters and other complex consonant clusters (cf. Herman 2003, Wright 2010; also cf. footnote 28). On the other hand, in the data very few of these strategies appeared, practically only deletion from complex consonant clusters. As it is also claimed elsewhere, the diachronic deletion strategies seem to have lost their productivity in the synchronic phonology of Italian (cf. Huszthy 2013a, 2015a, 2016c, 2017b).

The deletion of word-final consonants does not occur in the corpus at all, although several consonant-final target words are present in the sample texts. The usual strategy of the speakers in order to resolve the phonotactic ill-formedness of word-final obstruents or consonant clusters was schwa epenthesis (which happened in the overwhelming majority of the occurrences, in the case of each informant).[79] Accordingly, the diachronic strategy of deletion was replaced by the synchronic strategy of insertion, which is a further argument for the general Italian tendency to retain input elements (cf. Sections 3.1.5 and 3.3.2).

Deletions from obstruent clusters occurred only in the case of complex consonant clusters. This is a general strategy in many languages, even languages whose phonotactics otherwise tolerates obstruent clusters; for instance, in Hungarian the middle consonant is often

[79] Another sporadic strategy to realise word-final voiced obstruents in the corpus was final devoicing, which is, however, a kind of deletion (e.g. *iceber*[k], *upgr*[ejt], *pingpon*[k], *hydrobo*[p], etc.).

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deleted from clusters of three consonants, e.g. (Hun.) *asztma* [ˈɒsmɒ] ‘asthma’, (Hun.) *dombtető* [ˈdomtɛtøː] ‘hilltop’ (Siptár & Törkenczy 2000: 294. In fact, the Hungarian control informants of the research applied far more consonant deletions than the Italians, practically this was their preferred strategy in every consonant cluster of three members, e.g. *sof*<t>*ball*, *rön*<t>*gen*, *pin*<g>*pong*, etc. (cf. Section 2.2.1.1). Interestingly, Italians did not apply deletion in *softball*, and only once in *röntgen*; the other target words of the corpus with Italian deletions were: *gin*<k>*go* (39 del), *pin*<g>*pong* (35 del), *Wolf*<g>*ang* (22 del), *gan*<g>*ster* (16 del), *Sin*<g>*spiel* (10 del), *ou*<t>*door* (10 del)[80], *nor*<d>*coreani* (8 del), *Sam*<p>*doria* (8 del). These are all complex clusters, where the deletion always targets the first stop.

At the same time, the phonotactically ill-formed intervocalic TC clusters were not once resolved by deletion or by regressive place assimilation. The most popular repair strategies involved insertion, i.e. schwa epenthesis (cf. Section 3.1.2) and preconsonantal obstruent gemination (cf. Section 3.1.5), while many clusters remained unresolved as well. As a conclusion, we may claim that the diachronic deletion strategies of Italian phonology have given place in synchrony to insertion strategies, which primarily aim to preserve the available input elements (cf. the claims regarding Italian conservative phonology, in Section 3.3.2).

3.2 Italian in the framework of Laryngeal Realism

Laryngeal Realism (Iverson & Salmons 1995; Honeybone 2005) is a phonetically-based, i.e. “realistic”, theoretical-phonological background, born to sort languages according to systematically marked laryngeal features (cf. Section 1.2.2).

LR contradicts the general conception about voicing contrast formulated in the framework of SPE (Chomsky & Halle 1968; followed among many others by Wetzels & Mascaró 2001), where [±voice] is handled as a phonologically universal binary feature (this is the “broad interpretation of voice”).[81] In contrast, LR is based on the “narrow interpretation of voice” (cf. van Rooy & Wissing 2001: 295).

[80] The example of *outdoor* also counts as a cluster of three members, since the postvocalic /u/ surfaces as a sonorant (a bilabial approximant) [w] in the Italian pronunciation, so again the first stop is deleted from the complex cluster: *o*/wtd/*oor* → *o*[wd]*oor*.

[81] In the view of the “broad interpretation of voice”, the binary voicing contrast is presumed to be identical in languages like English on the one hand, and in languages like Hungarian on the other. That is, the difference between these two groups of languages in the realisation of voice is presumed to be phonetic and not phonological.

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In LR, languages which exhibit a two-way laryngeal distinction, can be aligned in agreement with three different, potentially marked laryngeal features: [voice], [spread glottis] and [constricted glottis]. In most Germanic languages the marked feature is [spread glottis], in most Slavic and Romance languages it is [voice], while in some American indigenous languages (like Q'eqchi' and Mam) the marked feature is [constricted glottis] (cf. Balogné Bérces & Huber 2010a: 446).

In the literature of LR, languages which exhibit laryngeal opposition upon the [voice] feature are typically labelled *voice languages*, while languages which use the [spread glottis] feature, are called *aspiration languages* (cf. Section 1.2.2). The "narrow interpretation of voice" has several phonetic and phonological benefits. First of all, it helps to better approach laryngeal phonology by creating a direct contact between phonological theory and phonetic realisation (similarly to Laboratory Phonology); and so it corrects some errors which derive from the unreasonable generalisations of the "broad interpretation of voice". It also simplifies binary laryngeal contrasts through the fortis-lenis dichotomy and through markedness, where voiced and aspirated stops are marked, while plain voiceless stops are unmarked (cf. Schwartz 2015).

However, some theoretical and practical problems also arise with LR, of which the one that is the most relevant to the present discussion is that certain languages have been "overanalysed" in the framework of LR (mostly aspiration languages, since the theory has focussed on them), while others have not in the least received any attention. Among Romance languages Spanish and French are partially considered in LR, but Italian has been completely out of consideration. In the following subsections we will attempt to insert Italian laryngeal phonology into the LR-landscape, by analysing its laryngeal properties (some tentatives were already made in Huszthy 2016a, 2016b, 2016c, 2017a).

Romance languages are depicted in the literature of LR as classical voice languages since they exhibit voicing contrast between voiced and voiceless obstruents, together with RVA: "stops, fricatives and affricates assimilate in voicing to the following consonant, which is in accordance with these languages exhibiting voiced stops with negative voice onset time and thus the presence of voicing during the closure period before the release" (Recasens 2014: 165). Therefore, we also start our theoretical analysis of Italian laryngeal phonology considering it a voice language.

According to the previous statement, the classical [±voice] contrast is in natural correlation with RVA; some examples from Romance across word boundary: (Cat.) *ca**p** **d**au* [bd] 'no dice', (Cat.) *go**s** **b**o* [zβ] 'good dog' (Recasens 2014: 165), (Fr.) *ro**b**e **s**ale* [ps] 'dirty dress', (Fr.) *les fri**t**es **d**e Bruxelles* [dː] 'French fries from Brussels' (Snoeren & Segui 2003:

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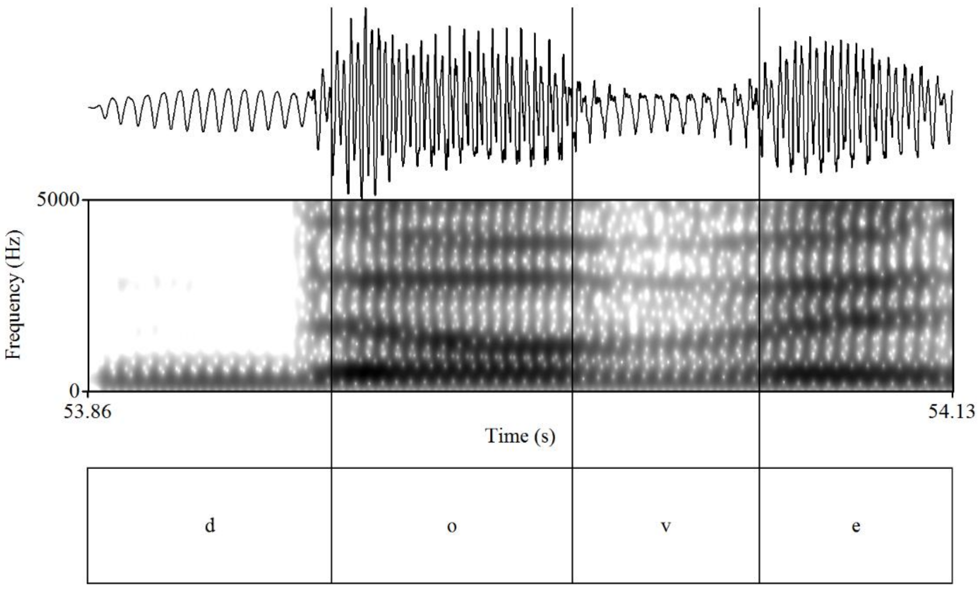
2325-2326). The traditional LR view also claims that “distinctive [voice] implies regressive voice assimilation” (van Rooy & Wissing 2001). However, Italian apparently has a [±voice] contrast which does not result in RVA. In the following subsections an attempt will be carried out in order to support this claim, from the point of view of both phonetics and phonology.

3.2.1 The phonetic characteristics of Italian initial stops

Italian [+voiced] obstruents are thoroughly voiced: in utterance-initial position they are pronounced with prevoicing, that is, in acoustic terms, with a long VOT lead, or in articulatory terms, vocal cords are in vibration even during the closure phase of the consonant. A clearly prevoiced word-initial [d] is shown in Figure (65) in the pronunciation of the Calabrian female informant of our corpus: a typical exponent of initial voiced stops attested in the recordings.[82] On the basis of their phonetic shape, Italian seems to be a classical voice language, since aspiration languages do not have any similar prevoicing pattern in initial stops. Thus, voiced stops can be considered thoroughly voiced in Italian, even in initial and in non-intersonorant position, unlike in aspiration languages.

Figure (65) *The (It.) word* dove *‘where’*



[82] The recording of the word *dove* ‘where’ shown in Figure (65) derives from the self introduction of the informant before the sample text reading.

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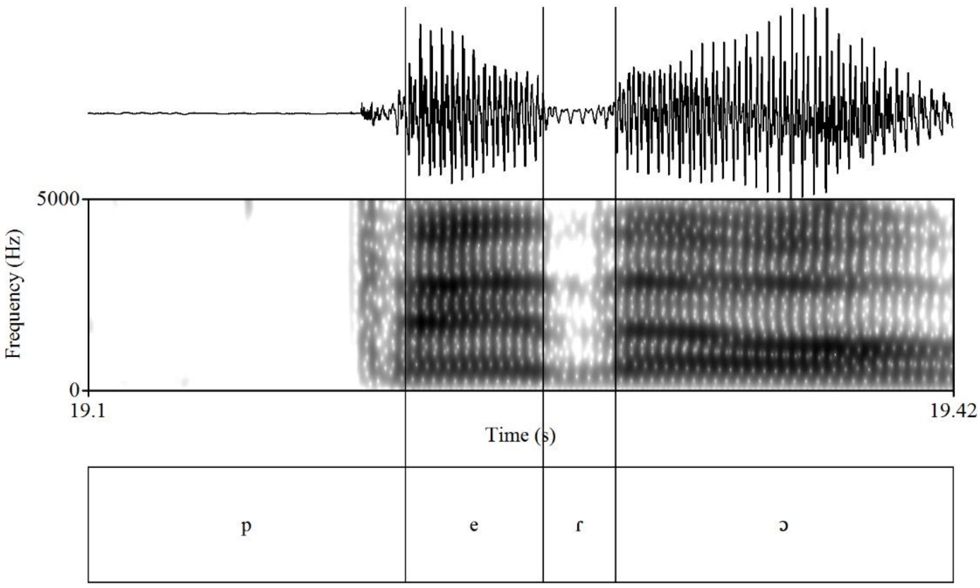
On the other hand, the phonetic shape of voiceless stops may induce a controversy about the laryngeal system of Italian, because the VOT lag found in Italian is typically longer than in other voice languages in general, but it is definitely shorter than in aspiration languages (cf. Section 3.2.5). A few studies about Italian stop-aspiration (Sorianello 1996; Stevens & Hajek 2010a; Nodari 2015) report that the phenomenon is salient, and it is attested more or less in every Italian variety, but primarily in the dialects of Calabria and Southern Apulia (where the VOT of voiceless stops is more or less the double compared to the other dialects). At the same time, Stevens & Hajek (2010a: 1558) claim that aspiration is not perceived by native speakers, except in the Calabrian varieties, and Nodari (2015: 142) notes that aspiration is also an important sociolinguistic marker for Calabrian speakers (cf. Section 3.2.4).

In Figure (66) an utterance-initial voiceless /p/ is shown in the pronunciation of the female informant from Apulia.

Figure (66): *Praat diagram of the (It.) word* però *'but'*



The initial voiceless /p/ in Figure (66) shows a moderate VOT lag after the release of the stop: 32 ms. In classical voice languages, the VOT measured for word-initial /p/ is usually under 15 ms, while in classical aspiration languages it is usually over 50 ms (cf. Lisker & Abramson 1964). Thus, this Italian realisation shows an intermediate solution, which may also be interpreted as phonologically irrelevant (cf. Section 3.2.5 for the Italian VOT means found in the corpus and Section 3.4 for phonological interpretations).

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This low measure of aspiration found in voiceless stops permits to create opposing theoretical interpretations to the laryngeal phonology of Italian. In the following subsections of Section 3.2 and in Section 3.3 Italian will be analysed as a voice language, where the slightly aspirated voiceless stops are in phonological opposition to thoroughly voiced stops: thus the marked feature of the laryngeal opposition is [voice] and not [spread glottis].

In this view aspiration is considered a phonetic side-effect of Italian voiceless stops which does not bring phonological consequences into the laryngeal system of Italian (cf. Huszthy 2016c: 433-435). Similar phonetic side-effects often characterise languages in LR, for instance the prevoicing found in Swedish lenis stops is considered phonologically irrelevant (cf. Ringen & Helgason 2004; Balogné Bérces & Huber 2010a, 2010b).

However, in Section 3.4 the opposite interpretation will also be developed, where we will attempt to present Italian as an aspiration language (or rather an h-language). Accordingly, in this view the mild aspiration found in the voiceless series of stops will acquire phonological importance, while the prevoicing of initial lenis stops will be considered a phonetic side-effect, similarly to the case of Swedish.

3.2.2 The voicing contrast among obstruents

Not only the phonetic characteristics of initial prevoiced stops attest that Italian has a regular obstruent voicing pattern, as generally do other voice languages too. Apparently, the [±voice] feature induces a phonemic distinction between Italian obstruents, as in Romance languages in general, such as Spanish and French.

In Chart (67) I collect a few examples for the Italian voice-opposition in obstruents: they are minimal pairs, differing only in the [±voice] value of homorganic obstruents: /b/~/p/, /d/~/t/, /g/~/k/, /d͡ʒ/~/t͡ʃ/, /v/~/f/. The sibilants /s, ʃ, t͡s/ are not included here, because they are in phonologically unconditioned free variation with their voiced counterparts (that is, the voiced counterparts of these sibilants probably are not phonemic, cf. the subsections of Section 1.2.4.3). For each obstruent, a word-initial (*a, c, e, g, i*) and a word-internal (*b, d, f, h, j*) minimal pair is shown.

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(67) *Minimal pairs illustrating Italian obstruent voice-oppositions*

/b/~/p/	a) *balla* [ˈbalːa] 'to dance, 3sg' vs. *palla* [ˈpalːa] 'ball' b) *albino* [alˈbiːno] 'albino' vs. *alpino* [alˈpiːno] 'Alpine'
/d/~/t/	c) *denti* [ˈdɛnti] 'tooth, pl.' vs. *tenti* [ˈtɛnti] 'to attempt, 2sg' d) *arde* [ˈarde] 'to burn, 3sg' vs. *arte* [ˈarte] 'art'
/g/~/k/	e) *gara* [ˈgaːɾa] 'race' vs. *cara* [ˈkaːɾa] 'dear, fem.' f) *pagare* [paˈgaːɾe] 'to pay' vs. *pacare* [paˈkaːɾe] 'to calm'
/d͡ʒ/~/t͡ʃ/	g) *giro* [ˈd͡ʒiːɾo] 'turn' vs. *Ciro* [ˈt͡ʃiːɾo] 'first name' h) *mangia* [ˈmand͡ʒa] 'to eat, 3sg' vs. *mancia* [ˈmant͡ʃa] 'tip'
/v/~/f/	i) *vede* [ˈveːde] 'to see, 3sg' vs. *fede* [ˈfeːde] 'faith' j) *cavone* [kaˈvoːne] 'big cable' vs. *cafone* [kaˈfoːne] 'bad-mannered'

The contrast between voiced and voiceless Italian obstruents is indisputable in word-initial position, as examples (*a, c, e, g, i*) show: many common words can be found in the Italian vocabulary which differ only in the [±voice] value of otherwise perfectly identical obstruents, similarly to the other Romance languages.

However, the opposition is less evident word-internally: firstly, because categorically fewer minimal pairs can be found in the Italian lexicon which attest the word-internal voicing contrast (cf. the examples *b, d, f, h, j*); secondly, because several Italian dialectal varieties are characterised by a lenition process which grants partial (or total) voicing to word-internal voiceless obstruents (cf. Rohlfs 1966), and the dialectal lenition may affect the speakers' Italian pronunciation as well. In these cases the word-internal voice opposition is often neutralised; some examples from the Southern Italian substandard: *mando* [ˈmando] 'to send, 1sg' vs. *manto* [ˈmando] 'mantle', *rido* [ˈriːdo] 'to laugh, 1sg' vs. *rito* [ˈriːdo] 'rite', *diga* [ˈdiːga] 'dam' vs. *dica* [ˈdiːga] 'to say, 3sg, imp.', etc.

As a result of the dialectal lenition phenomena, some words are lexicalised in Standard Italian with both voiced and voiceless word-internal obstruents, especially in the case of the velars /g, k/, e.g. *figo*/*fico* 'cool', *cagare*/*cacare* 'to defecate', etc.; nonetheless, other examples can also be found which maintain the /g/~/k/ difference: *affo*[g]*are* 'drown' vs. *affo*[k]*are* 'set fire', *fu*[g]*o* 'to rout, 1sg' vs. *fu*[k]*o* 'male bee', etc.

In conclusion, we consider the [±voice] contrast phonemic in Italian, even if in some instances of word-internal position it is neutralised, but this neutralisation process is similar to final devoicing in voice languages (such as in Catalan, Czech and Russian), which does not question the nature of the voice contrast in these languages (cf. Section 3.2.3).

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3.2.3 The exceptional /s/

As it has already been claimed multiple times in the dissertation, the phonetic and phonological behaviour of /s/ (as well as that of sibilants in general) is exceptional compared to the other obstruents (cf. Section 1.2.4.3.2, and the subsections of Sections 2.1.2 and 2.2.2). In the following subsections we will review such irregularities.

3.2.3.1 About sibilants in general

The sibilants /s, ʃ, t͡s/ present a much more complicated landscape compared to the other obstruents, seen in Sections 3.2.1 and 3.2.2. Sibilants are often exceptional in the phonology of the world's languages, mostly /s/ and its homorganic variants, which is probably based on a phonetic ground too: as the most important articulatory gestures of sibilants, Ladefoged & Maddieson (1996: 138, 145) identify the turbulent airstream, the fastest among the articulatory gestures, generated by a very narrow constriction, "when the jet of air created by the dental or alveolar constriction strikes the teeth"; therefore, even the slightest change of the articulatory system may generate categorically diverse sibilant sounds.

In Italian dialects, as well as in the regional pronunciations of Standard Italian, several sibilant variants occur which are in complementary distribution with /s/; for instance – according to the place of the articulation, sorted by the retraction of the tongue – alveolar [s], alveopalatal [ɕ], postalveolar (also called prepalatal) [ʃ], retroflex [ʂ] and their voiced counterparts [z, ʑ, ʒ, ʐ] (cf. Huszthy 2017b: 191). Most of these variants chiefly appear in preconsonantal position, as the result of a typical palatalisation (i.e., tongue retraction) process of /sC/ clusters, e.g. (Neap.) *sposa* [ˈʃpoːsə] 'bride', (Neap.) *sbirro* [ˈʒbirːə] 'policeman', (Venetian) *sposa* [ˈɕpoʑa] 'bride', (Sicilian) *finestra* [fɪˈnɛʂɹa] 'window', etc. (cf. Rohlfs 1966; Huszthy 2017b, 2018).

It should be noted that the postalveolar /ʃ/ is also present in Standard Italian (and in most of the dialects) as a phoneme (cf. Chart (1) in Section 1.2.4.3.1), but its distribution is different from the palatalised [ʃ] in /sC/ clusters (which is an allophone of /s/, and indeed it is present only in preconsonantal position, even if phonetically it is also pronounced as [ʃ]). First of all, the Italian /ʃ/ phoneme appears almost exclusively in intervocalic position and it is usually geminated (except in some northern varieties), e.g. *capi*[ʃː]*i* 'to understand, 2sg', *pe*[ʃː]*e* 'fish', *uno* [ʃː]*opero* 'a strike', etc. On the other hand, the Italian /ʃ/ phoneme is diachronically the

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result of the Latin [sk] plus palatal vowel cluster, while the dialectal distribution of preconsonantal [ʃ] equals the distribution of /s/ (cf. Krämer 2009: 49). As far as its voiced counterpart [ʒ] is concerned, it appears only dialectally, before voiced consonants (as in the Neapolitan example above, [ʒ]*birro* 'policeman'), or in the Tuscan varieties in intervocalic position instead of /d͡ʒ/ (e.g., *ragione* [raˈʒoːne] 'reason');[83] in any case, [ʒ] is phonologically never distinctive, so it cannot be considered a phoneme.

The presumed phonemic role of the voiced alveolar fricative [z] has already been rejected in Section 1.2.4.3.2. We repeat here the most important arguments in favour of this claim. Firstly, in word-initial position before a vowel the voiced [z] never appears, e.g. [s]*era* 'evening', [s]*ette* 'seven', [s]*ubito* 'immediately', etc.; and in the word-final context, which is rare anyway, we do not have [z], either, e.g. *ga*[s] 'gas', *bu*[s] 'id.', *lapi*[s] 'pencil', etc. Secondly, there are extremely few minimal pairs in Italian which can be contrasted on the basis of the voice value of /s/, and in synchrony the reason for the existence of these minimal pairs is questionable, too. Thirdly, in Northern Italian varieties only [z] is used in intervocalic position, while in Southern Italian varieties only [s] occurs, e.g., *rosa* 'rose' (North.) [ˈroːza] vs. (South.) [ˈroːsa], *basilico* 'basil' (North.) [baˈziːliko] vs. (South.) [baˈsiːliko], etc. Furthermore, each consonant of Italian occurs as geminated except for [z], which is another phonological argument that it does not have a phonemic role in Italian, it is rather a positional allophone of /s/.

The case of the sibilant affricate /t͡s/ is complicated, too, because its voiced counterpart /d͡z/ is usually considered a phoneme in the consonantal inventory of Italian (cf. Bertinetto & Loporcaro 2005: 132; Krämer 2009: 46-50), even if it does not seem to be distinctive (cf. Section 1.2.4.3). Both [t͡s] and [d͡z] appear in many Italian common words, but they are very often interchangeable, e.g. *mezzo* [ˈmɛd͡zːo]/[ˈmɛt͡sːo] 'half', *zampa* [ˈd͡zampa]/[t͡sampa] 'paw', *zucchero* [ˈd͡zukːero]/[ˈt͡sukːero] 'sugar', etc.[84] Bertinetto & Loporcaro (2005: 133) bring only one example to illustrate the apparent voice contrast between /t͡s/ and /d͡z/: *razza* [ˈrat͡sːa] 'race' vs. *razza* [ˈrad͡zːa] 'ray (fish)'; however, word-initial examples cannot be found, and word-internal ones do not abound, either. In conclusion, we do not consider voiced sibilants (e.g., [z, ʒ, d͡z]) phonemic in Italian: that is the reason for the sibilants /s, ʃ, t͡s/ not being included in Chart (67) of Section 3.2.2.

[83] In the dialects of Tuscany /d͡ʒ/ gets deaffricated in intervocalic position to [ʒ] (Rohlfs 1966).

[84] The [±voice] difference between the Italian sibilant affricates can be both dialectal and idiolectal; furthermore, intraspeaker variation is also attested, i.e., the same speakers may use the same words with both [d͡z] and [t͡s].

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3.2.3.2 Italian preconsonantal s-voicing in diachrony

Historically, Italian seems to have been a prototypical Romance language, or from the LR point of view, a very ordinary voice language: it probably had RVA, but the only possible input of the assimilation was /s/ before consonants, since there were not any obstruent clusters other than /sC/ (cf. Sections 2.1.2 and 3.1.8). The fact that Latin had no sibilant voicing before sonorants (moreover, [s] was usually deleted before voiced consonants in Latin, cf. Cser (2016: 71)) leads us to assume that sonorants did not trigger voicing initially in Italian, either. Sonorants may be supposed to have acquired a role as triggers of s-voicing at a later stage, presumably due to an analogical extension.

In the Italian lexicon most of the /sC/ clusters were formed at the boundary of phonological words; more precisely, upon the concatenation of /s/-final derivational prefixes (e.g. *s*-, *bis*-, *cis*-, *dis*-, *mis*-, *tra(n)s*-, etc.)[85] and consonant-initial lexical words, e.g. (It.) *s*- + *buco* 'hole' → [z]*bucare* 'to pop out', *bis*- + *nonno* 'grandfather' → *bi*[z]*nonno* 'great-grandfather', *dis*- + *gusto* 'taste' → *di*[z]*gusto* 'disgust', *tras*- + *bordo* 'side of a ship' → *tra*[z]*bordo* 'transshipment'.

The fact that such words regularly underwent s-voicing indicates that this voicing process was diachronically different than in synchrony, since in today's Italian s-voicing is not attested at the word boundary (cf. Section 3.2.3.3). In fact, Italian preconsonantal s-voicing seems to be regular RVA in diachrony. In Chart (68) further examples are collected to illustrate the ordinary patterns of s-voicing in the Italian native vocabulary.

(68) *Diachronic examples of Italian preconsonantal s-voicing*

/s/ + voiceless obstruent	/s/ + voiced obstruent	/s/ + sonorant
[sp]*aro* 'gunshot'	[zb]*arra* 'barrier'	[zm]*ettere* 'to stop'
pa[st]*a* 'pasta'	[zd]*egno* 'disdain'	[zn]*ello* 'thin'
a[sk]*oltare* 'to listen'	[zg]*abello* 'footstool'	[zl]*itta* 'sled'
[sf]*era* 'sphere'	[zv]*eglia* 'alarm clock'	[zr]*otolare* 'to unroll'

[85] According to Nespor & Vogel (1986: 125-126), derivational prefixes form independent phonological words in Italian (cf. Section 1.2.4.3.2).

As is shown in the above examples, /s/ appears as voiceless before voiceless obstruents, while it is voiced before voiced obstruents and sonorants (cf. Saltarelli 1970: 21-26; Lepschy & Lepschy 1988: 90; Nespor 1993: 74-76; Bertinetto & Loporcaro 2005: 134; Krämer 2009: 207-209). However, I propose in this dissertation that the status of Italian preconsonantal s-voicing has changed in synchrony, and it is not working anymore as a postlexical assimilatory process, that is, synchronically it does not equal RVA.

3.2.3.3 Italian preconsonantal s-voicing in synchrony

Several phonological problems arise in connection with the synchronic status of Italian preconsonantal s-voicing as productive voice assimilation. The first one – which directly induces the idea of the change in the diachronic status of the phenomenon – is that s-voicing does not work at word boundaries in synchrony. However, in other voice languages RVA applies even in sandhi position (cf. the Catalan and French examples of Section 3.2).

The absence of Italian preconsonantal s-voicing at the word boundary was previously reported by Nespor (1993) and Bertinetto (1999a, 1999b), e.g. *rebu*[s] *difficilissimo* 'a very hard riddle', *autobu*[s] *bianco* 'white bus'. Several other examples might be added to these two from the corpora of my studies, e.g. *lapi*[s] *giallo* 'yellow pencil', *Agnu*[s] *Dei* 'Lamb of God', *Jame*[s] *Bond*, *Pier*[s] *Bro*[z]*nan*, (It. acc.) *I*[z]*la*[s] *Baleares* 'Balearic Islands', etc.

Nespor (1993) and Bertinetto (1999a) argue that the absence of s-voicing in sandhi position can only be due to the fact that voice assimilation in Italian is exclusively lexical. However, this cannot be a relevant argument in synchronic phonology, since consonantal assimilations (especially RVA) are generally considered postlexical processes in languages (cf. Kiparsky 1982). On the basis of Nespor (1993)'s and Bertinetto (1999a)'s claim we may presume that preconsonantal s-voicing is lexical as long as it is lexicalised in Italian, so it is not a productive phonological process anymore. This assumption is supported by the fact that s-voicing is often absent in loanwords and in new compound words, e.g. (It.) *gasdotto* [sd] 'pipeline'; *iceberg* [sb], *frisbee* [sb], *baseball* [sb], *facebook* [sb], etc. (cf. Section 2.2.2.1 and footnotes 58 and 59). Accordingly, s-voicing is assumed to be lexicalised in the native vocabulary and it keeps working as an optional voicing process by analogy in non-native and new compound words.

The other important argument against the productivity of s-voicing in Italian phonology is the absence of RVA in non-/sC/ obstruent clusters. Since we cannot identify regular voice

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assimilation patterns in loanwords and older “Latinising” words (e.g. *a*[bs]*ide* ‘apse’, *su*[bs]*trato* ‘substratum’, *e*[kˈd͡z]*ema* ‘eczema’, *a*[fg]*ano* ‘Afghan’, *su*[dk]*oreano* ‘South Korean’, etc., cf. Chapter II), we may suspect that s-voicing labelled as “lexical voice assimilation”, too, is something other than RVA. Consequently, we do not consider Italian preconsonantal s-voicing as productive voice assimilation in this study. We will analyse this phenomenon shortly in two synchronic phonological frameworks, OT and ET, and draw further conclusions (cf. Sections 3.3 and 3.4).

3.2.4 Italian VOT values found in the corpus

In this subsection we return to the synchronic laryngeal phonology of Italian, as compared to the principles of Laryngeal Realism. In LR, the question of voice onset time (VOT) has a key role, because it is claimed that the aspiration found in word-initial voiceless stops is not only a phonetic side-effect of languages, but it has serious phonological consequences (cf. Section 1.2.2).[86] In fact, the LR typology of languages is also based on the VOT mean values of voiceless stops. In Chart (69) usual VOT averages are shown for the three most common initial voiceless stops, /p, t, k/, in three classical voice languages and in three classical aspiration languages. The data derive from Lisker & Abramson (1964).

(69) *VOT averages from three voice languages and three aspiration languages*

	a) Voice languages			b) Aspiration languages		
	Spanish	Hungarian	Dutch	English	Cantonese	Korean[87]
/p/	4 ms	2 ms	10 ms	58 ms	77 ms	91 ms
/t/	9 ms	16 ms	15 ms	70 ms	75 ms	94 ms
/k/	29 ms	29 ms	25 ms	80 ms	87 ms	126 ms

[86] According to Schwartz (2015) VOT is “overrated” in LR, especially with regard to voice languages.

[87] The Korean VOT values of Chart (69) refer to the aspirated set of stops. Korean also has a glottalised series of voiceless stops which are slightly aspirated (Lisker & Abramson 1964: 397). It is interesting to observe that the values of the “mild aspiration” found in Korean glottalised stops widely coincide with the Italian VOT values of the corpus: (Kor.) /pˀ/ = 18 ms, (Kor.) /tˀ/ = 25 ms, (Kor.) /kˀ/ = 47 ms vs. (It.) /p/ = 24 ms, (It.) /t/ = 27 ms, (It.) /k/ = 46 ms (cf. with Charts (70), (71) and (72)).

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As it is obvious from the data shown in Chart (69), VOT duration differs according to the place of articulation of the stops: usually the larger the obstruction, the more aspirated the consonant, since the explosion phase of the articulation takes more time. Hence, posterior stops have a longer VOT duration than anterior ones, so the regular lineup is: /p/ → /t/ → /k/ (cf. Section 1.2.2). The difference between /p/ and /t/ is not always so obvious, but the VOT values of /k/ are always considerably larger than those of either.[88]

VOT duration also differs according to languages, but the researchers of LR attribute a phonological difference to the distinction among the languages of Group (69a) and Group (69b); at the same time, minor VOT differences among the languages of the same groups are phonologically irrelevant. The VOT averages shown in Group (69b) are of typically aspirated stops, they could also be transcribed as /pʰ, tʰ, kʰ/. Generally speaking, we can talk about unaspirated stops if the VOT value of /p/ is under 10 ms, that of /t/ is under 15 ms, and that of /k/ is under 30 ms.

As far as Italian is concerned, the literature does not offer useable VOT values of initial or intervocalic singleton /p, t, k/ in Standard Italian. The main reason for this fact is quite simple: voiceless stops tend to lenite (by voicing or by fricativisation) in intervocalic position almost in every dialectal variety, which also influences the regional pronunciations of Standard Italian (cf. Marotta 2008: 238). Alternatively, VOT in geminated intervocalic /pː, tː, kː/ has been measured in several Italian varieties (since geminates are not targeted by lenition), and in these long stops preaspiration and postaspiration have equally been identified (Stevens & Hajek 2010a, 2010b). Other studies were dedicated to the aspiration of geminated stops in dialects of Southern Calabria and Southern Apulia (Sorianello 1996; Nodari 2015). They all determine VOT values which fall between the mean values of voice languages and aspiration languages seen in Chart (69). Some VOT means from Italian varieties from Sorianello (1996): /pː/ in Milan Italian shows 11 ms, in Cosenza Italian (Southern Calabria) 37 ms; /tː/ in Milan Italian shows 22 ms, in Cosenza Italian 51 ms; /kː/ in Milan Italian shows 39 ms, in Cosenza Italian 67 ms. The measurements of Stevens & Hajek (2010a) across 15 Italian cities are as follows: stressed /pː/ shows a VOT mean of 19 ms, stressed /tː/ shows a VOT mean of 26 ms, while stressed /kː/ shows a VOT mean of 60 ms.

[88] VOT is also influenced by some acoustic properties of the vowel which follows the voiceless stops, e.g. height, palatality and labiality (cf. Gósy 2004: 125). However, these factors are not considered in this section; instead, overall VOT means will be provided.

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A further interesting fact which concerns VOT in Italian voiceless geminated stops is that aspiration is apparently independent of the position of word stress. Generally, in languages where aspiration is phonologically relevant (i.e., in aspiration languages), VOT is heavily influenced by stress, since pre-tonic stops are usually much more strongly aspirated than post-tonic ones (cf. Honeybone 2002). On the other hand, in Italian geminated voiceless stops the opposite pattern is observed, that is, post-tonic stops are slightly more aspirated than pre-tonic ones (Stevens & Hajek 2010a: 1559). The differences are not really relevant, they only indicate that stress is not in correlation with aspiration in Italian.

Another study has been found which reports VOT values for Standard Italian, even if its purposes are not linguistic but pediatric (Bortolini et al. 1995). They analyse the speech production of "normal and preterm" Italian children, but they also create a control group of 7 adult Italian speakers (their place of origin is not indicated), whose VOT values in word-initial singleton /p, t, k/ are measured. The means are as follows: /p/ 11 ms, /t/ 19 ms, /k/ 34 ms. These values also fall between the results of voice languages and aspiration languages seen in Chart (69), but they are closer to the former group.

Against this background, we needed to measure the VOT values of initial and intervocalic /p, t, k/ in our research corpus as well. We found that voiceless stops appear to be mildly aspirated in the recordings, too, reaching a VOT average level which is exactly between the two groups of Chart (69). However, it is not discussed in the literature whether this low measure of aspiration may have any phonological consequences in Italian. We will later examine both possibilities, cf. Sections 3.3 and 3.4. For now, we show some results found in the research corpus for the Italian VOT averages of /p, t, k/.

Three target words were selected from the research corpus, containing both a word-initial and a word-internal stop, which were pronounced by 15 informants, a total of 258 occurrences.[89] The target words are *pingpong* [ˈpiŋg(ə)poŋgə], *tuttavia* [tutːaˈviːja] 'however', and *chirurgico* [kiˈrurd͡ʒiko] 'surgical'. VOT values were measured in Praat. The boxplot in (70), prepared with R, summarises the results of the total occurrences (also cf. Balogné Bérces & Huszthy to appear).

[89] The informants now include the Tuscan male speaker as well, who was formerly excluded from the RVA results. His accent, however, is suitable for the VOT measurements.

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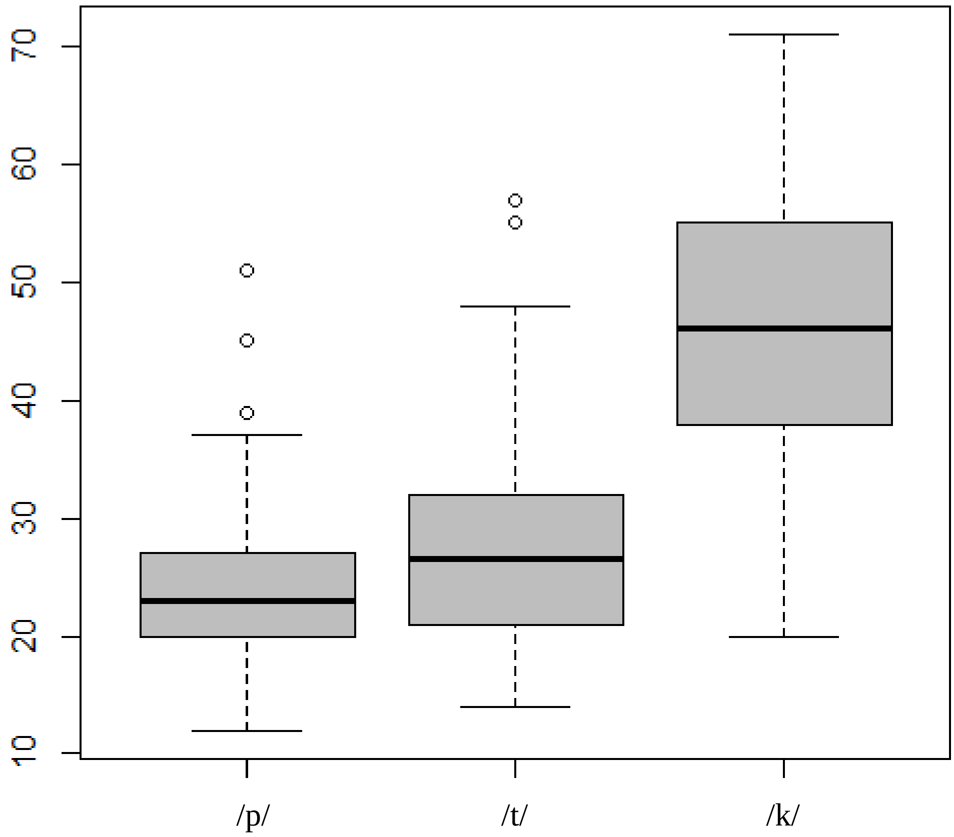
(70) *VOT values of Italian /p t k/ in the corpus (ms)*



The total mean values are the following: /p/ – 24.04651 ms; /t/ – 27.46512 ms; /k/ – 46.12346 ms. These figures are intermediate between those in classical voice languages and aspiration languages, seen before in Chart (69), and they broadly coincide with the formerly measured VOT averages of Italian varieties, presented in the previous paragraphs (they also coincide with the mildly aspirated Korean glottalised stops, cf. footnote 87).

However, the VOT results in boxplot (70) show a very huge deviation between minimum and maximum values, which is unusual compared to other languages. The maximum values are the following: /p/ – 37 ms (and an isolated 51 ms);[90] /t/ – 48 ms (and an isolated 57 ms); /k/ – 71 ms: which are clearly aspirated realisations. The minimum values are the following: /p/ – 12 ms; /t/ – 14 ms; /k/ – 20 ms: which, on the other hand, are clearly unaspirated realisations. This extreme deviation may also suggest that aspiration in Italian stops is optional, and not phonologically motivated. But in order to draw further conclusions we need to examine the same results in detail. Boxplot (71) shows the same VOT results with the division into word-initial and word-internal stops.

[90] The isolated manifestations are marked in the boxplot with a small circle above the maximum values of the boxes. Isolation means that these occurrences spring up from the averages.

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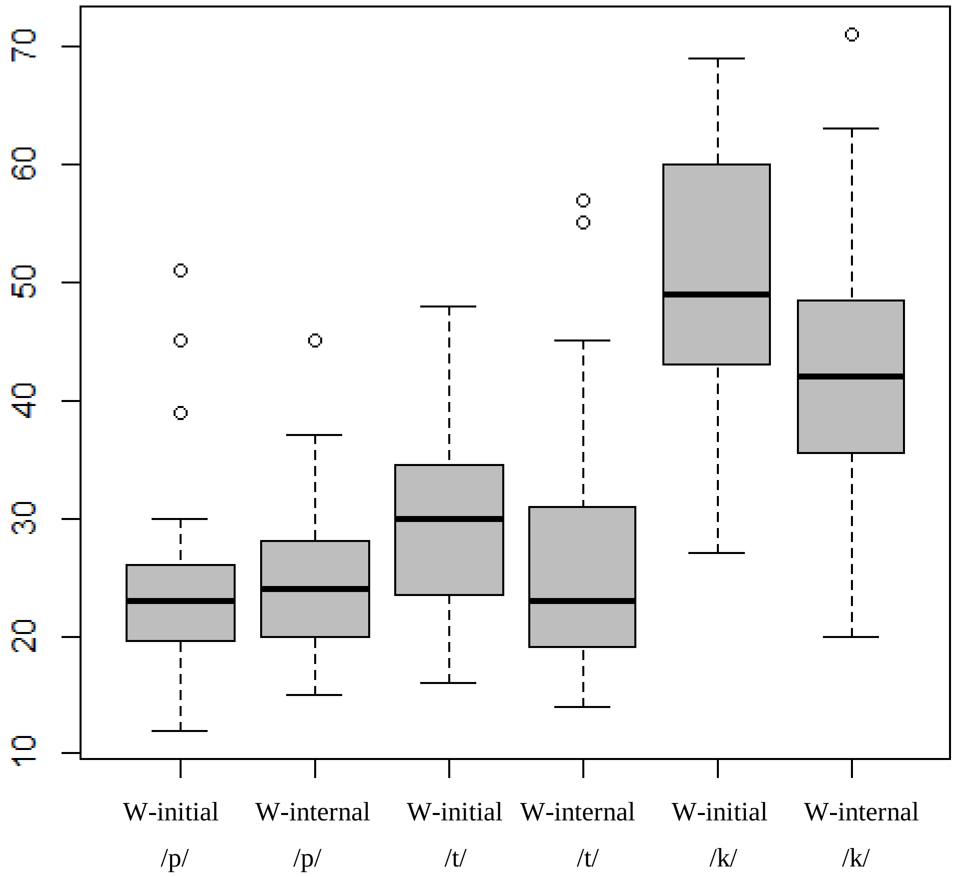
(71) *VOT values in word-initial and word-internal /p, t, k/*



On the basis of the claims found in the literature, we would expect heavier aspiration in word-initial stops compared to word-internal ones, since in languages where aspiration is phonologically relevant, VOT values are larger in word-initial position; in addition, word-stress also increases the aspiration (cf. Honeybone 2002). However, the difference regarding the position of the stop is not so salient in the above Italian data.

In boxplot (71) a very slight, but maybe not insignificant difference can be noted between the VOT values of the same stops in word-initial and word-internal positions. The case of /p/ appears to be irrelevant: the averages are almost the same, and the only distinction lies in the minimum and the maximum values, which are a little bit higher in word-internal position.[91] But in the case of /t/ and /k/ the word-initial stop appears to be more aspirated than the word-internal one, as expected. In the target words *tuttavìa* and *chirùrgico*[92] both stops are in

[91] Even if this difference is unexpected, it probably does not have any importance. It may also be due to the fact that the target word *pingpong* had an unpredictable word-stress in the informants' pronunciation: both [ˈpiŋg(ə)poŋgə] and [piŋg(ə)ˈpoŋgə] occurred among the realisations, even with intraspeaker variation.

[92] The stressed vowels are marked with a grave accent.

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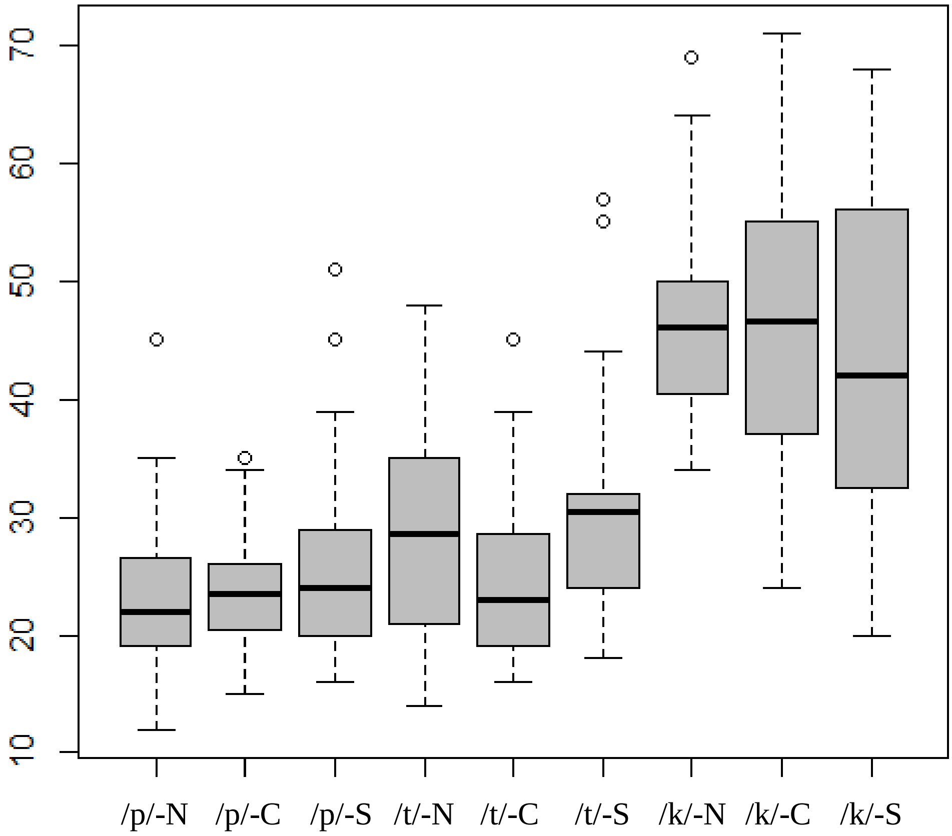
an unstressed syllable, so the VOT differences may really be due to the position of the stop. This information may lead us to attribute some phonological role to aspiration in Italian, which will be developed in Section 3.4. The last boxplot (72) provides a comparison of the dialectal VOT values in the pronunciations of the northern, the central and the southern informants.

(72) *A dialectal comparison of the VOT values of overall /p, t, k/*



Basically, no dialectal difference can be detected among the results, which is quite surprising. According to the literature, the aspiration found in Southern Calabria and Southern Apulia is significantly stronger than in the other dialectal zones (cf. Sorianello 1996; Stevens & Hajek 2010a, Nodari 2015). However, the two Calabrian informants of this study did not produce much stronger aspiration than the other informants. The isolated, heavily aspirated manifestations mostly derive from them, but occasionally even the other informants produced strongly aspirated stops. The precise VOT means of boxplot (72) are as follows: /p/-North: 22.95833 ms, /t/-North: 28.16667 ms, /k/-North: 47.54167 ms; /p/-Centre: 23.1875 ms, /t/-Centre: 24.03125 ms, /k/-Centre: 46.83333 ms; /p/-South: 25.83333 ms, /t/-South: 30.56667 ms, /k/-South: 44.07407 ms.

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As we have seen in this section, Italian voiceless stops show a degree of overall aspiration that falls between the standard values of "ordinary" voice languages (like other Romance, Slavic, Hungarian etc.) and aspiration languages (like English, German, Chinese etc.). However, the values themselves are of little (if any) interest from a phonological point of view, if we consider that sheer phonetic realisation is a non-argument in phonology.[93] Italian, usually considered an ordinary Romance language (and as such, a voice language) has several phonetic and phonological peculiarities; nevertheless, in the following sections we will analyse its laryngeal system from two opposing directions: first as an ordinary voice language, in an Optimality Theoretic account; then, with a Laryngeal Relativism approach, supported by GP's Element Theory, which permits an analysis of the same system as an *h-language*.

In Section 3.2 we argued that, from a purely LR point of view, Italian can be shown to exhibit distinctive, phonemic [voice] – in fact, this argumentation is very similar to the one applied to the case of Swedish (cf. Ringen & Helgason 2004; Helgason & Ringen 2008). The main phonetic difference between the two languages is that the fortis set of stops is heavily aspirated in Swedish, while only mildly aspirated in Italian; however, the lenis set is equally prevoiced (for further comparisons between Italian and Swedish cf. Section 3.4.1). In the following sections we will first follow this train of thought, and come up with an OT analysis; then, we will go on to approach the same data from a more abstract, phonologically-based theoretical perspective, that of Laryngeal Relativism.

3.3 An OT-account: Italian as a voice language without voice assimilation

Optimality Theory (OT) is a mainstream framework in modern phonological analysis. The classical model – initially developed by Prince & Smolensky (1993/2004), then immediately upgraded by McCarthy & Prince (1993, 1994, 1995), Kager (1999), etc. – is based on the concept of "optimality": that is, the assumption of an optimal linguistic form which is instantly selected in the mind of the speaker from plenty of other forms (called candidates) which are not as "appropriate" as the chosen one.

"Appropriate" means that the optimal form is not necessarily ideal, since even the winning candidates of the analyses violate lower ranked constraints; still, according to the given circumstances, they are the optimal forms. The selection process happens through the net of an

[93] This claim goes back to Kaye's Phonological Epistemological Principle: "The only source of phonological knowledge is phonological behaviour" (Kaye 2005: 283).

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infinite number of universal, violable, conflicting constraints (rather than rules); in the view of OT languages differ in the ranking of these constraints.

OT was developed with the very aim to handle conflicts between simultaneous phonological forces. It offers a highly suitable system to capture phonotactic, segmental, featural, metrical, prosodic etc. issues, and it is also frequently used in laryngeal phonological analyses. The choice for OT was motivated by the literature, too, since RVA (and other laryngeal phenomena, e.g. final devoicing) in voice languages is typically analysed in this framework (cf. Petrova *et al.* 2000; Kenstowicz, Abu-Mansour & Törkenczy 2003; Rubach 2008; Siptár & Szentgyörgyi 2013; etc.). On the other hand, phonologists who work within LR often analyse aspiration languages in the framework of Government Phonology (and/or Element Theory); therefore, our initiative to reanalyse the laryngeal phonology of Italian considering it an aspiration language will not be developed in OT, but in ET (cf. Section 3.4).

Accordingly, these two frameworks are in complementary distribution in this work (also cf. Section 1.2.3). Our data indicate that Italian is a language with voiced-voiceless contrast in word-initial obstruents but without RVA, and the framework of OT allows us to analyse it as such (cf. the similar discussion regarding Swedish and its OT-analyses in van Rooy & Wissing (2001) and Ringen & Helgason (2004)). But as we will see, certain fundamental assumptions in the version of ET we are to apply presently do not enable us to consider Italian a voice language, since the model predicts that a language which does not have postlexical RVA does not have the active L-element, either.

The spread of OT in phonological theory has led to the birth of several subsystems within OT; for instance, Stochastic Optimality Theory (cf. Boersma & Hayes 2001), which aims at softening the overly strict constraint rankings presumed in classical OT – so that it is able to handle linguistic variation – and Stratal Optimality Theory (cf. Bermúdez-Otero 2006, 2018), which was conceived in order to manage opacity and the interaction of phonology with morphology combining the insights of classical OT and Lexical Phonology (Kiparsky 1982). Nevertheless, in this dissertation the classical model of OT is used, while further research activities might also include the above mentioned subsystems, if the present one will not be completely satisfying.

In the following subsections various OT-analyses will be shown related to the laryngeal phonology of Italian. In Section 3.3.1 a constraint evaluation will be presented through a combination of some of the relevant OT-constraints which have been used for laryngeal analyses and for the phonology of Italian. In Sections 3.3.2 and 3.3.3 I will analyse Italian as an exceptional voice language which lacks regressive voice assimilation for special reasons of

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faithfulness, but at the same time it has a different voicing phenomenon which targets only the consonant /s/ when it is in intersonorant position or before voiced consonants.

3.3.1 Constraints adopted from laryngeal phonology

The first step during an OT-analysis (beyond the formulation of a basic concept which is applicable in OT, cf. the previous section) is the collection of those constraints which have already been used for similar phenomena by other phonologists. OT does not work by inventing ad hoc constraints for special cases: the constraints are supposed to be universal, so they must function in any language. Even so, since the spread of OT, numberless universal constraints have been introduced to the system.

A project launched by the Graduate Institute of Applied Linguistics of Dallas, entitled "How many constraints are there?", documented 1666 unique OT-constraints which were born from 1993 until 2008 (published in Ashley *et al.* (2010)). They also published the detailed list of these constraints in an Excel file, which I will refer to as the "Constraint Catalogue". Obviously, since 2008 at least the same number of new constraints have probably been produced in various papers. Nevertheless, in the OT-analyses of this dissertation I will attempt to keep to the constraints found in the "Constraint Catalogue" as well as a few additional constraints borrowed from the literature regarding Laryngeal Realism and the synchronic phonology of Italian.

In (73) ten important constraints are listed concerning the laryngeal phonology of voice languages and aspiration languages. The first five constraints of the list (73a-e) are faithfulness constraints; that is, they refer to the correspondence between the input of the analysis and the possible outputs. The other five constraints (73f-j) are markedness constraints; that is, they assign segmental or featural restrictions irrespectively of the input.[94]

[94] The phrasings of the constraints are different in style, because they derive from different sources, as it will be precisely indicated.

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(73) *Ten important laryngeal constraints*

a) IDENT(LARYNGEAL): (abbreviated: ID(LAR)) Output segments and their input correspondents must agree in all laryngeal feature specifications, i.e. do not change a segment's laryngeal features (McCarthy & Prince 1995; Lombardi 1995).

b) IDENT(VOICE): (abbreviated: ID(VOI)) Output correspondents have the same specification for [voice] as input correspondents (Krämer 2000; Petrova *et al.* 2000, 2006; Rubach 2008).

c) IDENT(SPREAD GLOTTIS): (abbreviated: ID(SG)) Output correspondents have the same specification for [spread glottis] as input correspondents (Rose & Walker 2004)

d) IDENTONSET(VOICE): (abbreviated: IDONS(VOI)) Consonants that are tautosyllabic with a following sonorant should be faithful to an underlying voice specification (Lombardi 1999; Krämer 2000; Wetzels & Mascaró 2001; Rubach 2008).

e) IDENTPRESONORANT(VOICE): (abbreviated: IDPRES(VOI)) Obstruents preceding [+sonorant] segments (including vowels) are faithful to their input with respect to the feature [voice] (Blaho 2003; Petrova *et al.* 2006; Rubach 2008).

f) ASPIRATION: (abbreviated: ASP) If a consonant is not continuant and not voiced, it is aspirated (Kirchner 1997; Jensen 2000).

g) VOICEASSIMILATION: (abbreviated: VA) Obstruent clusters must agree in their value for [±voice] (Rubach 2008).

h) AGREETAUTOSYLLABIC(VOICE): (abbreviated: AGREETAUTO(VOI)) Tautosyllabic obstruent sequences must have the same specification for [voice] (Baković 2005).

i) *VOICE: (abbreviated: *VOI) Avoid voiced obstruents (Petrova *et al.* 2000; Krämer 2000).

j) *LARYNGEAL: (abbreviated: *LAR) Do not have laryngeal features, e.g., voiced obstruents (Lombardi 1999).

Several similarities can be observed among certain constraints listed in (73). IDENT is a so-called "constraint family", one of the fundamental families of faithfulness constraints, responsible for correspondences between the input and the outputs (other similar faithfulness constraint families are DEP, MAX and FAITH; cf. the list in (77), and also cf. McCarthy & Prince 1995). Constraints belonging to families are often specified, that is, they are referred to a reduced group of segments, features or positions. The IDENT constraints in (73) are all specified once for [voice], while two of them (73d, 73e) have a positional specification too (referred to segments in the syllable onset, and to segments before sonorants).

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Positional faithfulness constraints are important in order to express the default regressive direction of voice assimilation; in fact, certain segments are apparently more faithful to underlying specifications than others, e.g. the onset position is stronger than the coda position (cf. constraint (73d)), and the prevocalic (or presonorant) position is also stronger than preconsonantal position (cf. constraint (73e). At the same time, we may also note that these two constraints in part overlap each other (for explanations cf. the next paragraph). Further overlaps can also be noted in the list in (73), for instance, constraint (73a) expresses both (73b) and (73c), since ID(LAR) refers to both [voice] and [spread glottis] faithfulness.

The requirement for sharing voice values between adjacent obstruents (that is, voice assimilation) is expressed by markedness constraints, most importantly, by costraint (73g) – namely VA – which is also called AGREE(VOICE) elsewhere in the literature (cf. among others Lombardi 1999) and also UNIFORMITY (cf. Kenstowicz, Abu-Mansour-Törkenczy 2003). Constraint (73j) includes (73i) as well, since it does not permit any laryngeal specification, e.g. [voice], [spread glottis] or [constricted glottis]. In contrast, constraint (73f) requires surface aspiration in underlyingly unaspirated voiceless stops.

The phenomenon of RVA is expressed in OT through the "cooperation" of various constraints (cf. Lombardi 1995, 1999; Kenstowicz, Abu-Mansour & Törkenczy 2003; Petrova *et al.* 2006; Siptár & Szentgyörgyi 2013; etc.). Markedness constraints are responsible for the voicing accord of the adjacent obstruents, such as VA and AGREETAUTO(VOICE) (or other subconstraints of the AGREE family, cf. the list in (77)). On the other hand, positional faithfulness constraints determine the regressive direction of the assimilation, such as IDENTONSET(VOICE) and IDENTPRESONORANT(VOICE). The fact that the primary direction of obstruent assimilations is regressive is due first of all to the phonological strength of the onset position as opposed to the phonological weakness of the coda position (cf. lenition processes mainly target coda consonants). If these constraints are high ranked, the coda consonant assimilates to the following onset consonant in voice (cf. Rubach 2008: 437), e.g. *vo*/d.k/*a* → [t.k], *foo*/t.b/*all* → [d.b] (cf. footnote 7 in Section 1.1.3).

Sometimes, however, constraints (73d) and (73g) fail to express RVA, e.g. in the case of word-initial clusters or tautosyllabic obstruent clusters. Constraints (73e) and (73h) help these situations: most importantly, IDENTPRESONORANT(VOICE) expresses the phonological strength of the rightmost obstruent in a cluster, i.e., that one which is immediately followed by a [+sonorant] element (a sonorant consonant, e.g. /m, n, l, r/, or a vowel). In voice languages IDENTPRESONORANT(VOICE) is always supposed to be high ranked, that is, the standard direction of voice assimilation is regressive in these languages, determined by the rightmost obstruent of the cluster (cf. Petrova *et al.* 2006: 5).[95] Cavirani & Hamann (in prep.) explain the need for a similar constraint (which they define as IDENT[voice]_V) through the RVA found in the Emilian dialects of Italian, which could not be properly expressed in Emilian by a prosodically defined positional FAITHFULNESS constraint (like IDENTONSET(VOICE)), because it would assign the same violation to regressive and progressive onset-internal assimilation.

In (74) below constraints selected from the set of (73) are shown which may be relevant for the case of Italian as well. Usual rankings are also indicated, based on the literature, for both voice languages (74a) and aspiration languages (74b) (cf. Rubach 1997, 2008; Lombardi 1999; Jessen & Ringen 2002; Blaho 2003, 2008; Ringen & Helgason 2004; Baković 2005; Petrova *et al.* 2006; Krämer 2000, 2003a, 2003b, 2005, 2009, 2012; Siptár & Szentgyörgyi 2013).

(74) *The most relevant laryngeal constraints*

a) A typical ranking for classical voice languages:

VA » IDPRES(VOI) » ID(VOI) » *VOI » *LAR » ASP, ID(LAR)

b) A typical ranking for classical aspiration languages:

*VOI » ID(SG), ASP » ID(LAR) » *LAR » IDPRES(VOI), VA » ID(VOI)

As the constraint rankings in (74) indicate, in voice languages the constraints responsible for RVA (such as VA and the positional faithfulness constraints) are higher ranked than those which prohibit laryngeal features (such as *VOI and *LAR); while in aspiration laguages they are lower ranked. On the basis of the ranking in (74a), the optimal output of an input like *vodka* (i.e., with a word-internal DT cluster) will be *vo*[tk]*a*; while an input like *football* (i.e., with a word-internal TD cluster) will be *foo*[db]*all* (consider Tableau (75)). On the other hand, if the ranking coincides with (74b), the optimal outputs of the same inputs will be *vo*[tk^{sg}]*a* and *foo*[$t^{sg}p$]*all* (consider Tableau (76)), where [^{sg}] in the index means that the stop is fortis, even if from a phonetic point of view it is not necessarily aspirated. Note that only in Tableau (75) does classical RVA take place, the fact that the voice values of the clusters in question do not differ in Tableau (76) is not due to voice assimilation.

[95] In languages whose phonotactics permits word-final obstruent clusters, like Hungarian, a further constraint is also high ranked, namely IDENTWORDFINAL(VOICE) (cf. Petrova *et al.* 2006: 10; Siptár & Szentgyörgyi 2013: 16), which is irrelevant in the case of Italian, so we will not use it.

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Tableau (75) *Typical laryngeal patterns in voice languages*

a) *vo*/dk/*a*	VA	IdPres(voi)	Id(voi)	*Voi	*Lar	Asp	Id(lar)
☞ [tk]			*			**	*
[dk]	*!			*	*	*	
[tk^{sg}]			*		*!	*	**
[dg]		*!	*	**	**		*
[t^{sg}k^{sg}]			*		*!*		**

b) *foo*/tb/*all*	VA	IdPres(voi)	Id(voi)	*Voi	*Lar	Asp	Id(lar)
[tb]	*!			*	*	*	
☞ [db]			*	**	**		*
[tp]		*!	*			**	*
[t^{sg}p]		*!	*		*	*	**
[t^{sg}p^{sg}]		*!	*		**		**

Tableau (76): *Typical laryngeal patterns in aspiration languages*

a) *vo*/dk^{sg}/*a*	*Voi	Id(sg)	Asp	Id(lar)	*Lar	IdPres(voi)	VA
[tk]		*	*!*	*			
[dk]	*!	*	*		*		*
☞ [tk^{sg}]			*	*	*		
[dg]	*!*	*		*	**	*	
[t^{sg}k^{sg}]		*		*	**!		

b) *foo*/t^{sg}b/*all*	*Voi	Id(sg)	Asp	Id(lar)	*Lar	IdPres(voi)	VA
[tb]	*!	*	*	*	*		*
[db]	*!*	*		*	**		
[tp]		*	*!*	**		*	
☞ [t^{sg}p]			*	*	*	*	
[t^{sg}p^{sg}]		*		*	**!	*	

The analyses in Tableaux (75) and (76) are, of course, only illustrative, in specific languages the constraint ranking may be more refined; for instance, according to the analyses of Petrova *et al.* (2006), *Voi in Russian precedes Id(voi), unlike in Hungarian; while in Swedish VA is higher ranked and *Voi is lower ranked compared to Tableau (76). However, the OT-analyses in Tableaux (75) and (76) serve to demonstrate that the case of Italian laryngeal phonology is much more complicated than the above presented patterns. The constraints listed in (73) are not enough in order to possibly explain the lack of voice assimilation in Italian. In (77) seven further OT-constraints are listed: the first five (77a-e) are very general constraints which derive from the earliest descriptions of OT, while the last two (77f, 77g) concern more specifically the phonology of Italian.

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(77) *Further constraints to analyse the laryngeal phonology of Italian*

a) DEP: Every segment in the output is present in the input as well (Prince & Smolensky 1993; McCarthy & Prince 1993, 1995; Kager 1999).

b) MAX: Every segment in the input is present in the output as well (Prince & Smolensky 1993; McCarthy & Prince 1993, 1995; Kager 1999).

c) LINEARITY: (abbreviated: LIN) The input reflects the precedence structure of the output, and vice versa (McCarthy & Prince 1995; Morelli 1999; van Oostendorp 2004: 26; Krämer 2009: 143).

d) CONTIGUITY: (abbreviated: CONT) Don't change the neighbourhood relations inside correspondent strings (McCarthy & Prince 1993, 1995; van Oostendorp 2004: 25; Krämer 2009: 38).

e) STRESS-TO-WEIGHT PRINCIPLE: (abbreviated: SWP) Stressed syllables must be heavy (Prince 1990; McCarthy & Prince 1993, 1995; Krämer 2009; Huszthy 2016a: 103).

f) CODACONDITION(ITALIAN): (abbreviated: CODACOND) A coda consonant in Italian may be only a sonorant /l, m, N, r, j/, half of a geminate consonant or /s/ (about the CODACOND constraint cf. Prince & Smolensky 1993; McCarthy & Prince 1993, 1995; about the coda condition of Italian cf. Itô 1988: 38; Nespor 1993: 153; Krämer 2009: 137-140; Huszthy 2016a: 99).

g) AGREE-C(VOICE): Adjacent consonants must agree in [voice] (Huszthy 2016a: 110, 2016c: 446).

The above constraints may effectively complement the laryngeal constraint set seen in (73). The DEP and the MAX faithfulness constraint-families have been mentioned previously; they are responsible for a basic correspondence between input and output: the first one does not allow epenthesis, the second one does not allow deletion. It is my assumption that their relation has recently changed in the phonology of Italian (as it is explained below), which will acquire importance in the analyses of Section 3.3.2. Constraints (77c) and (77d) defend the coherence of segment strings, such as consonant clusters, similarly to faithfulness constraints: LINEARITY does not allow metathesis, while CONTIGUITY does not allow epenthesis and/or deletion in continuous strings.

Furthermore, constraints (77e) and (77f) are very important in any aspect of the phonology of Italian. The coda condition of Italian has been analysed many times, since it is quite severe (like Italian phonotactics in general). Phonologists generally agree that singleton obstruents cannot occupy a coda position in Italian, but there are discussions about the possible

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role of /s/ in the coda (Morelli 1999; Bertinetto 1999a, 1999b, 2004; Krämer 2009; Schmid 2016; Huszthy 2016a). Besides, Krämer (2009: 139) claims (based on Repetti (1993, 2006)'s observation) that coda obstruents are allowed in loanwords, as we have also seen their occurrences in the corpus. The SWP is also fundamental in Italian phonology: this principle (or, here, rather constraint) is responsible for stressed vowel lengthening typical of Italian (which characterises the Italian foreign accent, too, cf. Section 1.2.4.3), but it may cause consonant gemination processes as well, which may be relevant to laryngeal phonological analyses.[96] Finally, constraint (77g) is an extension of the formerly seen AGREE(VOICE) constraint family to clusters of any consonants, including sonorants: this extension is motivated by the presence of presonorant s-voicing in the phonology of Italian (while presonorant obstruent voicing phenomena occur in other languages as well).

With the aid of some of the constraints in (77) we are able to explain the usual diachronic strategies of Italian to resolve the ill-formed TC clusters, namely regressive place assimilation and preconsonantal stop deletion. The example of (Lat.) *abstractus* 'abstract' → (It.) *astratto* well illustrates both processes (cf. footnote 28). If we take the hypothetical form */abstrakto/ as an input, a constraint ranking like SWP, CODACOND, LIN » DEP, CONT » MAX leads to the optimal output [astratto]. However, I claimed at different parts of this dissertation that these two diachronic strategies (i.e., place assimilation and deletion) are no longer productive in the phonology of Italian; in fact, Italians in recent loanwords and in their foreign accent do not apply regressive place assimilation in TC clusters and also tend not to delete the input consonants. In terms of OT this fact can be explained through a change in the previously indicated constraint ranking: I presume that the MAX faithfulness constraint is very high ranked in the synchronic phonology of Italian, so it precedes DEP, SWP and CODACOND, respectively (cf. the OT-analyses of Section 3.3.2).

The constraints seen until now are not enough to properly explain the phenomenon of Italian preconsonantal s-voicing together with the absence of RVA in other obstruent clusters. We have at least two possibilities to simultaneously analyse the two phenomena in OT. On the one hand, with the supposition that RVA in Italian targets only tautosyllabic clusters (cf. Bertinetto 1999a, 1999b), which is expressed by the AGREETAUTO(VOI) constraint (cf. 73h); that is, /sC/ undergoes RVA only when it is parsed as tautosyllabic (a similar analysis is carried

[96] The effect of SWP is expressed by Krämer (2009: 179) with a different constraint: FOOT=μμ ("Every foot has exactly two morae"), which is an important observation in order to simplify the analysis of stressed vowel lengthening and unstressed vowel shortening; however, here we use the classical SWP constraint.

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out in Huszthy (2016a, 2016b); also cf. Section 3.3.3). On the other hand, we can also analyse the two phenomena independently of syllable structure, with the aid of further constraints which regard the exceptional sibilants (see the list in (78)).

(78) *Sibilant-specific constraints in Italian phonology*

a) *VsV: No voiceless coronal fricatives between two vowels (Kenstowicz 1995; Peperkamp 1997; Krämer 2003a, 2003b, 2005, 2009).

b) ID(VOI)[-SIB]: Non-sibilant obstruents are faithful with respect to [voice] (Huszthy 2016c: 447).

c) IDPRESON(VOI)[-SIB]: Non-sibilant presonorant obstruents are faithful with respect to [voice] (Huszthy 2016c: 447).

d) s-[son]: /s/ becomes a sonorant when followed by a sonorant consonant (Huszthy 2016c: 447).

The markedness constraint (78a), which is violated by a voiceless coronal fricative in intervocalic position, is "highly specific" (Krämer 2003b), because this kind of lenition process is a characteristic of Northern Italian varieties only.[97] For the same reason, Krämer (2003a, 2003b, 2005, 2009) assumes a more general constraint as well, which includes the same phenomenon: *VC̥V, that is, the prohibition of intervocalic voiceless consonants. Another generalisation of the same phenomenon appears in Huszthy (2017b: 206), when *VsV is replaced by LENITION[SIBILANT], which makes sibilants voiced in intervocalic position by lenition. Nevertheless, in this dissertation *VsV will be used in its original form.

Constraints (78b) and (78c) are the specifications of two previously seen IDENT(VOICE) constraints (cf. 73b, 73e): they were provided by the [-sibilant] feature, so they leave sibilants out of consideration when they act (about the exceptional phonological behaviour of sibilants cf. Section 3.2.3 and its subsections).

As far as constraint (78d) is concerned, the idea is that /s/ in phonology does not always behave as an obstruent consonant – in certain cases it may assume the properties of a sonorant. /s/ shows a strong relationship to sonorants: in diachrony, a frequent sound change in languages is when /s/ transforms into homorganic sonorants like /l, r, n/; in synchrony, /s/ may appear in

[97] However, a kind of predecessor of the *VsV constraint can also be found in SPE phonology in the form of a rewrite rule: s → [+voice] / V_V (Chomsky & Halle 1968: 47), which aims to explain alternations like (Eng.) *con*[s]*ist* vs. *re*[z]*ist*. This rule confirms the *raison d'être* of the specific *VsV constraint.

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the syllable coda in Italian, like sonorants normally do, and unlike any other obstruent (Baroni 2014: 5-6). Blaho (2003: 27) and Siptár & Szentgyörgyi (2013: 19) use a constraint similar in function to (78d) for Hungarian /v/ (which Blaho calls v-[son], while Siptár & Szentgyörgyi call LABIAL(SONORANT)). Hungarian /v/ requires special treatment, since it exhibits different consonantal behaviours in different phonetic contexts: sometimes it appears as an obstruent [v], other times as a sonorant [ʋ]. The analyses assume that Hungarian /v/ is not specified for the feature [sonorant] in the underlying representation, and the value of this feature is determined in allophones according to the v-[son] constraint, which specifies /v/ as a [+sonorant] if it is followed by a [+sonorant] segment (Blaho 2003: 27).

The situation appears to be very similar in the case of Italian /s/ as well. I assume that /s/ may behave in Italian as a sonorant if it is followed by a sonorant consonant (which is expressed by constraint (78d)), that is, it becomes voiced in this context. Accordingly, on the basis of constraints (78b) and (78c), every non-coronal obstruent must preserve its underlying voice specification in the surface form, like /b/ in the (It.) word *a*[b]*side* 'apse', which does not get devoiced before the voiceless [s]. Similarly, not even coronals can change their underlying voice value unless they are fricatives. This is the reason why sonorants do not trigger voicing in TR and FR clusters, e.g. *tre* 'three', *treno* 'train', *freno* 'brake', etc. (cf. Section 3.3.3; also cf. Huszthy 2016c: 447).

In the following subsections of Section 3.3 a series of OT-analyses will be presented applying the constraints introduced above. In Section 3.3.2 the general lack of voice assimilation will be treated in OT, while in Section 3.3.3 the phenomenon of Italian preconsonantal s-voicing will be analysed.

3.3.2 The conservatism of Italian as an input-preserving attitude

As we have seen at various points of previous sections (mostly Section 3.1), the synchronic phonology of Italian shows several "conservative" tendencies. Conservatism as a linguistic attitude may have both diachronic and synchronic manifestations; in the first case, affinities to the proto-language can be considered (in this approach, according to Marotta (2008: 236), Italian is one of the most conservative languages of the Romance dominium, cf. Section

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1.2.4.3.3); in the second case, conservatism refers to the tendency of preserving the components of the input in the outputs.

In terms of OT a similar conservatism can be optimally explained, through the high-ranking of faithfulness constraints compared to markedness constraints (cf. Section 3.3.1 regarding the considerations about /abstrakto/ → [astratto] and the supposed rising of MAX in the constraint ranking of Italian). However, the kind of linguistic conservatism found in synchronic Italian phonology is not as simple as it appears from the above description. In fact, in order to preserve the available input elements, the speakers often change them by adding other elements, too, so they may create even longer and more complicated outputs. Therefore, the conservatism of Italian phonology is actually "unbalanced", since it does not mean total faithfulness, but an inclination to extend forms rather than undergo deletion or assimilation (cf. Huszthy 2015a: 243-244).

The two most important conservative processes of Italian phonology which serve the defence of the input elements are schwa epenthesis in ill-formed consonant clusters (e.g. *foot*[ə]*ball*, *vod*[ə]*ka*, *ping*[ə]*pong*, cf. Section 3.1.2) and preconsonantal obstruent gemination (e.g. *u*[pː]*grade*, *vo*[dː]*ka*, *e*[kː]*zema*, cf. Section 3.1.5). In both cases the string of the input elements is extended with an additional element, in order not to delete or change any segment in the input (cf. Huszthy 2015a: 245). These insertion phenomena violate the DEP constraint, thus it is supposed to remain low ranked in Italian phonology.

Other conservative tendencies also appear among the data of the corpus; for instance, the absence of regressive place assimilations in obstruent clusters (even if diachronically it was a common Italian repair strategy, this process seems to have ceased to apply in synchrony, as it was mentioned in the previous section); the scarce readiness for deletion from multiple consonant clusters (in the dataset only very few deletions happen, which is surprising in light of the severe phonotactics of Italian); the failing coalescence of adjacent homorganic obstruents (as in *Su*[dt]*irolo*, *ou*[td]*oor*, *bac*[kg]*round*); the absence of affrication of /t/+/s/ in the target word *ou*[t|s]*ider* (the [t] is usually released before the [s], instead of being fused into [t͡s]). And most importantly, we may add to the list the absence of regressive voice assimilation in obstruent clusters: in this view the lack of RVA is a similar input-preserving strategy, since assimilation means the change of an input element.

In the next few OT-analyses we will attempt to establish a relevant ranking of faithfulness constraints, which follows the synchronic conservatism of Italian phonology, that is, it allows for insertion, but punishes deletion or feature-change. Accordingly, exponents of the MAX constraint family (seen in 77b) will certainly be higher ranked than DEP constraints

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(seen in 77a); similarly, IDENT constraints will also be high ranked. The first tentative analysis is given in Tableau (79).

Tableau (79) *OT-analysis of the complex medial cluster in* Sampdoria

Sa/mpd/*oria*	MAX	LIN	IDENT(VOI)	DEP	VA	*VOI
☞ [mpd]					*	*
[mpt]			*!			
[mbd]			*!			**
☞ [mpəd]				*		*
[nd]	*!					*
[ndp]		*!			*	*

The analysis in Tableau (79) has two winning candidates: a realisation of the marked consonant cluster without RVA or any other repair strategy, and another with schwa epenthesis. This analysis is only provisional (as well as the constraint ranking too, since there is only one border: in the middle between the first three and the second three constraints), but it shows us that the MAX faithfulness constraint is higher ranked than DEP (cf. Section 3.3.1), and markedness constraints are generally lower ranked than input-preserving constraints.

In voice languages, the markedness VA (or AGREE(VOI)) constraint is higher ranked than the faithfulness constraint IDENT(VOICE), and this fact causes the voice assimilation of adjacent obstruents. We suppose, however, that the ranking between these constraints is the reverse in Italian phonology, and so adjacent obstruents tend to preserve their underlying voice values. Other complex input clusters with the constraint order seen in Tableau (79) would have the same two optimal outputs, e.g. *pi*/Ngp/*ong* → *pi*[ŋgp]*ong* & *pi*[ŋgəp]*ong*, *so*/ftb/*all* → *so*[ftb]*all* & *so*[ftəb]*all*, *bac*/kgr/*ound* → *bac*[kgr]*ound* & *bac*[kəgr]*ound*, etc. This evaluation also indicates that schwa epenthesis may serve as an input-preserving repair strategy in these cases, whose aim is to stick to input voice values (which is phonetically much easier, too, when the first stop in the cluster is released allowing the intrusion of a schwa).

In the following analyses we will attempt to achieve a stricter constraint ranking to better approach the absence of RVA in Italian obstruent clusters. First, we will consider the case when the first obstruent of the relevant cluster is involved in the word stress, like in the words *abside* ‘apse’ (It.) [ˈaːb(ə)side], *vodka* (It.) [ˈvɔːd(ə)ka], *sovchoz* (It.) [ˈsɔːvkot͡s], etc. By virtue of the word stress, the constraints SWP and CODACOND will also be relevant in the analyses, whose ranking relation needs to be clarified. SWP requires stressed syllables to be heavy, so stressed syllables without a coda consonant and with a short vowel are punished; on the other hand, the type of the coda consonant is determined by the CODACOND constraint. I presume, however –

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on the basis of the supposed conservatism of the synchronic phonology of Italian –, that MAX is higher ranked in Italian than SWP and CODACOND, since they allow epenthetic processes. Therefore, they will also be lower ranked than the IDENT(VOICE) constraint family (whose relation to MAX has not been determined), but they will be higher ranked than VA, DEP and *VOI. Consider the constraint ranking in Tableau (80) below.

Tableau (80) *OT-analysis of the Italian pronunciation of* vodka

/ˈvɔdka/	MAX	ID(VOI)	SWP	CODACOND	VA	DEP	*VOI
[ˈvɔdka]				*!	*		**
[ˈvɔtka]		*!		*			
[ˈvɔdga]		*!		*			
[ˈvɔkka]	*!					*	
☜ [ˈvɔːdka]				*!	*	*	**
[ˈvɔːtka]		*!		*		*	*
[ˈvɔdːka]				*!*		*	**
[ˈvɔdəka]			*!				
☞ [ˈvɔːdəka]						**	**
[ˈvɔdːəka]						**	***!
[ˈvɔːdːəka]						***!	***

Tableau (80) contains quite a number of candidates: these are all possible outputs of the input /ˈvɔdka/. Among the Italian realisations which occurred in the corpus (cf. Section 2.2.1.1) the two most frequent outcomes are those indicated with the icons ☜ and ☞. The unusual first hand icon (which points to the left) shows a candidate [ˈvɔːdka] which is the "classical" Italian solution without RVA (found several times in the dataset), but it is not optimal in the analysis, because it violates the coda condition. According to the analysis in (80), the optimal Italian output of *vodka* is the candidate which transfers the coda obstruent into the onset of a following syllable created by schwa epenthesis: [ˈvɔːdəka].[98] This is an attested solution in the corpus, but our analysis shows that the lack of RVA is due to the coda condition, which is not a completely satisfying solution to us, given that schwa epenthesis is a significantly less frequent phenomenon in the corpus than the absence of RVA (cf. Section 2.2.1.1). Consequently, we will need a different explanation, in which the coda condition plays a less salient role.

For now, we establish a preliminary ranking order of the previously seen constraints for the laryngeal phonology of Italian, see (81).

[98] The other solution which is allowed by the CODACOND, with the place assimilation in [ˈvɔkka], is punished by the highest ranked MAX constraint.

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(81) *A preliminary ranking of laryngeal constraints in Italian phonology*

Max, Lin » IdPres(voi), IdOns(voi) » AgreeTauto(voi), Id(voi), Id(sg) » SWP, CodaCond, Cont » Dep, VA, Agree-C(voi) » Asp, *Voi » *Lar

The constraint ranking in (81) is quite different from that of classical aspiration languages (cf. Tableau 76); at the same time, it does not match that of classical voice languages, either (cf. Tableau 75). The most important differences are that Id(voi) constraints are higher ranked than VA, unlike in voice languages; but *Voi and Asp are low ranked, unlike in aspiration languages. Dialectal aspiration phenomena are allowed, though, by the higher ranked Id(sg) constraint; however, this implies that aspiration is underlying in these cases.[99] Some ordering restrictions are universal, i.e., specified constraints are always higher ranked than non-specified ones (Prince & Smolensky 1993): so IdPres(voi) and IdOns(voi) must precede Id(voi), and similarly, AgreeTauto(voi) precedes Agree-C(voi), as long as the former refers to tautosyllabic obstruents only, while the latter to any consonant cluster.

The conservatism of Italian phonology lies in the fact that input-output correspondence constraints are higher ranked than output-input correspondence and general markedness constraints: so Max is higher ranked than Dep, but Lin is also higher ranked than Cont, since the latter requires correspondence between output and input. The ranking in (81) is illustrated in Tableau (82).

Tableau (82) *Illustration of the constraint ranking in (81)*

/tg/	Max	Linearity	IdPres(voi)	IdOns(voi)	AgreeTauto(voi)	Id(voi)	Id(sg)	SWP	CodaCond	Contiguity	Dep	VA	Agree-C(voi)	Asp	*Voi	*Lar
[tk]			*!	*		*			*					**		
[dg]						*!			*						**	**
[gg]	*!					*					*				**	**
☞ [tg]									*			*	*	*	*	*
[gt]		*!	*	*		**			*	*		*	*	*	*	*

[99] This hypothesis is supported by the fact that the informants of the corpus whose dialect has strong aspiration (i.e., the Calabrese and the Tuscan speakers) did not aspirate more than the other informants in Standard Italian and in loanwords.

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Still, the constraint ranking illustrated in Tableau (82) is not convincing enough, because it leaves without explanation certain facts we have already seen, such as outputs extended by epenthesis, or the case of tautosyllabic /sC/ clusters, which could not undergo s-voicing because of the too high ranked IDONS(VOI) constraint. If we introduced a further candidate in Tableau (82) like [tVg] (i.e., with the epenthesis of a vowel), it would win the analysis with the above constraint ranking (since it would violate only CONTIGUITY and DEP among the relevant constraints). In Tableau (82) we cannot obtain two optimal candidates, like in Tableau (79); thus, the position of DEP is crucial, since if it was one up in the ranking, the winning candidate would remain [tg].

In order to better analyse the laryngeal phonology of Italian, in Section 3.3.3 we will consider the phenomenon called "Italian preconsonantal s-voicing", since /s/ may apparently get voiced before consonants in Italian. As is well known, the phonological behaviour of /s/ (and of sibilants in general) is exceptional (especially in Italian), so sibilant-specific constraints have been introduced (cf. the list in (78)), which we will see working in the next section.

3.3.3 The OT-analysis of Italian preconsonantal s-voicing

There are many different phonological explanations for the strange voicing phenomenon of Italian /s/ before voiced consonants. One is that /s/ forms tautosyllabic clusters with the following consonant, and RVA is possible only in tautosyllabic consonant clusters in Italian (which is expressed in OT by the AGREETAUTO(VOI) constraint, which requires voicing in tautosyllabic obstruent clusters, cf. the previous sections and Baković 2005: 286). However, this interpretation is rather arbitrary and uncertain, because /s/ may apparently be parsed as both heterosyllabic and tautosyllabic in Italian (cf. Marotta 1995; Bertinetto 1999a, 2004; Huszthy 2016a); moreover, it may acquire voice before both voiced obstruents and sonorants.

If we aim to comprehensively treat the phenomenon in OT, we need sibilant-specific constraints (listed in (78) in Section 3.3.1). In Tableau (83) a first approach is shown, still without the specific constraints: a /Cs/ and an /sC/ cluster is analysed in the (It.) words *abside* [ˈaːbside] 'apse' and *sbaglio* [ˈzbaʎːo] 'error', respectively.

Tableau (83) *OT-analysis of the relevant clusters in (It.)* a/bs/ide *and (It.)* /sb/aglio

a) a/bs/*ide*	IDPRES (VOI)	AGREETAUTO (VOI)	ID (VOI)	VA	*VOI
[ps]			*!		
[bz]	*!		*		**
☞ [bs]				*	*

b) /sb/*aglio*	IDPRES (VOI)	AGREETAUTO (VOI)	ID (VOI)	VA	*VOI
[sp]	*!		*		
☞ [zb]			*		**
[sb]		*!		*	*

When the /sC/ cluster is tautosyllabic (as it is presumed in (83b) because of its word-initial position), the AGREETAUTO(VOI) constraint is decisive in the OT-analysis and it enforces the s-voicing. Accordingly, the heterosyllabic /bs/ cluster (in (83a)) will not undergo voicing in Italian, unlike the /sb/ cluster. However, when an /sC/ cluster may vacillate between tautosyllabic and heterosyllabic realisations (that is, in word-internal position), the analysis becomes much more complicated.

Tableau (84) provides a comparison between a word-internal /sC/ cluster and a straightforwardly tautosyllabic word-internal /TR/ cluster. The words analysed are (It.) *vetro* [ˈveːtro] ‘glass’ and (It.) *asma* [ˈaːzma] ‘asthma’. In *asma* the /s/ precedes a sonorant consonant, so we will need the AGREE-C(VOI) constraint too (cf. (77g)), which may explain the voicing of /s/ in this case.

Tableau (84) *OT-analysis of the (It.) words* vetro *and* asma

a) /ˈvetro/	ID(VOI) [-SIB]	SWP	CODA COND	AGREE-C (VOI)	ID (VOI)
[ˈvet.ro]			*!	*	
[ˈved.ro]	*!		*		
[ˈve.tro]		*!		*	
☞ [ˈveː.tro]				*	
[ˈveː.dro]	*!				*

b) /ˈasma/	ID(VOI) [-SIB]	SWP	CODA COND	AGREE-C (VOI)	ID (VOI)
[ˈas.ma]			(*!)	*!	
? [ˈaz.ma]			(*!)		*
[ˈa.zma]		*!			*
[ˈaː.sma]				*!	
☞ [ˈaː.zma]					*

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If we introduce the sibilant-specific IDPRES(VOI)[-SIB] and ID(VOI)[-SIB] constraints in the system – which means that sibilants are not involved in voicing faithfulness – the previous ranking pattern changes: the sibilant-specific IDENT(VOI) constraints take the place of the non-specific IDENT(VOI) constraints which, instead, go to the end of the ranking. In this way, the tautosyllabic /tr/, /pr/ and /kr/ clusters will not undergo voicing through the AGREE-C(VOI) constraint, but the tautosyllabic /s/ plus voiced consonant or sonorant clusters will.

The CODACONDITION(ITALIAN) may somewhat complicate the analysis, since according to the description in (77f) /s/ is accepted coda position. In a similar way, the candidate [ˈaz.ma] of the analysis in (84b) will also win, but Italians usually lengthen the stressed vowel before the /sC/ cluster in the word *asma*, so this winning candidate is suboptimal.[100] In my proposal /sC/ clusters may be parsed as heterosyllabic in Italian even if /s/ in coda violates the CODACOND constraint (since all constraints are violable in OT). That is, from here we rephrase the CODACONDITION(ITALIAN) constraint which in the following analyses will not tolerate /s/ in the coda, only half-geminates and sonorants (but, as we will see, /s/ may behave in Italian phonology as a sonorant as well). With the new constraint ranking introduced in Tableau (84) the order among ID(VOI) and VA is the same as in classical voice languages: i.e., VA precedes the faithfulness ID(VOI) constraints, apart from those specified for [-sib].

In the next tableau the target word *backslash* will be analysed, which showed a very interesting optional s-voicing in the dataset: the medial complex consonant cluster /ksl/ was realised by the Italian informants as both [ksl] and [kzl], but never as [ɡzl], which would be expected once the /s/ underwent voicing. We may assume that the (often intraspeaker) variation of voicing or devoicing in the case of /sl/ is due to the vacillation of /sC/ as a tautosyllabic or as a heterosyllabic cluster: in this case s-voicing appears to be possible only if the /sC/ cluster is parsed into the onset. Tableau (85) contains a first approach to s-voicing in this word.

[100] The length of the main stressed vowel generally vacillates before /sC/ clusters in Italian, e.g. (It.) *p*[ˈa]*sta* / *p*[ˈaː]*sta* ‘id.’ (cf. Huszthy 2013a, 2016a). Since the foot is maximised in two morae (Krämer 2009: 179), the variation of stressed vowel lengthening is probably in connection with the syllabification of the /sC/ clusters: when the preceding vowel is long, /sC/ is tautosyllabic (viz., the coda position of the stressed syllable cannot be filled because of the long vowel), otherwise it is heterosyllabic.

Tableau (85) *Unexpected s-voicing in the target word* backslash

bac/ksl/*ash*	ID(VOI) [-SIB]	CODA COND	AGREE-C (VOI)	IDONS (VOI)	ID(VOI)
[k.sl]		*	**!		
[ks.l]		**!	**		
☞ [k.zl]		*	*	*	*
[kz.l]		**!	*		*
[g.zl]	*!	*		*	**

According to the analysis in Tableau (85), s-voicing may take place even when /s/ stands after a voiceless obstruent. Candidates [ks.l] and [kz.l] are excluded from the analysis by violating the coda condition twice; otherwise, these candidates would fail even if /s/ was permitted in coda by the CODACOND, since Italian does not have branching codas.[101] Another possibility is to treat /s/ as an extrasyllabic element: [k.s.l], even if this move leaves many questions unanswered. Nevertheless, this may well be what happens when /s/ does not get voiced; in a few of the recordings the informants omit /s/ altogether: *ba*[kl]*ash*; while in others they leave a very small silence (about 2-5 milliseconds) after /s/ in the cluster (without introducing a schwa); in the latter case /s/ never gets voiced. But if we adopted [k.s.l] as a candidate in Tableau (85), it would win the analysis, and the output with s-voicing would fail. Apparently, with the analysis in (85) we cannot allow s-voicing to be optional in the word *backslash*.

In Tableau (86) below a complex OT-analysis is offered of regular s-voicing (86a), presonorant s-voicing (86b), the absence of RVA (86c) and optional presonorant s-voicing in *backslash* (86d) (cf. Huszthy 2016c: 448). Besides the constraints used previously, now s-[son] appears as well, which demands /s/ to become a sonorant consonant before another sonorant consonant (cf. Baroni 2014; Huszthy 2016c). The sonorant-like behaviour of /s/ is an alternative explanation for presonorant s-voicing in Italian, which circumvents assimilatory processes and voice spreading phenomena. As we will see at the end of this section, s-[son] may offer a better explanation for preconsonantal s-voicing than AGREE-C(VOI), since the former constraint appears to be less speculative than the latter.

[101] A good argument against branching codas in Italian is offered by a few words which lexically end in two consonants, but always have a final schwa in the Italian pronunciation: *nord* [ˈnɔrdə] 'north', *est* [ˈɛstə] 'east', *ovest* [ˈɔːvestə], *film* [ˈfilmə], etc. (cf. Section 1.2.4.3.3). The final schwa is lexicalised in these words, so they never surface in Italian as monosyllabic (cf. Huszthy 2016d: 176).

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Tableau (86) *Complex OT-analysis of Italian voicing patterns in consonant clusters*

a) /sb/*arra*	IDONSET (VOI)[-SIB]	ID(VOI) [-SIB]	AGREE-C (VOI)	VA	*VOI	s-[son]
[sb]arra			*!	*	*	
☞ [zb]arra					**	
[sp]arra	*!	*				

b) *a*/sm/*a*	IDONSET (VOI)[-SIB]	ID(VOI) [-SIB]	AGREE-C (VOI)	VA	* VOI	s-[son]
☞ a[zm]a					*	
a[sm]a			*!			*

c) *vo*/dk/*a*	IDONSET (VOI)[-SIB]	ID(VOI) [-SIB]	AGREE-C (VOI)	VA	* VOI	s-[son]
☞ vo[dk]a			*	*	*	
vo[tk]a		*!				
vo[dg]a	*!	*			**	

d) *ba*/ksl/*ash*	IDONSET (VOI)[-SIB]	ID(VOI) [-SIB]	AGREE-C (VOI)	VA	* VOI	s-[son]
☞ ba[ksl]ash			**			*
☞ ba[kzl]ash			*	*	*	
ba[gzl]ash		*!			**	

In the complex tableau in (86) we see the optimal realisation of four different inputs according to the laryngeal phonology of Italian. Example (86a) is from the native vocabulary of Italian, *sbarra* 'barrier', showing word-initial preconsonantal s-voicing, due to ID(VOI)[-SIB] and AGREE-C(VOI), which eliminate candidates with devoicing or non-realised s-voicing. The situation is similar in (86b), where presonorant voicing occurs word-internally, as we have seen in Tableau (84b). In the word *vodka* in (86c) there are no sibilants – consequently, the high ranked faithfulness constraints preserve the voice values of the input in the winning candidate.

The most interesting case is (86d), of course, where two optimal candidates appear, since both violate the four lower constraints in different combinations but with the same number of total violations. The s-[son] constraint is supposed to be low ranked here, so it may have a role only under specific conditions, like in the case of *backslash*. Apparently, /s/ before /l/ and after /k/ may appear as entirely voiced only if it behaves as a sonorant, as in (86d), where two optimal candidates are generated: one without s-voicing, where the voicing of /s/ is probably blocked by the previous voiceless obstruent; and one in which /s/ acts as a sonorant.

However, we also have another possibility to analyse preconsonantal s-voicing and the absence of RVA together, as in Tableau (86). As a matter of fact, if we presume that the s-[son] constraint has a higher position in the ranking (which equals that of VA), the AGREE-C(VOI)

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constraint practically becomes unnecessary. If we eliminate AGREE-C(VOI) from the constraint list and replace it with s-[son] in Tableau (86), the evaluation brings the same results. In this way we can dispose of a constraint which is phonetically problematic, since sonorants do not have distinctive [voice], that is, they are not supposed to trigger voicing in obstreunts. If we presume that presonorant s-voicing is only due to the s-[son] constraint, we can also make a difference between RVA and presonorant s-voicing, since the latter phenomenon is not considered an assimilatory process in this view.

In conclusion, the input-preserving faithfulness constraints are high ranked in Italian, because of the conservatism of Italian phonology. Despite the strong preservatory tendencies of Italian, sibilants seem to be exceptional, and as a result, they may be affected by voicing, both in intersonorant position (cf. the *VsV constraint in 78a) and before voiced consonantal segments. If we were to include the aspiration processes of Italian voiceless stops too, we would need further constraints, such as SPECIFY, which requires obstruents to be specified for a laryngeal feature, so they cannot remain voiceless if unaspirated (Petrova *et al.* 2006). Obviously, the OT-analyses seen in Section 3.3 do not offer a definitive solution to the issue of preconsonantal s-voicing and the absence of RVA in Italian phonology – they only provide a tentative approach to the phenomenon. These analyses are still strongly connected to the diachronic aspects of the Italian laryngeal system, so several further refinements are required to more appropriately reflect the current synchronic tendencies attested in the data.

3.4 An "alternative" Laryngeal Relativism-account: Italian as an *h-language*[102]

In the previous section Italian was analysed as an exceptional voice language which lacks voice assimilation. However, as it has already mentioned in Sections 3.1 and 3.2, the peculiar laryngeal phonology of Italian also permits an "alternative" theoretical analysis which will be proposed in this section. The background phonological frameworks of this approach are Government Phonology's Element Theory (Kaye, Lowenstamm & Vergnaud 1985; Harris 1990, 1994; Scheer 2004; Kaye 2005; Balogné Bérces 2017; etc.) and Laryngeal Relativism.

Cyran (2011, 2012, 2014, 2017a, 2017b) has recently proposed an extension of Laryngeal Realism, which he calls "Laryngeal Relativism". The idea is that as long as a sufficient phonetic distance is kept between two sets of obstruents (e.g., voiced-voiceless,

[102] Chapter 3.4 draws heavily on Balogné Bérces & Huszthy (to appear).

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aspirated-unaspirated, etc.) to maintain phonological contrast, both the marked and the unmarked sets may receive any (more or less arbitrary) phonetic interpretation. That is, phonetic interpretation is partly phonological. He also claims that it may even be the case that two laryngeal systems which are phonetically identical, stem from two phonological settings in which the marked/unmarked relation is reversed.

As Balogné Bérces and Huszthy (to appear) claim, Cyran's Laryngeal Relativism may practically predict the situation of Italian, if we consider it an *h-language* (see the definition in Section 3.4.1), rather than an *L-language* (that is, a voice language). In Section 3.4.1 the theoretical framework will be described, while in Section 3.4.2 we will attempt to reanalyse the laryngeal phonology of Italian in a Laryngeal Relativism approach.

3.4.1 *L-languages*, *H-languages* and *h-languages*

In Sections 1.2.1 and 3.2 we have discussed the laryngeal typology of languages established by Laryngeal Realism; however, LR is not the first approach which aims to sort phonological systems into two laryngeal categories. Element Theory (ET) is the subtheory of melodic representations in Government Phonology (GP), which – as opposed to the classical generative theory of binary distinctive features (which originally comes from structuralism) – presumes that every phonological property is privative, that is, unary. ET has long made a laryngeal categorisation of languages similar to that of LR, in fact, Harris (1994) claims that in languages like Romance (i.e., voice languages in LR) the element **L** (for low tone in vowels and active voice in obstruents) is active in the lenis series and the fortis set is unmarked; while in languages like English or German (i.e., aspiration languages in LR) the element **H** (for high tone in vowels and voicelessness or aspiration in obstruents) marks fortis, and lenis is unmarked.

Balogné Bérces & Huber (2010a, 2010b) claim that, in an LR-approach, aspiration languages do not provide real evidence of laryngeal activity (intended here as [voice] and RVA), which is in sharp contrast with the situation of voice languages; that is, these are two completely different mechanisms, which require special representations. Balogné Bérces & Huber (2010a) conclude that while voice is melodic in voice languages, aspiration is a general property of fortis consonants in aspiration languages, and they propose that aspiration is dominant obstruency (which is represented by the element **h** in ET). Consequently, aspiration/[spread glottis] has to be represented by the element **h**, too, which dominates the phonological expression. The details of their analysis are irrelevant here, but the claim is that

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the laryngeal properties of aspiration languages are not melodically represented, and, instead, they translate as the special function of **h**.

So as to explain the importance of **h** in laryngeal typology we have to consider first Cyran's Laryngeal Relativism. Cyran (2011, 2012, 2014) argues for the relevance of Laryngeal Relativism with his mother tongue, Polish, whose two major dialect groups, Warsaw Polish and Cracow Polish (practically northern vs. southern varieties), differ phonologically but are phonetically identical in terms of laryngeal features (also cf. Rubach 1996). Warsaw Polish is analysed as a "classical" voice language (that is, in terms of ET, an "L-system"), while the phonetically identical system of Cracow Polish is analysed as an "H-system", with phonologically active **H** rather than **L**. Both dialects exhibit RVA, interpreted in this approach as L-spreading in Warsaw Polish and as H-spreading in Cracow Polish. The fundamental difference between the two systems is that Cracow Polish presents a process which is generally considered in descriptions as "cross-word pre-sonorant voicing", which must be due to its being an H-system with unmarked lenis obstruents that undergo passive voicing in sonorant contexts. Cyran arrives at a typology in which Warsaw Polish, and generally Slavic and Romance languages (as well as, supposedly, Hungarian) are L-systems with evidence of phonologically active **L**; while Cracow Polish (as well as Germanic languages) are H-systems with phonologically represented **H**.

In our case, Cyran had a crucial innovation which can also be employed for the case of Italian, since he redefined the category of H-systems, "originally" corresponding to Germanic-type aspiration languages. In his system, languages like Cracow Polish have active **H** that spreads. While he is able to elegantly treat laryngeal systems with apparent "cross-word pre-sonorant voicing", for instance, in (standard) English and German, no laryngeal activity in the form of any kind of spreading is attested, which rather suggests the absence of any laryngeal element. If aspiration/fortisness in aspiration languages is the special function of **h**, then actually three types of phonological systems can be identified, rather than two: in addition to Cyran's L- and H-systems, Balogné Bérces (2017) also assumes the existence of the category of the so-called h-systems (also cf. Balogné Bérces & Huszthy to appear).

The category of h-languages practically coincides with that of aspiration languages in the classical LR-typology, like most varieties of English and German. In these languages the fortis and lenis sets differ in structural aspects, and there is no laryngeal spreading (that is, voice assimilation). Although traditional descriptions report utterance-initial and final (partial) "devoicing" and word-medial "bidirectional devoicing" of lenis obstruents in, for instance, Standard English, under the LR assumption the aspiration of fortis as well as the voicelessness

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of lenis are underlying – that is, “devoicing” in such languages is not a process but the emergence of the input form. Its analysis as “devoicing” actually results from the false assumption that the lenis set is underlyingly voiced (cf. Section 3.1.1). On the contrary, the lenis series is underlyingly unmarked, which accounts for the apparent cases of devoicing, but which also explains why we can get voiced lenis obstruents in intersonorant position, as a result of passive voicing.

According to Balogné Bérces & Huber (2010a, 2010b) and Balogné Bérces (2017), the h-systems can also include languages whose laryngeal phonology has always been a riddle for phonologists, like Swedish (which would be an H-system in Cyran’s Laryngeal Relativism). In fact, if the sufficient discriminability in production and perception is a major driving force in the phonetic implementation of phonological contrasts (also cf. Cyran 2012), languages with voiced lenis series and heavily aspirated fortis series may belong to the same h-system. For instance, Swedish exemplifies the typical Germanic pattern, except for the fact that its lenis obstruents are fully voiced even in utterance-initial position, which has led researchers to classify it as a separate category (cf. Ringen & Helgason 2004; Helgason & Ringen 2008). However, Balogné Bérces (2017) suggests that this is only to enhance discriminability to a degree beyond the minimally required “sufficient”; that is, Swedish simply “overshoots” the phonetic distance required for discriminability, but phonologically it remains an h-system: this is indeed a normal effect of Laryngeal Relativism.

The category of L-languages exactly coincides with that of voice languages in the classical LR-typology, such as Slavic and Romance languages, Hungarian, etc. Since in these languages the **L** element is characterised by phonological activity (i.e., underlying voice which spreads), they have RVA. At the same time, they lack passive voicing, since the voicing of an unmarked would lead to subminimal phonetic distance, so even if they also have word-final delaryngealisation (i.e., final devoicing, as in many Slavic languages and in certain Romance languages as well), they will not exhibit “cross-word pre-sonorant voicing”.

Finally, when the marked series of obstruents contains the **H** element, we arrive at Cyran’s H-systems, i.e., languages or varieties like Cracow Polish (to which we could add, for instance, Slovak, Catalan, West Flemish, Ecuadorian Spanish, that is, varieties with “cross-word pre-sonorant voicing”). Since the phonetic interpretation is assumed to be arbitrary, the presence of **H** does not in itself guarantee the presence of aspiration; at the same time, **H** is a prime that is able to spread; therefore, H-languages will exhibit voice assimilation, unlike h-languages. If such languages also have final obstruent delaryngealisation, they also exhibit cross-word passive voicing manifested in “cross-word pre-sonorant voicing”. In

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addition, the non-existence of an inactive laryngeal prime implies that a system which is binary but exhibits no RVA will necessarily be an h-system, with the fortis set stably located near the aspirated end of the VOT continuum, and the lenis set fundamentally voiceless but subject to passive voicing. This may be the case that we also find in the laryngeal system of Italian.

3.4.2 An attempt to recategorise Italian laryngeal phonology

On the basis of what has been developed in Section 3.4.1, the laryngeal characterisation of Italian may be due to a combination of phonological structure and phonetic implementation, that is, Italian may be analysed as an h-system with virtually no aspiration in the fortis series.

The usual classification of Italian as an L-system (that is, a “true” voice language) is primarily based on two arguments. Firstly, on (impressionistic) evidence of its phonetics, which present fully voiced lenis and voiceless fortis obstruents: these patterns suggest that it belongs to the same type as, for instance, French, Spanish or (typical) Slavic languages. Secondly, it is supposed to have carried its laryngeal properties throughout its history as part of its genetic inheritance as a Romance language. However, neither of the two arguments is strong enough to be decisive from a synchronic phonological point of view. The first argument cannot be accepted as evidence in phonology according to Laryngeal Relativism; while the second argument can easily be refuted through diachronic laryngeal modifications found in other languages, e.g., Cracow Polish and Scottish English, which have descended from an ancestor shared by the other varieties, but today diverge from those varieties in their laryngeal settings.

On the basis of the empirical data collected for this dissertation, we can decide where Italian really belongs, or, in fact, whether it can be categorised at all. As it has been shown in Chapter II and in Section 3.2, from a phonetic point of view we find substantial voicing in lenis obstruents and voicelessness in the fortis set; phonologically, however, we fail to identify true laryngeal activity in the data, as no assimilation (i.e., feature spreading) is detected in the vast majority of the informants’ outputs. In the present system, this suggests that Italian can be categorised as an h-language, making phonetic use of the sufficient discriminability between fully voiced and voiceless unaspirated (or mildly aspirated).

As is clear from the data presented in Chapter II, the most common strategy of Italian speakers is the preservation of the underlying voice values in obstruent clusters. The two-thirds majority of NoVA cases, found in the data, characterises the performance of all the informants rather evenly – there is no considerable difference between “repairers” and “non-repairers”.

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The only slight variation is found in terms of geographical region: speakers coming from the south of Italy avoid VA more systematically, but even the informants from northern and central regions all leave more than a half of the clusters unrepaired (cf. the statistics of Section 2.2.1.5). This indicates that voice assimilation is not an integral part of the phonological system of varieties of Italian.

At the same time, speakers also use RVA in 15% of the overall data, which is not insignificant: RVA seems a real, but suboptimal strategy for Italians to resolve these clusters. However, if we zoom into this phenomenon, it seems rather unbalanced as far as its result as voicing vs. devoicing is concerned: among the total occurrences of RVA, 28% of voicing and 72% of devoicing are found (as represented in Diagram (32) in Section 2.2.1.1). We also found a non irrelevant amount of progressive devoicing in the data (see Diagram (31) in Section 2.2.1.1, moreover, Section 3.1.1): it is applied in 9% of all non-/sC/ input clusters. Although it seems the least used strategy in the overall examination of the data, we must notice that it is highly restricted in its occurrence, being relevant in the TD environment only, i.e., when the voiceless input obstruent precedes the underlyingly voiced one. If we take a look only at the target words which allow for the strategy of PD (i.e., words with voiceless plosive – voiced plosive, voiceless non-sibilant fricative – voiced plosive, and voiceless plosive – voiced affricate sequences in the input), we can see it in inverse ratio to RVA: if speakers have the choice between the two processes (namely, PD and RVA in the TD context), they clearly prefer PD to RVA (cf. Diagram (33) in Section 2.2.1.1). To sum up the findings from the dataset, even though Italian exhibits substantial voicing in its lenis obstruents, while its fortis set is basically voiceless unaspirated (or, rather, mildly aspirated), it does not resort to systematic RVA as a repair strategy in loanwords and foreign accent as is usual in voice languages. Instead, the vast majority of input obstruent clusters remains unrepaired. Even in the cases when apparently some process applies, it produces voiceless outputs, be it devoicing RVA or PD.

We may notice, however, that this characterisation is reminiscent of what is described in Section 3.4.1 above as the profile of h-languages. If approached on the basis of their spelling, they exhibit "bidirectional devoicing" (rather than RVA); phonologically, however, they are better analysed as having voiceless unaspirated lenis and voiceless aspirated fortis underlyingly, with no true laryngeal activity. The "devoicing processes" they appear to display are not processes at all, since the voiceless forms are not derived but underlying. Italian seems to match this description. In fact, the study also confirms that lenis voicedness in Italian is firmly maintained in sonorant environments only, and it is frequently "lost" next to a fortis obstruent (manifested in apparent cases of "devoicing RVA" and "PD"). That is, it is passive voicing –

unexpected from an L-language but a regular feature of h-systems. The only considerable difference between Italian and, for instance, English, is the phonetic implementation of these obstruents: the absence of heavy aspiration.

Eventually, the slight aspiration found in voiceless Italian obstruents in the corpus (described in Section 3.2.4, cf. boxplots (70), (71) and (72)), may acquire phonological importance. In fact, the fortis set shows a degree of overall aspiration that falls between the standard values of “ordinary” L-systems like Slavic or Hungarian and h-systems like most Germanic languages. The constrast among a prevoiced lenis set and a mildly aspirated voiceless fortis set of obstruents is similar to the case of Swedish: apparently there are languages which “overshoot” the minimal phonetic distance which is required to obtain the laryngeal contrast among obstruents (cf. Section 3.2.4). In conclusion, Italian – which is usually considered an ordinary Romance language (and as such, an L-system) – has several laryngeal peculiarities; nevertheless, it can also be analysed as an h-language, which may explain these peculiarities, and this option is actually predicted by Laryngeal Relativism.

On the basis of the theoretical analyses developed in Sections 3.3. and 3.4, we may conclude that the singular laryngeal phonology of Italian can be analysed in opposing ways. We can consider Italian a voice language (similarly to other Romance languages) which lacks RVA for reasons of input preservation: OT is a suitable system to analyse Italian this way. We may also note that we could probably analyse Italian in an OT-account as an aspiration language, too. Nevertheless, the framework of ET combined with Laryngeal Relativism is more convenient for considering this option, as we have seen in Section 3.4. However, in the ET-approach this is the only analytical option available, and it is impossible to analyse Italian as a voice language (or rather an L-language). Because of the representationally based prerequisites of the model, if we do not find RVA in the system, we are unable to identify the active L-element, which leads us to the analysis of Italian as an h-language.

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Chapter IV

4. Conclusions

In this dissertation I have been investigating the synchronic patterns of the laryngeal phonology of Italian, especially focussing on voice assimilation. According to the literature (cited in various parts of the previous sections), Italian seems to be a regular Romance language, classified in an LR approach as a voice language. Still, if we analyse its laryngeal properties in detail, plenty of irregularities arise which contradict this generalisation.

In Section 4.1 we summarise the phonetic and phonological findings of this study as compared to the results of the literature. In Section 4.2 we examine whether voice assimilation can be acquired by Italians through language contact; finally, in Section 4.3 we give indications to further research in the field.

4.1 Summarised results

In the second chapter of the dissertation acoustic and statistical evidence was offered in order to demonstrate that Italians tend to retain underlying voice values in obstruent clusters. In the subsections of Section 2.1.1 various non-/sC/ obstruent clusters were shown in Praat figures which demonstrate the adjacency of completely voiced and completely voiceless obstruents in the pronunciation of different Italian informants. Similar non-assimilated obstruent clusters may arise in the case of other voice languages, too (such as in Hungarian), especially in spontaneous speech or when the obstruent clusters are interrupted by pauses (cf. Markó, Gráczi & Bóna 2010; Mády & Bárkányi 2015). However, the Italian data shown in Section 2.1.1 is unusual even in this respect. Apparently, Italians are able to preserve the underlying voice values even when the obstruents of the clusters are perfectly coarticulated; for instance, in the case of homorganic stop + stop clusters, as in Figures (6) and (10), or in clusters with fricatives, as in Figures (12), (13), (14) and (15).

In the subsections of Section 2.1.2 /sC/ clusters were shown which, according to the literature (cf. Bertinetto 1999a, 1999b; Bertinetto & Loporcaro 2005: 134; Krämer 2009: 207; etc.), are supposed to undergo s-voicing in the phonology of Italian when C is voiced. On the other hand, we have seen in Figures (22), (23) and (24) that the expected s-voicing may be absent in word-internal /s/ plus voiced obstruent clusters. Sonorants can also trigger s-voicing

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in Italian (even if it is phonologically problematic, since sonorants are generally considered as unspecified for [voice]), as it has been discussed in Section 2.1.2.2. In Figure (28) evidence has been shown for s-voicing triggered by glides, which is a novelty in the phonetic and phonological description of Italian. Figure (29) represents a remarkable pronunciation of the target word *backslash*, with s-voicing before the sonorant [l], but without voice-spreading from the voiced [z] to the previous [k]: *ba*[kzl]*ash*. Such realisations suggest that the phenomenon of Italian preconsonantal s-voicing differs phonologically from RVA. In conclusion, this preconsonantal s-voicing process has been declared stabilised in word-initial position, but word-internally it seems to be optional.

In Section 2.2.1.1 statistical analyses demonstrate that the lack of RVA is not accidental in the Italian data. On the whole – as summarised in Chart (30) and shown in Diagram (31) – 65% of the total occurrences of non-/sC/ obstruent clusters surface in the pronunciation of the informants with opposite voice values. In 15% of the cases RVA appears, while 9% of the relevant data exhibit progressive devoicing (the remaining 11% are composed of deletions, mispronunciations and other alternative realisations). If we specifically focus on the occurrences of RVA, we see a rather asymmetric distribution of the phenomenon – in fact, in 72% of the cases devoicing happens. If we confront only the 28% of voicing by RVA with progressive devoicing (i.e., in the target words with TD, FD and T$\widehat{DZ}$ clusters, as shown in Diagram (33)), we find PD in 17% of the cases, and RVA only in 8%. These results suggest that speakers prefer the strategy of PD over voicing by RVA; while in the great majority of the cases (65%) the clusters still surface with oppositely voiced obstruents.

A control group of Hungarian informants (fluent speakers of Italian as L2) also participated in the study, and their results are shown in Diagram (34). The Hungarian control informants used RVA in 81% of the Italian target words, while 10% of deletions, 5% of progressive devoicing and 4% of NoVA cases also occurred. The comparison between the Italians' and the Hungarians' results helps us to conclude that the laryngeal behaviour of these two groups of speakers differs in fundamental ways: Hungarians prefer to apply RVA when they encounter differently voiced obstruents in clusters, while Italians prefer to retain the underlying voice values of the obstruents.

In the final subsections of Section 2.2 different phonetic and sociolinguistic issues were addressed which might influence the distribution of the cases of RVA in the target words, or help the preservation of the underlying voice values. Surprisingly, the places and manners of articulation of the obstruents did not prove to be significant in this respect (Section 2.2.1.2), and apparently the position of the word stress is not relevant, either (Section 2.2.1.3). At the

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same time, word frequency in language use appeared to be a relevant factor (Section 2.2.1.4). The target words were sorted in Chart (39) according to their frequency in language use; and as it turned out, frequently used words allow a significantly larger number of cases of RVA than infrequent words (cf. Diagram (40); the possible phonological consequences of this fact are discussed in Section 4.2).

Section 2.2.1.5 includes a dialectal comparison between the results of Northern Italian, Central Italian and Southern Italian speakers. The proportions of the strategies used by the northern and the central speakers are very similar; however, Southern Italians apparently display much more conservative laryngeal behaviour; in fact, they retain underlying voice values in 82% of the obstruent clusters and apply RVA only in 6% of the cases (cf. Diagrams (42), (43), (45) and Chart (44)). They also use much fewer deletions (5%) compared to the northern and the central informants (15%), but the number of schwa epentheses is also significantly higher in the case of the southern speakers (32%).[103]

The statistics which regard /sC/ clusters (discussed in the subsections of Section 2.2.2) show quite balanced results between realisations with and without s-voicing. Apparently, s-voicing applies regularly in word-initial position, but it is optional word-internally, both before voiced obstruents and sonorants (cf. Charts (47), (49), (50), (51), (52), (54), (55), (56), (57) and Diagrams (48), (53), (58)). These results confirm our claim that Italian preconsonantal s-voicing seems to be phonologically different from RVA in synchrony.

In the third chapter of the dissertation various phonological approaches are offered so as to structurally explain the data presented in Chapter II, proceeding towards more and more theoretical interpretations. In Section 3.1 a Laboratory Phonology-approach is provided, which still remains on the practical ground of the dataset. In its subsections so-called “phonetic repair strategies” are analysed, which help the informants to avoid or replace RVA in the obstruent clusters. The massive appearance of these strategies suggests that the lack of RVA is phonetically problematic for the speakers, who need to somehow repair the clusters, e.g., through the aspiration of voiceless stops before voiced ones (cf. Section 3.1.2), through partial voicing (cf. Section 3.1.3), through the reordering of the obstruents by metathesis (cf. Section 3.1.4), etc. Preconsonantal stops are often released in the Italian informants’ pronunciation

[103] According to these dialectal differences, the two opposite phonological interpretations of Italian laryngeal phonology (in OT in Section 3.3 and in ET in Section 3.4) are also dialectally motivated. In fact, the OT-account suits the Southern results more, which show significantly stronger phonological conservatism; on the other hand, the Laryngeal Relativism-account in ET suits the northern results more, where far more cases of progressive devoicing are attested.

(release burst is discussed in Section 3.1.6). However, I argued that the lack of coarticulation does not necessarily contribute to the lack of RVA in these cases, which is also confirmed by Cavirani (2018)'s data, where RVA also targets non-coarticulated obstruent clusters in the Emilian dialects of Italian (cf. Section 4.3; also cf. Cavirani & Hamann in prep.).

The phenomenon called "preconsonantal obstruent gemination" – which was discovered during the present research (and was also discussed in some previous case studies, cf. Huszthy (2015a), (2015b)) – is particularly interesting (cf. Section 3.1.5). This strategy appears mostly in the pronunciation of the Southern Italian informants, who typically lengthen the obstruents which precede another one. From a phonological point of view this is a fortition process which helps the preservation of the input obstruent, instead of deleting or assimilating it in the preconsonantal position. That is, preconsonantal obstruent gemination is an additional conservative phonological process of Southern Italian varieties.

In Section 3.2 an attempt is made to reconcile the laryngeal phonology of Italian with Laryngeal Realism. On the basis of the phonetic characteristics of Italian initial stops (cf. Section 3.2.1) – which is the standard method to categorise languages in the framework of LR – Italian seems to belong to voice languages (similarly to the other Romance languages), since the lenis series of stops is prevoiced (as shown in Figure (65)). However, in the fortis series of stops a small amount of aspiration is found in the data (cf. Section 3.2.4; and also cf. Stevens & Hajek 2010a; Nodari 2015). Therefore, the laryngeal system of Italian is somewhat similar to that of Swedish, an aspiration language where a prevoiced lenis set is in contrast with an aspirated fortis set (cf. Ringen & Helgason 2004; Helgason & Ringen 2008). Even though the voicing contrast between the Italian obstruents (discussed in Section 3.2.2) and the history of Italian preconsonantal s-voicing (discussed in Section 3.2.3 and in its subsections) suggest that Italian is an exceptional voice language, rather than an exceptional aspiration language, the aspiration in the fortis series and the frequent cases of progressive devoicing lead us to examine the other possibility, too.

Consequently, in the last two sections of Chapter III two opposite theoretical approaches are offered to the synchronic laryngeal phonology of Italian. In the Optimality Theoretic account of Section 3.3 Italian is seen as an exceptional voice language which lacks voice assimilation, unlike "regular" voice languages. OT is a very popular framework in laryngeal phonology, so in Section 3.3.1 a considerable number of constraints are collected from the literature, which one can resort to during the analysis of Italian as well. In this approach the synchronic conservatism of Italian phonology (which is particularly intense in the case of the Southern Italian informants, cf. footnote 103) is seen as an input-preserving attitude, that is,

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speakers prefer to extend the input forms to avoid their being subjected to deletion or assimilation (that is, RVA in our case).

In Tableaux (75) and (76) the typical laryngeal constraint rankings of voice languages and aspiration languages are illustrated, respectively. The ranking established for Italian (cf. the list in (81) and Tableau (82)) is more similar to that of voice languages, with the main difference that the markedness constraints which are responsible for voice agreement (such as VA) are lower ranked. On the other hand, faithfulness constraints, which preserve the elements in the input, are very high ranked: this explains the "asymmetric conservatism" of Italian phonology, which allows insertion but punishes deletion or assimilation (insertion processes – such as schwa epenthesis or preconsonantal obstruent gemination – are seen in this approach as fortition phenomena which help the complete preservation of the input segments).

Preconsonantal s-voicing is expressed in OT through the high ranked sibilant-specific subconstraints of the IDENT(VOICE) faithfulness constraint family (cf. (78b), (78c)). Accordingly, preconsonantal /s/ is exceptional in Italian even as far as its phonological conservatism is concerned; that is, /s/ readily changes its voice value, unlike any other obstruent (cf. the analyses in Tableaux (84), (85) and (86)). Furthermore, presonorant s-voicing can also be motivated by another constraint, s-[son] (78d), which requires /s/ to behave as a sonorant in presonorant position (cf. the analysis in Tableau (86)). Another possibility to capture preconsonantal s-voicing in OT is through syllable structure. If we suppose that /sC/ clusters can also be parsed as tautosyllabic in Italian phonology (cf. Bertinetto 1999a, 1999b; Huszthy 2016a, 2016b), we are able to explain preconsonantal s-voicing through Baković (2005)'s AGREETAUTO(VOI) constraint, which requires tautosyllabic obstruent sequences to have the same specification for [voice]. However, this explanation is problematic, given that the syllabification of /sC/ clusters is apparently unpredictable in Italian (Bertinetto 2004).

The ET-based Laryngeal Relativism-account presented in Section 3.4 is a radically theoretical explanation of the lack of RVA in Italian phonology. In this approach Italian is seen as an unusual type of aspiration language, more precisely, an h-language in the ternary typology of languages with a bidirectional laryngeal opposition (Balogné Bérces 2017; Balogné Bérces & Huszthy to appear). The mild aspiration found in the fortis series of stops and the frequent cases of "progressive devoicing" (cf. Sections 2.2.1.1 and 3.2.4) also justify this idea. If we analyse the laryngeal system of Italian as that of an h-language, these phonetic manifestations are not surprising. The voicing opposition is built upon a prevoiced lenis set (whose voicing is in fact passive) and a slightly aspirated fortis set. Consequently, RVA is not even expected in Italian in this approach, since it cannot exhibit true laryngeal activity.

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4.2 Outlook: Can RVA be acquired?

The laryngeal phonology of languages is particularly sensitive to language contact (cf. Balogné Bérces & Huber 2010b). The laryngeal patterns of a dominant, superstrate language can easily affect minor, substrate languages around, for instance, Canadian French has lost active voice in the lenis series, while Brazilian Portuguese speakers who have spent considerable time in the USA pronounce the fortis series with larger VOT values (Helgason & Ringen 2008: 620). Various diachronic examples attest, too, that languages can change their laryngeal patterns under the influence of other languages, for instance, several dialects of the aspirating Proto-Germanic system have become voice languages at a later stage, such as Dutch, Yiddish and Scottish English varieties.

As far as the Italian data of the corpus is concerned, the mild aspiration found in the fortis series of stops and the preference of progressive devoicing over RVA by the speakers (especially in the case of the northern informants, cf. footnote 103) might also originate in diachronic language contact, through the influence of a Germanic superstratum during the history of the Northern Italian dialects (also cf. Lepschy & Lepschy 1988: 19-20). This is only weak speculation; however, a more relevant synchronic question arises at this point: can Italian speakers acquire RVA through language contact?

We will turn now to the issue of the two Hungarian-Italian near-bilingual informants of the study. As it has been mentioned in Section 2.2.1.5, these speakers speak Hungarian fluently, but with a strong Italian accent, and speak Italian with a native accent (the other Italian informants did not notice any element of FA in their pronunciation). At the same time, their results show far more cases of RVA compared to the other Italian speakers. In my opinion, this fact can be related to their secondary L1, Hungarian, which might have influenced their laryngeal behaviour even when speaking Italian.

If we compare the bilingual informants' results with those of the other Italians, we find categorical differences (cf. Chart (41) of Section 2.2.1.5). The two bilinguals (labelled in Chart (41) as "Rome_f_1" and "Rome_f_2") apply RVA in 47% of the obstruent clusters, while the other Italians only in 11%. On the other hand, NoVA cases amount to 68% in the pronunciation of the informants excluding the bilinguals, while in their case only to 41%. The results of the

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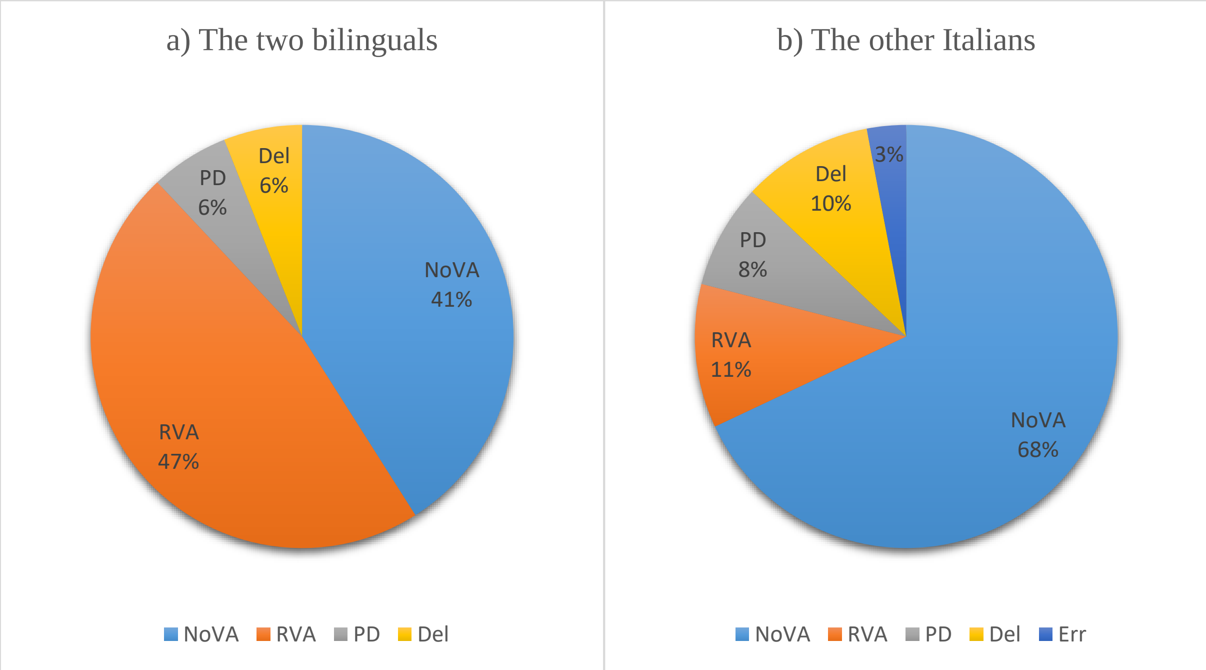
bilinguals and the other Italian informants excluding them are shown in a double pie chart in Figure (87).[104]

Figure (87) *Comparison of the bilinguals' and the other informants' results*



This comparison clearly indicates that the monolingual and the near-bilingual speakers produce significantly different results. A further interesting fact is the asymmetry in the distribution of RVA, as far as voicing and devoicing are concerned. Among the 47% of RVA of the bilinguals far more cases of devoicing can be observed than voicing; exactly 83% of the clusters of a voiced and a voiceless obstruent are devoiced by these two informants (e.g. /DT/ → [TT]), while only 17% of the clusters of a voiceless and a voiced obstruent are voiced (e.g. /TD/ → [DD]). As already referred to in previous sections (cf. Sections 2.1.1.2 and 2.2.1.1), the devoicing-type of RVA seems to be "easier" than voicing, inasmuch as it is more frequent than voicing even in classical voice languages (cf. Markó, Gráczi & Bóna 2010); moreover, the Hungarian control informants of the corpus also used significantly more devoicing than voicing (cf. Section 2.2.1.1). If we hypothesise that the use of RVA as a strategy by the bilingual informants can be due to language contact with Hungarian, we also hypothesise that the acquisition of devoicing by RVA is more effective than that of voicing.

[104] These results slightly differ from those published in Huszthy (2016c: 450) (where the two bilingual speakers' results were compared to two other Italian informants' results), because the data have since been double-checked and revised.

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It is apparent that the bilingual informants use deletion less than the other Italians. Moreover, the number of their schwa epentheses is also smaller; they use this strategy only in 6% of the cases, and only in DT clusters (where the schwa could also belong to the release of the voiced stop before the voiceless one). These results may also be related to the language contact with Hungarian, since the influence of Hungarian may ease the phonotactic restrictions regarding obstruent clusters for these two speakers; in fact, the bilinguals often manage to coarticulate stop plus stop clusters (similarly to the Hungarian control informants), unlike the other Italian speakers. At the same time, the two bilingual speakers' results are far from those of the Hungarian control group (cf. Chart (34) in Section 2.2.1.1), so the supposed impact of Hungarian on their laryngeal system is only partial.

At the same time, the intriguing results of the bilingual informants may suggest that once Italians acquire RVA through a strong contact with another voice language (Hungarian in this case), they are able to add it to their L1 phonological repertoire, and use it in L1 pronunciation. This may be an argument in favour of the assumption that the lack of RVA is ill-formed in Italian phonology, and that voice languages must have RVA in obstruent clusters (in accordance with van Rooy & Wissing (2001)'s claim).

All of these considerations certainly require further support from much more detailed, much more precise statistical analyses and a larger pool of bilingual Italian informants (that is, this is the first indication of the dissertation to further research, cf. Section 4.3); however, we can also draw a further hypothetical conclusion of this study (as an extension to Section 4.1): maybe the absence of RVA is only a provisional situation in the phonology of Italian. This issue has recently been raised by the mass arrival of non-native obstruent clusters in loanwords and foreign proper names, but with the increase of language contacts it may be resolved automatically (Huszthy 2016c: 451).

This observation may gain further support from the case of word frequency in language use: we have seen in Section 2.2.1.4 that infrequent target words do not exhibit RVA at all, while in more frequently used words RVA appears (cf. Diagram (40)). The same situation arises in Section 2.2.2.1 as well, where 19% of the occurrences of the frequently used name *James Bond* are shown to undergo s-voicing, while in other, more infrequent names or target words (such as *Pierce Brosnan* and *silence drive*) no s-voicing is attested in sandhi position. Consequently, language contact and word frequency in language use might both contribute to the expansion of voice assimilation in Italian phonology in the future.

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4.3 Indications to further research

I am convinced that the lack of RVA in Italian offers a quite rich topic for further phonetic and phonological studies, as it has been referred to in previous sections, for instance, in the case of the bilingual speakers (cf. Section 4.2). Of course, the corpus can always be enlarged and the formal analyses can always be improved. Furthermore, two final issues are yet to be considered in this final section of the dissertation, which definitely require further research: the possibilities to gain data about the absence of RVA in Italian from experiments of speech perception, and the case of dialectal RVA found in certain Northern Italian varieties (mentioned in the Preface and in various sections above).

The role of speech perception has recently been reassessed in phonetic and Laboratory Phonology studies (cf. Hume & Johnson 2001; Johnson 2003; Boersma & Hamann 2009a, 2009b; Mády 2013; Cavirani & Hamann in prep.; etc.). Many linguists have demonstrated since the beginnings of modern linguistics (cf. Bloomfield (1933) and Trubetzkoy (1939), among others) that L1 phonology (especially the phonotactic restrictions of the speakers' L1) influences speech perception. An excellent example to prove this claim is provided by Dupoux *et al.* (1999). They tested the perception of Japanese speakers, who had to recognise the nonce word /ebzo/ pronounced by French speakers. Approximately 70% of the Japanese informants confirmed to hear the word as /ebuzo/, with an epenthetic /u/ which splits the /bz/ cluster. These results are without doubt due to the phonotactic restrictions of Japanese, which do not allow obstruent clusters (cf. Cavirani & Hamann in prep.; also cf. Wells 2000).

Cavirani & Hamann (in prep.: 1) claim that the influence of L1 phonology to speech perception is problematic for generative linguistic theories (from SPE until Optimality Theory), since in these approaches "phonotactic knowledge is confined to phonological production, and speech perception is considered extragrammatical". These observations encourage me to continue the examination regarding the lack of RVA in Italian from the aspect of perception.

Cavirani (2018) and Cavirani & Hamann (in prep.) conduct acoustically and perceptionally based inquiries into RVA in certain Gallo-Italic dialects spoken in Emilia-Romagna (the most southern dialectal group of Northern Italy). Emilian dialects are phonotactically exceptional in the Italo-Romance linguistic territory, because they allow highly marked obstruent clusters (cf. Section 3.1.5). Diachronically, a set of non-/sC/ obstruent clusters have evolved in Emilian through unstressed vowel reduction: vowels in weak prosodic position were first reduced to schwa, which subsequently disappeared, e.g. (Lat.) TĔPIDU(M) ‘lukewarm’ > *[ˈteːbədə] > *[ˈteːvədə] > (Bolognese) [ˈtavd] (Cavirani & Hamann in prep.; also cf. Rohlfs 1966; Loporcaro 2011; Cavirani 2015, 2018).

This vowel reduction process offers these varieties various inputs to RVA other than /sC/; some examples from Bolognese (Cavirani 2018: 146; Cavirani & Hamann in prep.) include [(a) ˈ**p**a͡j**z**] ‘(I) weigh’ vs. [ˈ**bz**ɛːr] ‘to weigh’ (with voicing by RVA), [ˈ**b**a**k**a] ‘mouth’ vs. [ˈ**pk**æŋ] ‘mouthful’ (with devoicing by RVA).

However, a few problems also arise with Emilian RVA. Most importantly, the weak-vowel reduction process apparently has not been completed in the phonology of these dialects, that is, the adjacency of the obstruents is not lexicalised. The vowel which diachronically separated the obstruents may still optionally surface as a schwa (e.g. [pəˈdɛːnɐ] ‘platform’); while the first stop is usually shown as released in Cavirani (2018: 149)’s figures (e.g. [ˈbdɛːna] ‘platform’ – with a released [b]), that is, the marked clusters are not coarticulated.

At the same time, this is important for the present study, since it means that the release of the first stop and RVA do not have a bleeding relationship (cf. Section 3.1.6). Furthermore, RVA seems to be optional in Cavirani (2018)’s results;[105] in fact, Cavirani finds several cases when the adjacent obstruents do not undergo RVA in the pronunciation of his informants, retaining the underlying voice values similarly to the data presented in the present dissertation (cf. Chapter II), e.g. [ˈpzɛːr] ‘to weight’, [ˈpdɛːna] ‘platform’, etc. Cavirani (2018: 149) explains the absence of RVA in these cases with the “priming effect” of Standard Italian: this remark is again very useful for the present study, since it confirms my basic hypothesis, viz., Italian lacks RVA, and this lack can also have a “priming effect” on dialectal RVA.

At this point we glance back to the issue of the two Emilian informants of this study (cf. Sections 1.3, 2.2.1.1 and 2.2.1.5). They are 20 and 22-year-old female speakers, from Sassuolo and Mirandola, respectively (province of Modena). Their results do not significantly differ from the other northern (and central – excluding the bilinguals) informants of the loanword experiment (cf. Chart (41)), which is surprising in light of Cavirani (2018) and Cavirani & Hamann (in prep.)’s studies. The reasons may be multiple – first of all, the age of the informants; indeed, Cavirani & Hamann’s 13 informants display an age average of 74 years (moreover, they are all male speakers with one exception). The two young informants of this study are most probably dialectophones to a lesser extent than the elder speakers, which may influence their laryngeal behaviour.

[105] However, more systematic results are shown in Cavirani & Hamann (in prep.)’s paper, supported by perceptional analyses, which suggests that RVA constitutes the regular pattern in Emilian dialects.

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In conclusion, Cavirani & Hamann's studies inspire further data collection on RVA in Italian compared to the Emilian dialects, possibly through both acoustic and perceptional experiments. It would be interesting to find out whether younger Emilian speakers use more RVA in their dialect than in loanwords in an Italian context. Such an investigation would verify the efficiency of the loanword method as well. A further research question could be whether the informants produce different results if we include the target loanwords in both dialectal and Italian contexts; similarly, whether the dialect and (substandard) Italian represent diverging laryngeal systems could also be revealed.

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Appendix: Components of the experimental design

A) The Italian sample texts of the corpus

1. *Risparmia su Bosch Lavastoviglie! Nuova tecnologia Active Water! Il motore Silence Drive garantisce la massima silenziosita. Funzione Upgrade: ottimi risultati di lavaggio!*

‘Save your money with Bosch Dishwashers! New Active Water technology! The Silence Drive motor guarantees maximum silence. Upgrade function: excellent washing results!’

2. *Electrolux Rex: lavastoviglie RealLife dotata di 6 programmi di lavaggio e Wash dry! Opzioni: Time Manager e Multilab. Vassoio con capacita XXL e maxi vasca!*

‘Electrolux Rex: RealLife dishwasher with 6 washing programs and Wash dry! Options: Time Manager and Multilab. Tray with XXL capacity and maxi tub!’

3. *Pierce Brosnan è in azione contro i nordcoreani, nei panni di James Bond. L’agente segreto è alla ricerca di un oggetto di kashmir sudcoreano e lotta con i gangster su un iceberg.*

‘Pierce Brosnan is in action against the North Koreans in the role of James Bond. The secret agent is looking for a South Korean kashmir object and fights the gangsters on an iceberg.’

4. *La McDonald’s Corporation è la maggiore catena di ristoranti fastfood, che offre vari panini a più piani, come il Big Mac, il McBacon o il Big Tasty.*

‘McDonald’s Corporation is the largest chain of fast food restaurants, offering various multi-storied sandwiches, such as Big Mac, McBacon or Big Tasty.’

5. *Tre orsi grizzly sono evasi dallo zoo di Termiz, al confine tra l’Uzbekistan e l’Afganistan. La polizia afgana collabora per la prima volta con quella uzbeca.*

‘Three grizzly bears escaped from the Zoo of Termiz, on the border between Uzbekistan and Afghanistan. The Afghan police collaborate for the first time with the Uzbek police.’

6. *Prossima sfida nella Champions League per i giocatori del telequiz. La Sampdoria gioca contro il Football Club Shakhtar Donetsk.*

‘Next challenge in the Champions League for telequiz players. Sampdoria plays against Football Club Shakhtar Donetsk.’

7. *I raggi X o raggi Röntgen possono essere usati anche in autopsia. I raggi Y invece possono causare eczema, ipso facto.*

‘X-rays or Röntgen-rays can also be used in autopsy. Y-rays, instead, can cause eczema, ipso facto.’

8. *Josh Brolin opta per la Mazda! Nella nuova pubblicità della Mazda l'attore statunitense suona il claxon mentre beve un cocktail con vodka e orange juice.*

'Josh Brolin opts for Mazda! In the new advertisement of Mazda the American actor sounds the horn while drinking a cocktail with vodka and orange juice.'

9. *L'origine della moneta grivna risale ai sovchoz sovietici, alla diffusione delle idee trozkiste e al movimento samizdat.*

'The origin of the hryvnia currency goes back to Soviet sovchoz, to the spread of Trozkist ideas and to the samizdat movement.'

10. *In Südtirol, ossia Sud Tirolo, si ha una subcultura di forte influenza italiana. La società segmentata tuttavia non shifta i confini della convivenza rapsodica.*

'In Südtirol, or South Tyrol, there is a subculture of strong Italian influence. However, the segmented society does not shift the boundaries of rhapsodic cohabitation.'

11. *La guzla è uno strumento musicale balcanico usato anche in Botswana. È presente anche nella musica jazz balcanica, non come negli altri tipi di jazz.*

'Guzla is a Balkan musical instrument which is used in Botswana, too. It is also present in Balkan jazz music, unlike in other types of jazz.'

12. *Il cosiddetto catgut è un filo chirurgico. Ultimamente si usa anche in botanica, con foglie obcordate. Come anche nel caso del ginkgo e del cactus.*

'The so-called catgut is a surgical string. Lately it is also used in botany, with obcordate leaves, such as in the case of ginkgo and cactus.'

13. *L'outdoor training è spesso utilizzato nelle aziende per trattare tecniche legate al team building e alla leadership. Dell'outdoor fa parte anche il softball e il pingpong.*

'Outdoor training is often used in companies which deal with technologies related to team building and leadership. Softball and pingpong are also part of the outdoor activities.'

14. *La cultura azteca fu senz'altro influenzata dal clima subtropicale. Anche se l'etnia ostacolava l'establishment degli outsider.*

'Aztec culture was undoubtedly influenced by the subtropical climate. Even if the ethnic group blocked the outsiders' integration.'

15. *Il genere del Doktor Faustus di Thomas Mann è Bildungsroman, mentre quello del Flauto Magico di Wolfgang Amadeus Mozart è Singspiel.*

'The genre of Thomas Mann's Doktor Faustus is Bildungsroman, while that of Wolfgang Amadeus Mozart's Magic Flute is Singspiel.'

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16. *L'Etna butta il magma come il kalashnikov i proiettili. Ogni eruzione sembra un Blitzkrieg.*

'Etna throws the magma as the Kalashnikov the bullets. Every eruption looks like a Blitzkrieg.'

17. *Vieni a mangiare al Fastfood Krishna, proprio di fronte al Ristorante Backslash! Qui trovi i migliori hotdog e kebab!*

'Come and eat at Fast Food Krishna, right in front of the Backslash Restaurant! Here you can find the best hotdogs and kebabs!'

18. *Dafne Basjad fu una delle fondatrici del movimento apartheid. Era una sportswoman convinta, soprattutto in swimming, ma andava anche con il surfboat e con l'hydrobob.*

'Dafne Basjad was one of the founders of the apartheid movement. She was a committed sportswoman, especially in swimming, but she also practiced surfboat and hydrobob.'

B) Target words with tested phenomena

Target word	Voice assimilation	s-voicing	Final devoicing	Precons. obst. gemination	Schwa epenthesis	Stressed vowel lengthening	Final cons. gemination	Ambiguous word stress
tecnologia				✓	✓	✓		
Active				✓	✓			✓
Upgrade	✓		✓	✓	✓✓	✓	✓	
Electrolux				✓✓	✓✓			✓
Rex				✓	✓✓			
Opzioni				✓	✓	✓		
Multilab			✓		✓		✓	✓
XXL				✓✓	✓✓			
maxi				✓	✓			
Brosnan		✓				✓	✓	
nordcoreani	✓			✓	✓	✓		
kashmir		✓				✓	✓	
sudcoreano	✓			✓	✓	✓		
gangster	✓				✓		✓	✓
iceberg	✓	✓	✓		✓			✓

Target word	Voice assimilation	s-voicing	Final devoicing	Precons. obst. gemination	Schwa epenthesis	Stressed vowel lengthening	Final cons. gemination	Ambiguous word stress
McDonald's	✓		✓	✓	✓✓	✓		
fastfood			✓		✓✓		✓	✓
Big Mac				✓	✓✓		✓	✓
McBacon	✓			✓	✓	✓	✓	
Big Tasty	✓			✓	✓	✓		
grizzly		✓		✓	✓			
Termiz			✓		✓		✓	✓
Uzbekistan	✓			✓	✓	✓	✓	
Afganistan	✓			✓	✓	✓	✓	
afgana	✓			✓	✓	✓		
uzbeca	✓			✓	✓	✓		
telequiz			✓		✓	✓	✓	✓
Sampdoria	✓				✓	✓		
Football	✓			✓	✓✓			✓
Club			✓		✓		✓	
Shakhtar				✓	✓		✓	✓
Donetsk				✓	✓✓	✓		✓
raggi X				✓	✓			
Röntgen	✓				✓			✓
autopsia				✓	✓	✓		
raggi Y				✓	✓	✓		
eczema	✓			✓	✓	✓		
ipso				✓	✓			
facto				✓	✓			
opta				✓	✓			
Mazda	✓			✓	✓			
claxon				✓	✓		✓	
cocktail				✓	✓		✓	✓
vodka	✓			✓	✓	✓		
juice			✓		✓	✓	✓	

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Target word	Voice assimilation	s-voicing	Final devoicing	Precons. obst. gemination	Schwa epenthesis	Stressed vowel lengthening	Final cons. gemination	Ambiguous word stress
grivna				✓		✓		
sovchoz	✓		✓	✓	✓	✓	✓	✓
trozkiste				✓	✓	✓		
samizdat	✓			✓	✓✓	✓	✓	✓
Südtirol	✓			✓	✓✓		✓	
subcultura	✓			✓	✓	✓		
segmentata				✓	✓	✓		
shifta				✓		✓		
rapsodica				✓	✓	✓		
guzla		✓		✓	✓	✓		
Botswana		✓		✓	✓	✓		
jazz			✓		✓		✓	
catgut	✓			✓	✓✓		✓	✓
obcordate	✓			✓	✓	✓		
ginkgo	✓				✓			
cactus				✓	✓	✓	✓	
outdoor	✓				✓			✓
tecniche				✓	✓			
building			✓		✓			✓
leadership					✓	✓	✓	✓
softball	✓				✓✓		✓	✓
pingpong	✓		✓		✓✓			✓
azteca	✓			✓	✓	✓		
subtropicale	✓			✓	✓	✓		
etnia				✓	✓	✓		
establishment		✓			✓	✓		✓
outsider					✓			✓
Doktor				✓	✓✓			
Bildungsroman	✓	✓			✓	✓		✓
Wolfgang	✓		✓		✓✓			✓

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Target word	Voice assimilation	s-voicing	Final devoicing	Precons. obst. gemination	Schwa epenthesis	Stressed vowel lengthening	Final cons. gemination	Ambiguous word stress
Singspiel	✓				✓✓	✓	✓	✓
Etna				✓	✓	✓		
magma				✓	✓	✓		
kalashnikov		✓	✓		✓	✓	✓	✓
Blitzkrieg			✓	✓	✓	✓	✓	✓
Fastfood			✓		✓✓		✓	✓
Krishna		✓				✓		
Backslash	✓	✓		✓	✓✓		✓	✓
hotdog	✓		✓	✓	✓✓		✓	✓
kebab			✓		✓		✓	✓
Dafne				✓		✓		
Basjad		✓	✓		✓	✓	✓	✓
apartheid			✓		✓	✓		✓
sportswoman		✓			✓✓	✓		✓
swimming		✓	✓		✓	✓		
surfboat	✓				✓✓			✓
hydrobob			✓		✓		✓	✓

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C) Target words with tested phenomena in sandhi position

Target word	Voice assim.	s-voicing	precons. obst. gem.	schwa epenthesis
Bosch Lavastoviglie		✓		
Silence Drive	✓	✓		✓
Wash dry	✓	✓		
Pierce Brosnan	✓	✓		
James Bond	✓	✓		✓
Champions League		✓		✓
Club Shakhtar	✓		✓	✓
Josh Brolin	✓	✓		
orange juice				✓
Sud Tirolo	✓		✓	✓
jazz balcanica	✓	✓	✓	✓
l'establishment degli	✓			✓
Faustus di	✓	✓		
Thomas Mann		✓		
Amadeus Mozart		✓		✓
Fastfood Krishna	✓		✓	✓

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Abstract

The laryngeal phonology of Italian is quite underrepresented in the phonological literature, although it presents a unique panorama. Italian has a prevoiced series of initial lenis stops and a mildly aspirated series of initial fortis stops. The two sets are in phonological opposition upon the [voice] feature, still, we cannot identify postlexical regressive voice assimilation (RVA) in obstruent clusters. In the terms of Laryngeal Realism, Italian seems to be an exceptional voice language without voice assimilation.

In the native vocabulary of Italian /sC/ is the only kind of obstruent cluster, which undergoes an interesting voicing process, labelled here preconsonantal s-voicing. This process is called “lexical” voice assimilation in the literature, however – as it is argued in this dissertation – it is not in compliance with RVA known from classical voice languages, it rather seems to be an optional lenition process which spreads by analogy in synchrony.

In this study the absence of RVA in Italian is demonstrated with the aid of a loanword test. 15 Italian informants were recorded in two soundproof studios, who were asked to read out 18 sample texts five times (the texts were filled with 108 target words containing laryngeal variables). The phonetic elaboration of the data includes two phases; firstly, acoustic analyses show that the perfect adjacency of a completely voiced and a completely voiceless obstruent is physically possible in Italians’ pronunciation; secondly, statistics testify that this is the most usual Italian solution for the surfacing of clusters of differently voiced obstruents.

The data is analysed from various phonological aspects. First, a Laboratory Phonology approach reveals that the absence of RVA is ill-formed for the speakers, since they often try to resolve the clusters with various repair strategies other than RVA. The second approach attempts to reconcile the laryngeal phonology of Italian with the claims of Laryngeal Realism. This section also contains a diachronic overview of the history of preconsonantal s-voicing, claiming that this process has lost its productivity in the synchronic phonology of Italian.

Finally, two formal analyses are offered to the absence of RVA in Italian. In an Optimality Theory account Italian is viewed as a voice language, which because of certain high-ranked, input-preserving faithfulness constraints, does not allow deletion or assimilation (such as RVA) in synchrony. On the other hand, in the combined frameworks of Element Theory and Laryngeal Relativism, Italian cannot be considered a voice language – instead, it is approached as an h-language, that is, as one which does not have an active L-element, so it is not supposed to have RVA, either.

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Összefoglaló

Az olasz nyelv laringális fonológiája nem sok figyelmet kapott eddig a hangtani szakirodalomban, noha egyedi jellegzetességekkel bír. Az olasz zörejhangokat zöngésségi szembenállás jellemzi, a szókezdő zöngés zárhangok teljesen zöngések, a zöngétlenek pedig enyhén aspiráltak, ám a [zönge] meglepő módon nem terjed, vagyis nem mutatható ki hátraható zöngésségi hasonulás (HZH) szomszédos zörejhangok között. A *laringális realizmus* nyelvtipológiája szerint egy olyan különleges zöngenyelvvel állunk tehát szemben, mely nélkülözi a zöngésségi hasonulást.

Az olasz nyelv natív szókincsében – fonotaktikai okokból – egyedül /sC/-csoportok képviselik a zörejhangkapcsolatokat. Ezek résztvesznek egy zöngésségi hasonuláshoz hasonló zöngésülési folyamatban, amit prekonszonantális s-zöngésülésnek hívok a dolgozatban. Amellett érvelek azonban, hogy az /s/ mássalhangzó előtti zöngésülése nem azonos a zöngenyelvekben megszokott posztlexikális HZH-val, többek között azért, mert ez a folyamat opcionális, és szóhatáron vagy morfémahatáron nem lép életbe.

A HZH hiányát egy jövevényszó-teszt segítségével igyekszem kimutatni az olasz nyelv szinkrón fonológiájában. 15 olasz adatközlő kiejtését vettem fel két hangszigetelt stúdióban, akiknek 18 rövid szöveget kellett ötször elismételniük, a szövegekben összesen 108 laringális változót tartalmazó célszó szerepelt. Az adatokat fonetikailag és fonológiailag is feldolgozom a dolgozatban. Először hangszínképek segítségével mutatom ki, hogy az olasz beszélők kiejtésében hogyan tűnnek fel szorosan egymás mellett teljesen zöngés és teljesen zöngétlen zörejhangok, majd statisztikai mérésekkel igazolom, hogy ez az érintett zörejhangkapcsolatok leggyakoribb megvalósulása az olaszban.

A jelenséget négy fonológiai oldalról közelítem meg. A laboratóriumi fonológia szempontjából azt mutatom ki, hogy a HZH hiánya milyen problémákat jelent a beszélők számára, akik ugyanis tíz különböző javító stratégiával igyekeznek könnyíteni a szomszédos zöngés és zöngétlen zörejhangok kiejtését. Ezután megkísérlem összebékíteni az olasz hangtant a laringális realizmussal, majd a fonetika talajától teljesen elrugaszkodva egy optimalitáselméleti elemzésre kerül sor, melyben az olaszt zöngésségi hasonulást nélkülöző zöngenyelvként mutatom be. A HZH hiányát ebben a megközelítésben az olasz hangtan szinkrón konzervativitása adja, „bemenetőrző” korlátok magasra rangsorolása okán. Végül az olaszt elemelméleti keretben elemzem, úgynevezett h-nyelvként, amely nem rendelkezik aktív L-elemmel, ezért nincs is okunk zöngésségi hasonulást feltételezni benne.