/s/-Voicing in English by Italian L1-speakers

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University of Amsterdam

Student name: Naomi Legius

Student number: 11045981

Email: naomilegius@gmail.com

Supervisor: Silke Hamann

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Abstract

This paper aims to investigate /s/-voicing in English by Italian L1-speakers. First, it will provide an overview of the phonetic systems of both English and Italian and the two will be compared in order to determine whether /s/-voicing is due to L1-interference. Then, the role of other possible factors, like intervocalic /s/-voicing and assimilation, will be considered. The present study aims to find an answer to the following questions: Is L1-interference the main cause for /s/-voicing in English by Italian L1-speakers? And, to what degree does orthography have an influence on /s/-voicing in English by Italian L1-speakers? Data were collected using a questionnaire and a reading task. Sixteen (former) university students aged 18-30 from the north of Italy have been recorded while they were reading an English text out loud, twice. In this text, words were included with /s/ that would undergo /s/-voicing in Italian in order to see if there is L1-interference. Finally, the output was analyzed using Praat (2001). Main findings were that, in most cases, /s/-voicing is caused by a combination of factors among which L1-interference is a frequently occurring cause. Furthermore, there is proof for an effect of orthography.

Keywords: fricative, voicing, L2, English, Italian

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I hereby declare that I have read the UvA guidelines on Plagiarism. This thesis is my own work and when consulted, I have correctly referred to my sources.

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1. Introduction

Previous research on second language learning suggests that L1-interference is often the cause for errors since it is proven to be difficult for second language learners to completely separate the different languages they speak (Flege, 1995; Treffers-Daller & Sakel, 2012). This is also the case when speakers attempt to learn pronunciation patterns in a foreign language. Extensive research has been done on L1-interference in the pronunciation patterns of a foreign language (Best et al, 2001; Burgos et al, 2013; Flege, 1981), however, research on linguistic interference by Italian L1-speakers, and especially research on linguistic transfer of Italian to English (Flege et al, 1995[1]; Flege 1995), is scarce. More specifically, little to no research has been done on transfer effects in the pronunciation of fricatives and processes such as /s/-voicing in English by Italian L1-speakers.

The present study is partly based on my observations of a native speaker of Italian. The speaker's realization of /s/ mostly followed the occurrence of /s/ in English (specified in section 2), however, some instances of /s/ were unexpectedly realized as [z]. Considering the rules for /s/-voicing in Italian (specified in section 2), some of the speaker's realizations of /s/ could be explained by L1-interference. My analysis of the Speech Accent Archive of Italian (2015), mostly resulted in the same observations. Although these speakers frequently deviate from the occurrence of /s/ in English, they often do follow the rules for /s/-voicing in Italian. Given that English is not the speakers' L1, it is likely that /s/-voicing in English is due to L1-interference. The present study investigates the regularity of /s/-voicing in English by speakers from the north of Italy and whether or not its occurrence could be explained by L1-interference. Since the text used for the Speech Accent Archive of Italian is not completely reliable in that it is rather short and was originally designed to test for multiple phenomena besides voicing, the text and method of the Speech Accent Archive was slightly modified in order to specifically test for /s/-voicing.

Research on /s/-voicing in English by Italian L1-speakers provides an insight in the motivation for the realization of /s/ and it can be used for educational purposes as it can improve learning methods for Italians learning English.

2. Background

Loporcaro and Bertinetto (2005, p. 145) claim that /s/-voicing is a process under northern influence, which means that /s/-voicing is influenced by the rules for /s/-voicing in the north of Italy. Especially the young generation realizes /s/ as [z] where the older generation would realize it as [s]. In order to keep a clear view and since there are many more local and regional varieties in Italy besides northern varieties, this paper will first discuss the rules for /s/-voicing in Standard Italian and the occurrence of /s/ in English. Subsequently, other relevant varieties of Italian will be considered.

Krämer (2009, p. 9) states that in Italian both <s> and <z> correspond to two allophones, depending on the phonetic environment. In most varieties, the voicing of /s/ is predictable because of regressive assimilation, wherein /s/ assimilates to the voicing of the following sound (Krämer, 2009, p. 9). Assimilation is the process whereby the sound quality of the /s/ assimilates to the preceding or following sound. Krämer (2009, p. 209) claims that the coronal fricative is the only obstruent that undergoes voicing assimilation. In Standard Italian, /s/ is always realized as [s] at the beginning of a word when followed by a vowel, and when /s/ is preceded by a sonorant consonant (/r/, /l/, /n/) word-internally (Krämer, 2009, p. 209). Krämer's (2009) suggestion that word-initial /s/ is always realized as [s] is contradicted by Agard and Di Pietro (1965, p. 15) and Canepari (1983, p. 24), who claim that word-initial /s/ is realized as [z] when it is followed by a voiced consonant (/b/, /d/, /g/, /dʒ/, /v/, /m/, /n/, /l/, or /r/). Furthermore, Agard & Di Pietro (1965, p. 50), Krämer (2009, p. 137), and Bertinetto (1999, p. 271) all agree to the fact that word-final consonants or consonant clusters

do not occur in the native lexicon. Many words that used to end in a consonant in earlier times or that still end in a consonant in sister languages, nowadays end in a mid front vowel in Italian (Krämer, 2009, p. 137). Thus, only loan words end in a consonant or a consonant cluster. These rules have been summarized in Table 1.

Realization	Position	Example
[s]	• At the beginning of a word, when followed by a vowel • At the beginning of a word when followed by a voiceless consonant (/p/, /t/, /k/, or /f/) • Word-internal when preceded by a sonorant consonant (/r/, /l/, /n/)	• sasso, sabato, sete • scuola, strada, spazio • borsa, insegno, qualsiasi
[z]	• At the beginning of a word when followed by a voiced consonant (/b/, /d/, /g/, /dʒ/, /v/, /m/, /n/, /l/, or /r/)	• sdentato, smemorato, sberla

Table 1: Realizations of /s/ in Italian

Furthermore, Agard and Di Pietro claim that Standard Italian also realizes /s/ as [z] between vowels (Agard & Di Pietro, 1965, p. 15), a process also known as intervocalic /s/-voicing.

In English, [s] and [z] both can occur in word-initial, word-medial, word-final position, and word-final clusters (Gimson, 2001, pp. 185-186) and therefore are phonemes in English. However, only [s] occurs in word-initial clusters (Gimson, 2001, p. 185). In addition, Roach (2009, p. 112) specifies that a verb carrying a third person singular suffix '-s', a noun carrying a plural suffix '-s' or a noun carrying a possessive suffix '-s' is pronounced as [s] if the preceding consonant is voiceless and as [z] if the preceding consonant is voiced. If the last consonant before /s/ is a sibilant, then word-final /s/ will be pronounced [iz] or [əz] (Woodward Ltda, 2018). These rules have been summarized in Table 2.

Realization	Position	Example
[s]	• Word-initial • In word-initial clusters: /sp/, /st/, /sk/, /sm/, /sn/, /sl/, /sf/, /sw/, /spl/, /spr/, /spj/, /str/, /stj/, /skr/, /skj/, /skw/ • Word-medial • Word-final • In word-final clusters: /sp(s,t)/, /st(s)/, /sk(s,t)/, /sm/, etc. • Third person singular suffix -s, noun carrying a plural -s, noun carrying a possessive suffix -s when preceded by a voiceless consonant	• cease, sample, soon • spare, scarce, smoke • pieces, essay, escape • niece, goose, pass • gasps, rests, ask • wants, clocks, cat's,
[z]	• Word-medial • Word-final • In word-final clusters: /bz/, /dz/, /gz/, /mz/, /zd/, etc. • Third person singular suffix -s, noun carrying a plural -s, noun carrying a possessive suffix -s when preceded by a voiced consonant • Last consonant before /s/ is a sibilant	• easy, thousand, hesitate • noise, does, butchers • ribs, films, raised • climbs, girls, man's • kisses, dishes, buses

Table 2: Realizations of /s/ in English

Some realizations of /s/ native speakers of Italian, see Table 3, deviate from the occurrence of /s/ in English but can be explained by L1-interference of Italian (e.g. *snack, snake, slabs, small, snow*). Other instances of /s/-voicing (e.g. *this*, *strong*, *fresh*), however, are left unexplained. As mentioned in the introduction, the present study is based on both the observations of a native speaker and analysis of the Speech Accent Archive of Italian, which means that Table 3 contain instances of /s/-voicing from both sources. Since the Speech Accent Archive of Italian was originally designed to test for multiple phenomena and hardly any research has been done on /s/-voicing in English by Italian L1-speakers, it is wise to take other factors into consideration.

Example Native Speaker of Italian	Speech Accent Archive of Italian
all [z]peakers	[z]nack
[z]trong	[z]nake
thi[z] target	fre[z] [z]now
[z]chool	[z]mall
[z]mall	[z]labs

Table 3: Realizations of /s/ which do not follow the occurrence of /s/ in English

The instances of /s/-voicing that are deviant from the occurrence of /s/ in English and the rules for /s/-voicing in Italian might, for instance, be due to regional differences or some other processes in Italian which are susceptible to these regional differences, like intervocalic /s/-voicing and assimilation. Furthermore, Loporcaro and Bertinetto state that "northern speakers tend to have an orthography-driven pronunciation" (Loporcaro & Bertinetto, 2005, p. 134), which means that the realization of, for example, /s/ is based on orthography (e.g. *easy* pronounced as ea[s]y). Since the orthography of /s/ in English can be considered to be inconsistent as can be concluded from Table 2 (e.g. *c*ease, *e*ssay, goo*se*), this could thus also be an important factor to look at when it comes to /s/-voicing in L2 English by Italians.

2.1 Intervocalic /s/-Voicing

As mentioned earlier on, intervocalic /s/-voicing is a process whereby /s/ is voiced when it occurs intervocally, ie. between two vowels. One theory about intervocalic /s/-voicing that has been widely discussed is the one by Loporcaro (1995; 1999, cited in Bertinetto, 1999, p. 268), who created a strength hierarchy to determine the realization of /s/, which has been modified by Bertinetto (see Table 4). The continuum varies from having a strong boundary to the right of /s/, that is a word-word boundary (indicated by 6+), to having a strong boundary to the left

of /s/, which also is a word-word boundary (indicated by +6). In the middle of the continuum there is no boundary. In case of the strongest boundary (+6 or 6+), /s/ is always realized as [s]. However, when a boundary is weaker (3+, 2+, 1+ or ∅) and located to the right of /s/, there is a high chance that /s/ will be voiced.

a.	word/word boundary	+6	[s]	*da* [s]*olo*	'alone'
b.	clitic/host boundary	+5	[s]	*lo* [s]*ento*	'I feel it'
c.	$stem_1/stem_2$ boundary	+4	[s]	*para*[s]*ole*	'sun-shade'
d.	prefix/stem boundary	+3	[s]	*a*[s]*ociale*	'asocial'
e.	stem/der.suffix boundary	+2	?	-	
f.	stem/infl.suffix boundary	+1	?	-	
g.	no boundary	∅	[s/z]	*Pi*[s]*a* *batte*[z]*imo*	'a place name' 'baptism'
h.	stem/infl.suffix boundary	1+	[s/z]	*ca*[s]*a* *ro*[z]*a*	'house' 'rose'
i.	stem/der.suffix boundary	2+	[s/z]	*ca*[s]*ata* *ro*[z]*eo*	'lineage' 'rosy'
j.	prefix/stem boundary	3+	[z]	*di*[z]*abituato*	'unused'
k.	word/word boundary	6+	[s]	*bu*[s] *arancione*	'orange bus'

Table 4: Strength hierarchy of intervocalic /s/-voicing in Standard Italian by Loporcaro, modified by Bertinetto (1999, p. 269)

In all cases, /s/ appears intervocally. The only factor that varies is the position of the boundary with respect to /s/. According to Bertinetto (1999, p. 272), in Standard Italian, intervocalic /s/-voicing can thus only occur when the boundary is located to the right of /s/ morpheme-internally (∅), as a prefix-final segment (3+), or as a root-final segment (2+, 1+). Krämer (2009, p. 208) agrees with (d) and (j) in Bertinetto's modified hierarchy, but has some

additional information on intervocalic /s/-voicing. According to Krämer (2009, p. 208), a voiceless obstruent followed by a prefix-final /s/, see (1), result in [s] and whenever there is a nasal followed by /s/, see (2), the /s/ is realized as [s] or [z], depending on the speaker.

(1) *e*[ks]-*amico* ‘ex-friend’

(2) *tran*[z]-*atlantico* ‘transatlantic’

tran[s]-*atlantico*

(Krämer, 2009, p. 208)

Where both Loporcaro and Bertinetto do not discuss compounds in detail, Krämer (2009, pp. 208-209) hypothesizes that intervocalic /s/ at the beginning of the second half of the compound results in [s], see (3), whereas intervocalic /s/ at the end of the first half of the compound results in [z], see (4). Krämer emphasizes that this statement is only empirical since there are not so many compounds ending in /s/ (Krämer, 2009, p. 208).

(3) *gira*[s]*ole* ‘sunflower’

(4) *ga*[z]*olio* ‘diesel’

(Krämer, 2009, p. 209)

2.2 Assimilation

Intervocalic /s/-voicing, the process discussed in the previous section, is a form of assimilation since /s/ assimilates in voicing to the neighboring vowels. As mentioned before, assimilation is a process whereby the sound quality of a certain sound assimilates to the preceding or following sound. Assimilation mostly affects consonants, for example, across word boundaries (Roach, 2009, pp. 110-111). There are two types of assimilation, namely,

regressive assimilation and progressive assimilation. In regressive assimilation, see (5), the previous speech sound assimilates to the following speech sound, whereas in progressive assimilation, see (6), the following speech sound assimilates to the previous speech sound (Roach, 2009, p. 111).

(5)	*this shoe*	→	[ðɪʃ ʃuː]	instead of	[ðɪs ʃuː]
(6)	*seven*	→	[ˈsɛvm]	instead of	[ˈsɛvn]

Assimilation is subdivided into three categories among which assimilation of place and assimilation of voicing (Roach, 2009, p. 111). Assimilation of place, of which (5) is an example concerning /s/, a speech sound assimilates to the place of articulation of the preceding or following consonant. In assimilation of voicing, see (7), a speech sound assimilates to the other speech sound with regard to voicing. Especially the last type of voicing will be relevant for this study.

(7)	*cheesecake*	→	[ˈʧiːskeɪk]	instead of	[ˈʧiːzkeɪk]

(Roach, 2009, p.112)

As can be deduced from the examples, assimilation can occur both on word boundaries and on morpheme boundaries. In addition, Roach mentions that it is most likely to find instances of assimilation in rapid, casual speech (Roach, 2009, p. 110).

2.3 Northern Italian

Standard Italian is based on the Tuscan dialect and was not widespread throughout the entire country until the twentieth century (Agard & Di Pietro, 1965, p. 4). The reason why it took

such a long time for Standard Italian to spread across Italy is that Italy was not united before 1861 (Repetti, 2000, p. 1). Before the unification of Italy, many dialects were spoken with as a result that many people were fluent in their own dialect, whereas only a small percentage of Italy's inhabitants at that time spoke the standard (Repetti, 2000, pp. 1-2). Because of this diversity, most dialects deviate from the rules set for Standard Italian. For example, Krämer (2005) points out that the short intervocalic /s/ is always pronounced voiced in Northern Italian, and that "in clitics and at word margins, /s/ always surfaces as voiceless" (p. 227). Research on the phonology of Italian dialects is scarce, with as one of its main reasons that many phoneticians are not aware of the linguistic diversity and that there also are only few sources that provide information on Italian dialects (Repetti, 2000, p. 4).

The diversity of the different dialects throughout Italy also affects the environments in which intervocalic /s/-voicing occurs. As mentioned earlier on in section 2, speakers from the north of Italy have a tendency to voice /s/ when it occurs intervocally. This is visible in Table 5, which looks less complicated than the strength hierarchy of intervocalic /s/-voicing in Standard Italian since none of the boundaries has multiple possibilities with respect to the realization of /s/.

a.	word/word boundary	+6	[s]
b.	clitic/host boundary	+5	[s]
c.	$stem_1$/$stem_2$ boundary	+4	[s]
d.	prefix/stem boundary	+3	[s]
e.	stem/der.suffix boundary	+2	?
f.	stem/infl.suffix boundary	+1	?
g.	no boundary	Ø	[z]
h.	stem/infl.suffix boundary	1+	[z]

i.	stem/der.suffix boundary	2+	[z]
j.	prefix/stem boundary	3+	[z]
k.	word/word boundary	6+	[s]

Table 5: Strength hierarchy of intervocalic /s/-voicing in Northern Italian by Bertinetto (1999, p. 273)

The table shows that within a word, the /s/ is always voiced and thus realized as [z] (2+, 1+, and ∅). The instance of /s/-voicing at a prefix/stem boundary (3+) is a special case. Bertinetto (1999) implies that this boundary marks both the point "where Standard Italian speakers shift to [z] instead of allowing the word-internal contrast /s/-/z/" (p. 273) and the point "where some Northern Italian speakers adopt the highly peculiar strategy of postnasal /s/-voicing" (p. 273), the latter concerning the fact that many speakers from the north tend to voice /s/ in the prefix *trans-* before a stem starting with a vowel. Bertinetto (1999, p. 273) states that not all speakers from the north voice the /s/ in *trans-*, but is not able to indicate to which areas in the north this phenomenon limits itself. Krämer (2005), on the other hand, contends that post-nasal /s/-voicing is something specific to speakers of Lombard, see section 2.3.3.

The La Spezia-Rimini Line, see Figure 1, divides the dialects of the north and the dialects of the middle and south on the basis of features specific to northern dialects like, for instance, intervocalic /s/-voicing (Savoia, n.d., pp. 225; 228-229). Since many people are somehow proficient in one or more dialect due to the late unification of Italy and Agard & Di Pietro (1965, p. 4) contend that dialects will leave their traces in Standard Italian, i.e. by means of phonology, the influence of dialects could thus be another factor that might be important to look at when it comes to /s/-voicing.

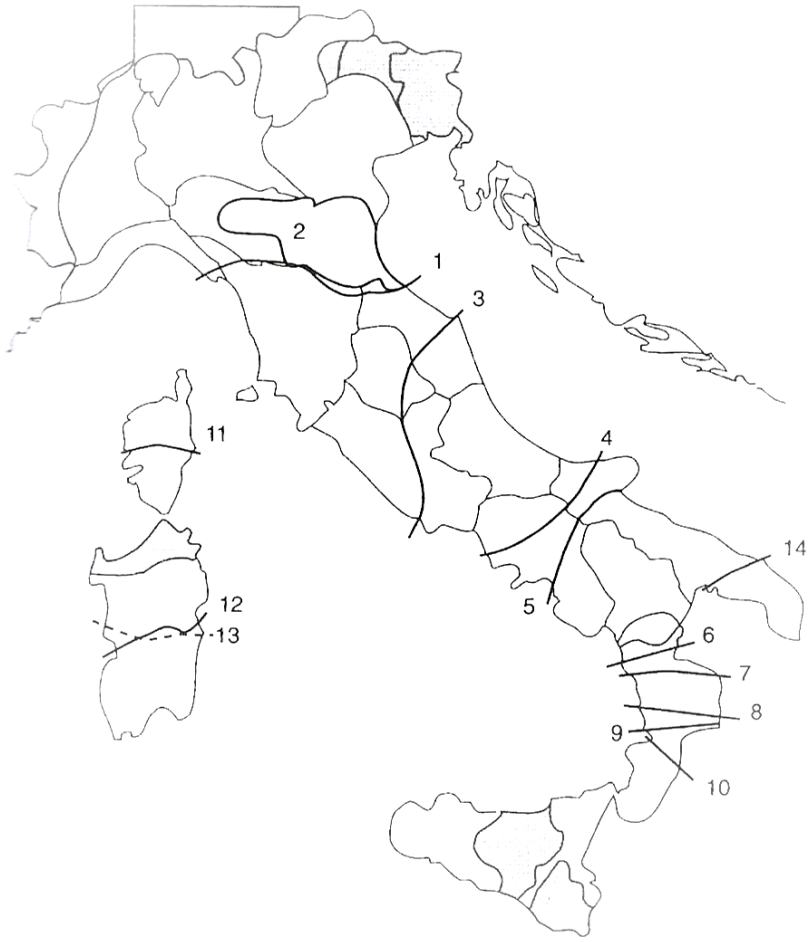

Figure 1: The La Spezia-Rimini Line (Line 1) (Savoia, n.d., p. 227)

2.3.1 Ligurian

Ligurian is a Gallo-Italic language or dialect spoken in Liguria in the North-West of Italy (Tamburelli & Brasca, 2018, p. 442). Features of Gallo-Italian in general include voicing of intervocalic consonants (Forner, n.d., p. 245). Within Ligurian, there are multiple varieties spoken in different parts of Liguria, Genoese being the dominant variety (Forner, n.d., pp. 246-247). Due to divisions made centuries ago and to the fact that Liguria borders on Piemonte and France, some Ligurian varieties contain elements of Piedmontese and Occitan (Forner, n.d., p. 247).

2.3.2 Piedmontese

Like Ligurian, Piedmontese is a Gallo-Italic language or dialect spoken in Piemonte in the North-West of Italy (Tamburelli & Brasca, 2018, p. 442). Within Piedmontese, there are a couple of varieties among which a Turinese variety that evolved from various central Piedmontese dialects in the late seventeenth century (Parry, n.d., p. 237). In the south of Piemonte, Piedmontese comes into contact with Ligurian resulting in transitional dialects that contain features of Ligurian (Parry, n.d., p. 237).

According to Montreuil (in Repetti, p. 211), Piedmontese and Lombard both contain word-initial consonant clusters that are unusual in Standard Italian, e.g., [vd] in Lombard and [bz] in Piedmontese. Another characteristic that Lombard and northern and eastern varieties of Piedmontese share is final obstruent devoicing (Benincà et al., 2016, p. 190). Furthermore, Parry (n.d., p. 240) mentions that the intervocalic consonants in Piedmontese follow the Western Romance pattern of voicing.

2.3.3 Lombard

Lombard is a Gallo-Italic language (Tamburelli & Brasca, 2018, p. 442) and its dialects are spoken in Lombardia, and in parts of Switzerland and Piemonte (Sanga, n.d., p. 253). Milanese used to represent Lombard, but over time, the eastern part of Lombardia adopted developments whereas Milanese did not accept changes as much as the east did (Sanga, n.d., p. 257). Other varieties thus developed from Milanese resulting in western and eastern Lombard. In the more remote areas in the east of Lombardia, Milanese is still the dominant variety (Sanga, n.d., p. 253).

There are a couple of features that are specific to Lombard. According to Krämer (2005), there is a Lombardian pattern when it comes to /s/-voicing. Speakers from this area

realize post-nasal /s/ as [s] when word-internal, see (8), and post-nasal /s/ as [z] when at the prefix-stem juncture, see (9) (Krämer, 2005, p. 240).

(8) *tran*[z]-*atlantico* ‘transatlantic’

(9) *sen*[s]*o* ‘sense’

(Krämer, 2005, p. 229)

Krämer (2005, p. 229) furthermore proposes that, apart from this rule, Lombard follows the rule for Italian in general that the /s/ is voiceless when preceded by a nasal or other sonorant. Besides this pattern on /s/-voicing, Krämer (2009, pp. 207-208) extends the pattern of Lombardian /s/-voicing noted by Krämer (2005). He notes that at word-initial and word-final position, /s/ is always realized as [s], see (10) (Krämer, 2009, p. 208). Furthermore, there is no voiced geminate coronal fricative as it only occurs as [ss], see (11). Even when /s/ is brought into intervocalic position by addition of a pro- or postclitic, it is pronounced [s] instead of [z], see (12). However, some speakers realize /s/ as [z] when it occurs in this position (Krämer, 2009, p. 208). Krämer concludes that the only positions in which /s/ is voiced is when it occurs intervocally in a morpheme internal position or when /s/ occurs in intervocalic position when a diminutive is formed, see (13) (Krämer, 2009, pp. 207-208).

(10) [s]*apore* ‘taste’ (noun)

bu[s] ‘bus’

(11) *ca*[ss]*a* ‘cash register’

(12) *lo* [s]*apevo* ‘I knew it’

vende [s]*i* ‘for sale’

(13) *a*[z]*ilo* ‘nursery school’

ca[z]-*ina* ‘house’ diminutive

(Krämer, 2009, p. 208)

2.3.4 Friulian

Friulian is a northern Italian language spoken in Friuli (Vanelli, n.d., p. 279). Classified as a Rhaeto Romance language, Friulian is not part of the Gallo-Italic group (Tamburelli & Brasca, 2018, p. 443). Nevertheless, Friulian contains a couple of northern Italian features. Both Vanelli (n.d., p. 281) and Baroni and Vanelli (n.d., p. 16; 23) argue that obstruents in word-final position are always voiceless since Friulian systematically employs devoicing in word-final position. Furthermore, Vanelli (n.d., pp. 281-282) adds that in the most innovative varieties of Friulian, the Latin reflexes *ci* and *ce* became [s] and [z] depending on their position in a word, see (14). One could assume that Friulian adopted intervocalic /s/-voicing since *ci* and *ce* are realized as [z] intervocally but as [s] in word-final position, see (15).

(14) *acetu(m)* [a’ze:t] ‘vinegar’

(15) *cruce(m)* [kro:s] ‘cross’

(Vanelli, n.d., p. 282)

Baroni and Vanelli (n.d.), however, mention that “intervocalic /s/-voicing is no longer a productive process of Friulian” (p. 24), since /s/ is not always realized as [z] when it appears intervocally. Multiple sources (Baroni & Vanelli, n.d.; Vanelli, 1986, cited in Baroni & Vanelli, n.d., p. 24; Torres-Tamarit, 2015) point to the relationship between vowel length and voicing as the cause for these differences in /s/-voicing.

2.3.5 The Salentino and Pugliese Dialect

Together with the Pugliese dialect, the Salentino dialect is one of the major dialect groups in Puglia and Salento (Loporcaro, n.d., p. 338).

The Salentino dialect is classified as the 'far southern' type and is spoken in the south-east part of Taranto, in Brindisi (except from Cisternino, Fasano, Ceglie, and Ostuni), and Lecce (Loporcaro, n.d., p. 338).

The Pugliese dialect is classified as the 'middle southern' type of dialect that is spoken in the provinces of Foggia, Bari, and Taranto (Loporcaro, n.d., p. 338).

Unfortunately, the only accessible information for both the Salentino dialect and the Pugliese dialect is on processes concerning vowels. There thus is no relevant information on /s/-voicing available for both dialects.

2.3.6 The Catanese Dialect

The Catanese dialect is an eastern Sicilian dialect spoken in Sicily, the South of Italy (Ruffino, n.d., p. 366). In the Middle Ages, many speakers of other languages and Italian dialects, i.e. Ligurian, Piedmontese, and Lombard, lived in Sicily. These speakers disappeared over a couple of centuries, but the influence of their languages or varieties can still be noticed in, for instance, some lexical innovations (Ruffino, n.d, p. 368). Furthermore, Ruffino (n.d., p. 374) notes that some dialects in the east of Sicily voice intervocalic consonants, like Gallo-Italic dialects.

All the above has been summarized in Table 6 in order to provide a clear overview of all languages and dialects.

Language/dialect:	/s/-voicing:	Intervocalic /s/-voicing:	Devoicing of fricatives:
Ligurian	?	Yes	?
Piedmontese	?	Yes	Yes, in some varieties
Lombard	Yes, post-nasal /s/ on prefix-stem juncture	Yes, a variation on it	Yes
Friulian	Yes (*ci* and *ce*)	In some positions	Yes
The Salentino dialect	?	?	?
The Pugliese dialect	?	?	?
The Catanese dialect	?	Yes, in east-Catanese	?

Table 6: Information on /s/-voicing and devoicing in the languages and dialects of Italy

As can be deduced from this table, there is not a lot of information available on processes related to /s/-voicing in Italian dialects. So far, only northern dialects and east-Catanese are known for intervocalic /s/-voicing and /s/-voicing in general.

2.4 Orthography

Little research has been done on the influence of a speaker's L1-orthography on the pronunciation of speech sounds in the L2 (Simon & Van Herreweghe, 2010, p. 303). Nevertheless, there is some evidence that pronunciation patterns in the L2 are affected by the grapheme-phoneme correspondences in the native language (Hayes-Harb et al., 2010; Hamann & Colombo, 2017).

When acquiring a second language, a speaker has to familiarize him or herself with the agreements between grapheme and phoneme in this new language (Hayes-Harb et al., 2010, p. 368). As mentioned by Hamann and Colombo (2017, p. 702) and Hayes-Harb et al. (2010, p.

368), inconsistencies in mappings between graphemes and phonemes can cause problems for non-native speakers. What might further complicate the process of learning a second language is that these correspondences between letter and sound may not be in agreement with the correspondences of the speaker's native language (Hayes-Harb et al., 2010, p. 368). This is also the case when it comes to the written forms in English for /s/. In English there are several orthographic representations for /s/, see the beginning of section 2 on the occurrence of /s/ in English. As soon as L2-learners encounter an unknown grapheme for /s/, there is a fair chance that they might fall back on the correspondences between letter and sound in their own language which causes them to make errors in the pronunciation of /s/. Given that Loporcaro and Bertinetto (2005, p. 145) claim that young speakers from the north of Italy have an orthography-driven pronunciation, orthography could thus be a plausible factor in /s/-voicing.

3. Hypothesis

The present study will address the following research question: Is L1-interference the main cause of /s/-voicing in English by Italian L1-speakers? If the answer to this question is negative, other factors will be taken into consideration. One could for instance assume that /s/-voicing is due to orthography. The second research question therefore is: To what degree does orthography have an influence on /s/-voicing in English by Italian L1-speakers? On the basis of the analysis of the Speech Accent Archive of Italian (2015) and previous literature, I predict that L1-interference is the main cause of /s/-voicing in English by Italian L1-speakers.

4. Method

4.1 Participants

Sixteen Italian (former) university students aged 18-30 from the north of Italy were tested in Turin. Four of these (former) university students have been excluded from analysis since they

took up residence in Turin quite recently. Their own regional variety could be too strongly present in their speech which could influence their pronunciation of Standard Italian and, indirectly, their pronunciation of English. Young native speakers from the north of Italy have been selected since Loporcaro and Bertinetto (2005, p. 145) claim that the young generation tends to realize /s/ as [z] more often than the older generation and that /s/-voicing is a process under northern influence.

Part of the participants indicated that they either had a passive or active competence in one or more of the northern languages or dialects Ligurian, Piedmontese, Lombard, or Friulian, and part of them indicated that they had some kind of competence in one or more of the southern dialects the Salentino dialect, the Pugliese dialect, or the Catanese dialect. Most participants indicated that they only use dialect in informal contexts, for instance, when in conversation with elderly people who are more proficient in their dialect than in Standard Italian.

4.2 Materials and Procedure

All participants were recorded using a Marantz Professional Solid State Recorder PMD620*MKII* and an Audix HT2 headset. The recording setup of the recorder was Preset-1, MIC Stereo, PCM-16, 16 bit, and 44.1kHz. The aim was to record all participants in a quiet room at or nearby one of the university buildings, however, it was not always possible to find a space to record in. In case there was no room available, the recordings were done outside at a location where there was as little noise as possible. Before each recording, the settings of the recording level were adjusted to the loudness of the voice of the participant in order to prevent clipping.

Beforehand, the participants were sent the Italian translation of the LEAP Questionnaire (2007) in order to determine their linguistic background.

Data were collected using a reading task based on the text used by the Speech Accent Archive of Italian (2015). The original text has been taken as a starting point and was extended for the present study, both versions are given in the Appendix in sections 9.1 and 9.2. All participants were asked to read a short English text out loud twice. Before reading the text out loud, participants were allowed to read the text for themselves once in order to familiarize themselves with the text and to stimulate two fluent readings of the text. Within this text, the positions of /s/ have been manipulated: 29 items followed the rules on /s/-voicing in Italian as specified in section 2 on the background information and 50 items did not follow these rules. There were no specific filler items since the test items were carefully distributed across the text in order to prevent suspicion.

Since the aforementioned LEAP Questionnaire did not cover all information valuable for analyzation of the data, each participant was asked to answer a few additional questions, see section 9.4, after completion of the reading task.

5. Analysis

All WAV-files were imported into Praat (2001). Then a TextGrid-file was created for every WAV-file in which the file was manually annotated for voicing. Each instance of /s/ in the recorded items could belong to the category voiced, voiceless, or half-voiced. In order for an item to be considered to be voiced, voicedness of /s/ had to be recognized in both the spectrogram and in the audio. Many items were half-voiced or its state of voicedness was unclear due to assimilation or the fact that /s/ was left unpronounced. When the item was voiced for less than half of its duration or when not voiced at all, the instance of /s/ was considered to be voiceless. In case of doubt, the items were checked by a trained phonetician who then made a final decision on the segment's voicing. During annotation, notes on voicing of the test items and other striking matters were made in an Excel-file.

After annotation, two tables have been created based on the properties of the test items in order to see if there is an effect of orthography on /s/-voicing. One table was created for the phonological properties, see Table 7, and one table was created for the orthographical properties of the test items, see Table 8.

5.1 Phonological Properties

	Unexpected				Expected									
	Word-initial		Word-medial		Word-initial		Word-medial		Word-final					
	/s/ + Cvoiceless	/s/ + V	C + /s/ + C	Cvoiced + /s/ + V	/s/ + Cvoiced		V + /s/ + Cvoiceless	V + /s/ + V	C + /s/ + C		C + /s/		V + /s/ + C	V + /s/
			nasal + /s/ + plosive		/s/ + nasal	/s/ + lateral			approximant + /s/ + plosive	plosive + /s/ + plosive	nasal + /s/	plosive + /s/	V + /s/ + plosive	
	Stella (0/24)	six (0/24)	instead (0/48)	insect (0/24)	snow (0/20)	slabs (0.5/24)	plastic (0/24)	Melissa (0/120)	first (0/48)	next (0/24)	since (0.5/37)	pants (0/24)	ask (0/24)	case (12/23)
	store (0/24)	so (0/48)	monsters (0/24)	princesses (1/24)	snack (6/24)	sleeping (7/24)	escape (0/24)	Melissa's (0/24)			silence (0/24)	wants (0/20)	forest (0/24)	niece (1.5/23)
	spoons (0/24)	solution (0/24)	sunscreen (0/24)	also (0.5/72)	small (24/48)	sleep (22.5/70)	extra (0/24)	princesses (0.5/24)			license (0/24)	rocks (0/23)	roast (0/24)	tortoise (0/24)
	scoop (0/24)	some (0/72)		exercise (0/24)	snake (2/24)	slippery (6.5/24)	exhausted (0/24)	decides (0/24)				six (0/1)	ghost (0/24)	dress (0/24)
	station (0/24)	since (0/45)			smokes (4.5/24)		plasters (0/23)	exercise (2/23)				axe (0/24)	must (1/24)	canvas (0/24)
	spare (0/24)	see (0/48)					stressful (0/24)	license (1/24)				smokes (0/22)	nest (0/24)	this (19.5/72)
	stars (0/24)	salmon (0/24)										cigarettes (0/24)		bass (0/24)
	stories (0/1)	silence (0/24)										stakes (0/24)		
	stressful (0/24)	soap (0/24)												
	scared (0/2)	sunscreen (0/24)												
	story (0/24)	sunny (0/24)												
	stakes (0/24)													
	spray (0/24)													
Total	0/267 = 0%	0/381 = 0%	0/96 = 0%	1.5/144 = 1.0%	36.5/140 = 26.1%	36.5/142 = 25.7%	0/143 = 0%	3.5/239 = 1.5%	0/48 = 0%	0/24 = 0%	0.5/85 = 0.6%	0/162 = 0%	1/144 = 0.7%	33/124 = 15.4%

Table 7: Voicing percentages regarding phonological properties

5.1.1 Category Unexpected

What stands out when looking at Table 7 regarding the phonological properties of the test items is that very little items were voiced in the category of test items that did follow the rules on /s/-voicing for Italian (only 0.2% of all instances within this category) and most items were voiced in the category that did not follow these rules for Italian (9% of all instances within this category). The only category within *unexpected* wherein items where voiced was the subcategory *Cvoiced + /s/ + V*. One out of 24 instances of *princesses* and 0.5 out of 72 instances of *also* were voiced. This is surprising since, in both of these words, the /s/ followed the rules on /s/-voicing for Italian. As mentioned in section 2, when the combination /r/, /l/, or /n/ + /s/ occurs, /s/ is realized as [s] instead of [z]. In the case of *princesses*, this could be an instance of progressive assimilation since the consonant preceding /s/ is voiced. A different explanation for this instance of /s/-voicing could be orthography, see section 5.2, however, the most plausible explanation is progressive assimilation. In case of *also*, it might also be an instance of progressive assimilation since /s/ assimilates to /l/ which is voiced.

5.1.2 Category Expected

Within the category *expected* there were more instances of voicing, especially within the subcategory */s/ + Cvoiced*, namely 26.1% within */s/ + nasal* and 25.7% within */s/ + lateral* was voiced. Within the first of these two categories, *small* was voiced in 24 out of 48 instances which is 50% of the time. An explanation could be that it is a transfer effect of Italian since word-initial /s/ + voiced consonant in Italian is pronounced [z], see section 2. Intervocalic /s/-voicing can be ruled out as a possible explanation because in both diagrams, see sections 2.1 and 2.3, it is indicated that a word-initial /s/ at a word-word boundary is realized as [s]. This test item occurred twice within the text, but there is no indication of improvement since the second instance of *small* was more frequently voiced than the first

instance of *small*. Within this same category, voicing of *snack*, *snake*, and *smokes* could, just as in *small*, be due to transfer effects. Within the category */s/ lateral*, the most frequently voiced item was *sleep* with 22.5 out of 70 instances. As in the case of *small*, the position of /s/ corresponds to the rule in Italian that the combination of /s/ + /l/ is pronounced [z]. Within the same category, *slabs*, *slippery*, and *sleeping* might, just as in *sleep*, be voiced due to transfer effects. In the subcategory *V + /s/*, the voicing percentage was 15.4%. The item that was most frequently voiced within this category is *case* with twelve out of 23 voiced instances, which is 52.2%. In case of an orthography-driven pronunciation, intervocalic /s/-voicing could be an explanation for voicing, see section 5.2. Another item that was frequently voiced within the category *V + /s/* is *this*, of which 19.5 out of 72 instances were voiced. Within these three instances of *this*, the highest percentage of /s/-voicing occurred when /s/ was followed by /m/, indicating that there might be transfer effects of Italian since in Standard Italian, /s/ + /m/ is pronounced [z], see section 2. Ultimately, the item *niece* was voiced 1.5 out of 23 instances. Even though it is a less plausible explanation, /s/-voicing of this item could be due to orthography, see section 5.2. Other, less frequently voiced items were *princesses*, *exercise*, and *license* within the category *V + /s/ + V*, *since* within the category *nasal + /s/*, and *must* within the category *V + /s/ + plosive*. The second /s/ in *princesses* was only voiced in 0.5 of 24 instances, the first /s/ in *exercise* was voiced in two out of 23 instances, and the first /s/ in *license* was voiced in one out of 24 instances. For *exercise*, *license*, and *since*, its orthographic representation could be an explanation, see Tabel 8. The most plausible reason for the instances of /s/-voicing within the category *V + /s/ + V* could be that /s/ occurs intervocally, meaning that it would be a transfer effect of Italian. In case of *princesses*, <ss> marks the boundary between a word and an inflectional suffix. In northern Italian intervocalic /s/-voicing, this would be realized as [z], see section 2.4, whereas in 'regular' intervocalic /s/-voicing, in this position, /s/ can either be realized as [s] or [z], see section 2.1. Since the

speaker who realized /s/ as [z] is from the north, it could thus point to an effect of northern Italian intervocalic /s/-voicing. In both *exercise* and *license*, /s/ does not mark a boundary and would thus be realized as [s] or [z] in 'regular' intervocalic /s/-voicing and as [z] in northern Italian intervocalic /s/-voicing. An effect of northern Italian intervocalic /s/-voicing would be plausible for *exercise* since both speakers who voiced this item originate from the north. In case of *license*, an influence of intervocalic /s/-voicing is less certain since this speaker originates from the south-west of Italy. Within the category *nasal + /s/*, the second /s/ in *since* was voiced in 0.5 out of 37 instances. The last voiced item is *must*, which was voiced one out of 24 times.

/s/-Voicing, like in section 5.1.1., can also be explained by assimilation. In case of *small*, *snack*, *snake*, and *smokes* from the category */s/ + Cvoiced*, *sleep*, *slabs*, *slippery* and *sleeping* from the category */s/ + lateral*, *case*, *niece* and *this* from the category *V + /s/*, *since* from the category *nasal + /s/*, and *must* from the category *V + /s/ + plosive*, voicing could be due to regressive assimilation. For instance, the participant who voiced *must* omitted /t/, which allows /s/ to assimilate to the next voiced consonant /b/ in *bring*. Furthermore, one out of three instances of *this* was clearly less frequently voiced than the others (two out of 22 times as opposed to 9.5 out of 23 times and eight out of 24 times). This instance of *this* was followed by a different consonant, namely /p/ of *problem* whereas the other instances of *this* were followed by *might* and *walk* which both contain a voiced consonant. Therefore, the most logical explanation for /s/-voicing of *this* would be regressive assimilation wherein /s/ assimilates to /m/, /w/ and /p/. However, in some cases progressive assimilation is one of the possible causes or even the most plausible cause for /s/-voicing. In case of *snack* and *smokes*, voicing could be due to progressive assimilation in which /s/ in *snack* assimilates to /a/ of the article *a* and /s/ in *smokes* assimilates to /m/ in *Tom*. Nevertheless, this is less plausible for *snack* since /n/ in *snack* has the same place of articulation as /s/, whereas /a/ in *a* has a

different place of articulation. However, in case of *since*, the most likely cause for /s/-voicing is progressive assimilation, where /s/ assimilates to the sound quality of /n/.

5.2 Orthographical Properties

	Word-medial						Word-final			
	nasal + /s/		V + /s/ + V		/s/ + plosive		nasal + /s/		plosive + /s/	
	<s>	<c>	<s>	<c>/<x>	<s>	<x>	<s>	<ce>	<s>	<x>
	insect (0/24)	princesses (1/24)	Melissa (0/120)	decides (0/24)	plastic (0/24)	extra (0/24)	license (0/24)	since (0.5/37)	pants (0/24)	six (0/1)
			Melissa's (0/24)	exercise (2/23)	escape (0/24)			silence (0/24)	wants (0/20)	axe (0/24)
			princesses (0.5/24)	license (1/24)	plasters (0/23)				rocks (0/23)	
Total	0/24 = 0%	1/24 = 4.2%	0.5/168 = 0.3%	3/71 = 4.2%	0/71 = 0%	0/24 = 0%	0/24 = 0%	0.5/61 = 0.8%	0/67 = 0%	0/25 = 0%

Table 8: Voicing percentages regarding orthographical properties

Another factor that might influence /s/-voicing is orthography. When looking at Table 8 on the orthographic representations of /s/, it stands out that /s/ was most frequently voiced in word-medial position. In word-final position, /s/ was only voiced in the category *nasal + /s/* when written as <ce> instead of <s> (0.8% of all instances), supporting the idea that orthography might influence /s/-voicing.

In word-medial position, /s/ was voiced in the category *nasal + /s/* when written as <c> (4.2% of all instances), and in the category *V + /s/ + V* when written as <s> (0.3% of all instances) and when written as <c> or <x> (4.2% of all instances). The data thus also show an instances of /s/-voicing when the orthographic representation of /s/ was <s>, however, this is only 0.3% as opposed to 4.2% for both categories in which /s/ was represented otherwise. The fact that /s/ was also voiced when represented as <s> does thus not outweigh the other instances of /s/-voicing where orthography did not match phonology.

Unfortunately, there are not so many items that can be used to test for an effect of orthography on /s/-voicing. Voicing of *princesses* could be due to orthography since <c> represents [s] here. However, this is not the most plausible solution for this instance of /s/-voicing since <c> in Italian does not represent [s] but [ts] (Agard & Di Pietro, 1965, p. 15). In case of *niece*, it could be that the participants who voiced this item do not see <ce> as an orthographic representation of /s/. However, this is implausible since neither of these participants pronounces a schwa or [e] after [z]. Nevertheless, another example and Table 8 do provide proof for an effect of orthography. *Case* was voiced by several participants. As mentioned in section 2, English has several orthographic representations of /s/, among which <se>. Naturally, <se> would not be realized as [z], but when speakers of Italian have an orthography-driven pronunciation, it could be that they interpret *case* in the same way in which they interpret the Italian *casa*, classified as a 1+ boundary, see section 2.1. When speakers apply the rules for intervocalic /s/-voicing, /s/ is realized as either [s] or [z]. When

speakers from the north apply rules for northern intervocalic /s/-voicing, /s/ is realized as [z], which would explain /s/-voicing in *case*. Concluding from Table 8, test items were more frequently voiced when the orthographic representation of /s/ was different from <s> than when /s/ was written as <s>. Furthermore, most instances wherein the orthographic representation of /s/ deviated from <s> where voiced by participants who were born in the north of Italy, which might suggest that Loporcaro and Bertinetto (2005, p. 145) are correct about the orthography-driven pronunciation of young speakers from the north.

Furthermore, there is possible proof of the earlier mentioned transfer effects in the duration of a double or geminate <s> in, for instance, *Melissa* and *dress* which was longer than in the instances where there was a single <s> in orthography. This could be due to the fact that the geminate /s/ is one of the double consonant sequences that occur in Italian (Agard & Di Pietro, 1965, p. 51) and since English has no geminates and, in Italian, the duration of a geminate is longer than a single consonant in orthography, it could thus be a transfer effect.

5.3 English Proficiency

Another possible explanation could be their level of English. Six out of seven participants listed English as their second most dominant language and as the language that they acquired after their native language in the LEAP Questionnaire. However, as soon as they had to list the languages that they would prefer when reading or speaking, the percentage for English almost never exceeded the boundary of 50%. Moreover, only one of these seven participants indicates that the percentage of being exposed to English is 50%, whereas all others do not exceed this boundary with their indications of 30% or below. What these findings indicate is that this group of speakers is willing to use English for communicative and intellectual purposes, but that they do not get enough input. This could affect pronunciation patterns in such a way that, if there is not enough input from, for instance, L1-

speakers of English, the pronunciation of L2-speakers of English will hardly or not improve (Baker & Hengeveld, 2012, p. 68). Furthermore, in case that there is a lack of contact with the target language, a speaker's acquired knowledge of a language might decay.

Additionally, seven out of twelve participants did not improve /s/-voicing in the second reading during the experiment. This might indicate that they were more aware of their pronunciation during the first reading than during the second reading of the text.

5.4 Variation Between Participants

When looking at the group of participants, there is a clear division between the frequency of /s/-voicing, see Table 9. Even though there are not the same number of participants in each category, it stands out that participants originating from the north-west, south-east, and south-west on average tend to voice /s/ more frequently than participants from the north-east and north-middle. This could indicate that not only speakers from the north, and more specifically, the north-west tend to voice /s/, but that the process has spread to the south-east and south-west of Italy.

Originally from	Number of participants	Items voiced	Column voicing average
North-east	1	4	4
North-middle	1	3.5	3.5
North-west	6	53.5	8.9
South-east	3	33.5	11.2
South-west	1	17.5	17.5

Table 9: /s/-Voicing by participants residing in Turin

Between participants, there is some variation when it comes to /s/-voicing. In total, there were 112 instances of /s/-voicing, which means that the average of /s/-voicing would be

approximately nine instances per speaker. Seven out of twelve speakers voiced above average. Four of the seven speakers originate from the north of Italy, whereas two originate from the south-east, and one speaker originates from the south-west. A possible explanation for /s/-voicing could be influence of a dialect. Striking is that the greatest number of these seven participants indicated that they either had a passive or active competence in Piedmontese. The fact that Piedmontese is a dialect from the north of Italy and that intervocalic /s/-voicing is one of its features makes it a plausible explanation for the high frequency of /s/-voicing by these participants. The same counts for the two speakers who have a competence in Ligurian and the Catanese dialect. Nevertheless, an influence of dialect may therefore not be the most plausible explanation for /s/-voicing since Piedmontese, (eastern-) Catanese, and Ligurian all share the feature of intervocalic /s/-voicing. Loporcaro and Bertinetto (2005, pp. 131-132), mention that, even if Italians do not speak a dialect, Standard Italian is always spoken with some sort of regional accent. On top of that, nearly all participants indicated that they rarely use dialect since their vocabulary, in their dialect, is rather limited. It thus is more likely that the region of which speakers originate is of influence on /s/-voicing than dialect.

5.5 Items Excluded from Analysis

For some of the test items, there were less items than initially planned. The main cause for this is assimilation. Especially in the cases of *six*, *snow*, *stories*, *since*, and *scared* there were many instances of assimilation. *Six* was frequently combined with the /s/ in the following word *spoons*, see (16), indicating that this is a form of regressive assimilation. There was only one instance of *six* that was realized as [s] instead of being omitted due to regressive assimilation. In the case of *snow*, the /s/ was combined with the preceding word *fresh*, see (17), indicating that it is a form of progressive assimilation. Due to the fact that

fresh ends in [ʃ], the place of articulation of /s/ assimilates to [ʃ]. *Stories* was combined with the preceding word *ghost* in 23 out of 24 instances, see (18). The second /s/ in test item *since* was combined with the following word *she* five times, see (19). Furthermore, it is a form of assimilation of place since /s/ assimilates to [ʃ]. The last item that involves assimilation is *scared*. In 22 out of 24 instances, *scared* was combined with the preceding word *is*, see (20). Another cause for omitted items was that /s/ was simply not pronounced. Sometimes the /s/ was omitted and sometimes it was replaced by another speech sound, i.e., [ts], [ʃ], [d], or [f]. The last reason why some instances of items were excluded from analysis is that either the signal was too weak, or there was too much noise during recording.

(16)	[sɪkspuːnz]	instead of	[sɪks spuːnz]
(17)	[frɛʃnəʊ]	instead of	[frɛʃ snəʊ]
(18)	[gəʊstɔːriz]	instead of	[gəʊst ˈstɔːriz]
(19)	[sɪnʃiː]	instead of	[sɪns ʃiː]
(20)	[ɪzkeəd]	instead of	[ɪz skeəd]

In summary, one could conclude that there are numerous causes for /s/-voicing, see Figure 2. The most prominent causes, seem to be regressive assimilation and transfer effects of Italian, with 31% and 28% respectively. With 13% each, orthography and progressive assimilation are less prominent causes for /s/-voicing. On top of the above-mentioned causes for /s/-voicing, other causes that were considered are dialect and the participant's experience with English.

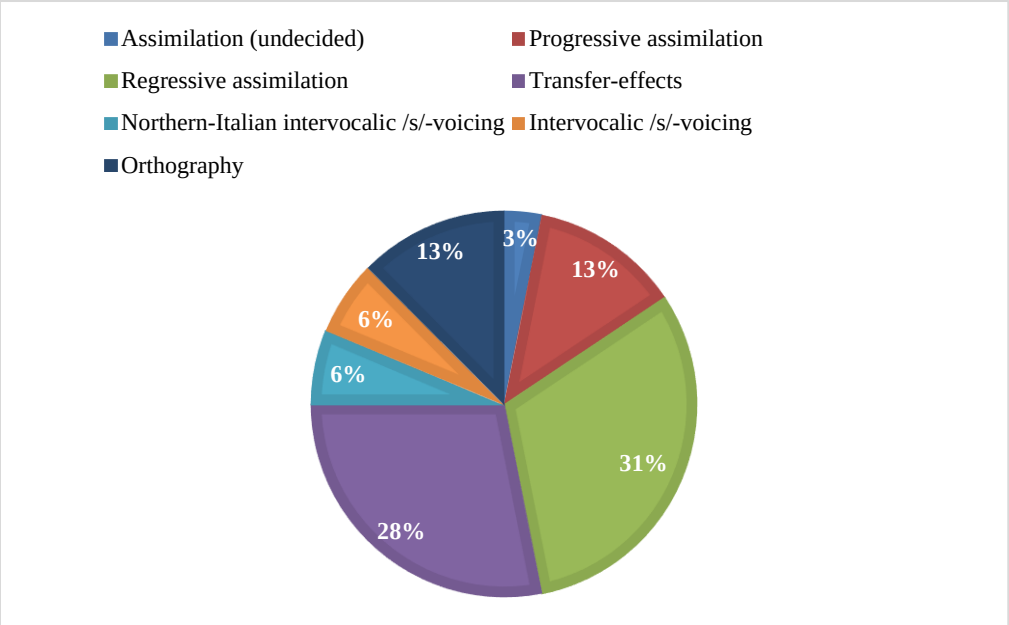

Figure 2: Causes for /s/-voicing in English by participants of the experiment

6. Conclusion

Even though the recordings do not necessarily provide convincing evidence for an effect of orthography on /s/-voicing, it is remarkable that /s/ was voiced more frequently when it was orthographically represented by a symbol other than <s>. As Loporcaro and Bertinetto (2005) claimed, an orthography-driven pronunciation might indeed be a feature from the north of Italy. Although, two speakers who voiced /s/ with an orthographic representation other than <s> originate from either the north-west or south-west, which might indicate that an orthography-driven pronunciation is not necessarily limited to the speakers' native language and the north of Italy but that the feature also spreads to the speakers' L2 and to the western part of Italy. They furthermore claimed that especially speakers from the north tend to voice /s/, however, findings of this experiment might indicate that it is also an ongoing process in the south-east and south-west of Italy. Besides, there is strong evidence that speakers from the north-west tend to voice /s/ more frequently than speakers from other regions in the north of Italy. The situation of /s/-voicing that Loporcaro and Bertinetto (2005) described might thus

have slightly changed. One could argue for an influence of dialect, however, northern-italian intervocalic /s/-voicing and the fact that most participants indicated that they are not so competent in their dialect, indicates that the region of origin might be of influence instead of dialect. Furthermore, many speakers indicated that they are currently not so much exposed to the English language. Exposure to English, whether it is a native speaker's use of English or a non-native's use of English, can really make a difference in the speaker's grasp of pronunciation patterns. Non-exposure to English could thus be a major factor in /s/-voicing where English does not permit this.

In conclusion, the answer to the first research question would be no, since /s/-voicing in English by Italian L1-speakers is not merely due to the rules for /s/-voicing in Italian. Nevertheless, it is the second-most plausible reason for /s/-voicing, so the hypothesis could be considered partly confirmed. The answer to the second research question would be that the orthographic representation of /s/ is not the most relevant reason for /s/-voicing, but that there is some evidence that it could have an influence on the realization of /s/. Unfortunately, there was only a small amount of test items that could be used to test for an effect of orthography, so the evidence is not completely valid.

7. Discussion

Unfortunately, resources on Italian dialects are scarce so it has been difficult to get a good idea of which processes are going on in the various Italian dialects. This is interesting, since in the available literature on dialects (for instance, Maiden & Parry (1997), it says that most dialects have a literary tradition since Standard Italian came into being only after various dialects had been spoken and written for several hundreds of years. By now, one would expect there to be more information on the linguistic systems of these dialects. Furthermore, not all resources were accessible (either the source was written in a language that is not accessible, or

it is impossible to get a copy of this source) which made it even harder to write about linguistic diversity in Italy. Due to the lack of extensive resources, it is impossible to precisely determine the influence of dialects. Not only for this research, but also for linguistic research on Italian or Italian dialects in the future, more accessible and extensive resources on dialects would be necessary in order to determine the exact impact of regional varieties, dialects and languages on the Standard Italian and indirectly on the pronunciation patterns of languages other than the native language.

When it comes to the setup of the experiment, the text could be improved since two participants guessed that I was testing them on /s/-voicing. These participants mentioned that there were certain clusters of sounds that reappeared in the text a couple of times. They also noticed that there were some alliterations involving /s/ in the text, which caused them to suspect that they were being tested on this speech sound. If ever tested for /s/-voicing again, it would thus be wise to prevent alliteration and to distribute the test items more carefully than how it has been done right now.

During analysis, there not only were instances of voicing, but also many instances of devoicing in which words containing /s/ that, according to the occurrence of /s/ in English, are supposed to be realized as [z], were realized as [s]. Judging from the first couple of participants, devoicing occurred more frequently than voicing. For further research, it might be interesting to have a look at this matter.

Referring to the speakers' indication that they are hardly exposed to the English language, there might be another cause for this lack of input. Some of the participants indicated that the method that is used in high schools to learn the English language might be the cause for shortcomings in the pronunciation of English speech sounds. In high schools, the focus is merely on grammar and vocabulary, whereas there is little to no attention for speaking and listening skills. It is important that students not only familiarize themselves with

the conjugations of verbs, but also pay attention to pronunciation patterns in order to establish links between orthography and phonology. A simple solution would be to offer classes taught in English at high school, or to at least shift the focus to speaking and listening a little more than to grammar, and to offer classes taught in English at university. This could pull international students and professors to Italian universities, which might create the perfect environment to practice speaking and listening skills even more.

The present study has found some evidence for an orthography-driven pronunciation, however, due to a short list of items it is not as convincing as hoped for. Further research should therefore point out whether or not /s/-voicing is really affected by orthography.

Another issue that was noticed during analysis and might be an interesting topic for further research is the scope of /s/-voicing. Where Loporcaro and Bertinetto (2005) claim that /s/-voicing is something that especially speakers from the north of Italy tend to do, this paper has found some evidence for the idea that /s/-voicing might also be a feature from the south. Again, due to a tight schedule and a limited amount of time, there was no opportunity to further investigate this matter. Therefore, together with orthography and devoicing, the scope of /s/-voicing could be an interesting topic for further investigation.

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9. Appendix

9.1 Text Used by the Speech Accent Archive of Italian (2015)

Please call Stella. Ask her to bring these things with her from the store: Six spoons of fresh snow peas, five thick slabs of blue cheese, and maybe a snack for her brother Bob. We also need a small plastic snake and a big toy frog for the kids. She can scoop these things into three red bags, and we will go meet her Wednesday at the train station.

9.2 Text Used in the Experiment

Please call Stella. Ask her to bring these things with her from the store: Six spoons of fresh snow peas, five thick slabs of blue cheese, and maybe a snack for her brother Bob. We also need a small plastic snake and a big toy frog for the kids. She can scoop these things into three red bags, and we will go meet her Wednesday at the train station.

Afterward, Tom will take the kids out camping in the pine forest. Melissa will probably bring her dress, but it is better to also bring a spare pair of pants in case we will go for a hike. Her uncle Tom smokes only two cigarettes a day so it should not be too hard for him to leave them at home. Instead, he could bring marshmallows to roast and eat at the campfire in the evening. Melissa's niece Bridget will take her sleeping bag and prefers to sleep under canvas whereas Melissa wants to sleep under the stars. Hopefully, Tom will find a solution to this problem because Melissa does not want to sleep in a tent and will try to escape. Tom is planning to tell some ghost stories when it is dark on the first night, however, this might get a little stressful for Bridget since she is scared of monsters and the dark. Maybe he could tell her a story about princesses and fireflies instead. If he decides to gather some wood for the campfire the next morning, he must bring his axe. Meanwhile, the two cousins can go to the river to see if they can find salmon, black bass, or even a tortoise. The rocks along the bedding of the river might be slippery so they should be careful. After this walk,

everyone will have had a bit of exercise. In the afternoon, Melissa and Bridget will first look up at the trees in silence to see if they can find any birds or a bird's nest. Then, they will have to put everything back in the car to get ready for their ride home. Tom will take some extra cushions as Melissa and Bridget will probably be exhausted.

Tell Tom that he should not forget to pack his driver's license, the tent stakes, a small bar of soap, a couple of plasters, and a bottle of sunscreen since the weather will be sunny. Anti-insect spray might also come in handy.

9.3 List of Test Items

Items used in the reading task of the Speech Accent Archive of Italian (2015)

Following the rules for Italian	Type	Not following the rules for Italian	Type
Stella	Word-initial cluster	*ask*	Word-final cluster
store	Word-initial cluster	*six*	Word-final cluster
six	Word-initial	*snow*	Word-initial cluster
spoons	Word-initial cluster	*slabs*	Word-initial cluster
also	Word-medial	*snack*	Word-initial cluster
scoop	Word-initial cluster	*small*	Word-initial cluster
station	Word-initial cluster	*plastic*	Word-medial
		snake	Word-initial cluster

/s/-voicing in English

Items used in the present study

Following the rules for Italian	Type	Not following the rules for Italian	Type
also	Word-medial	*forest*	Word-final cluster
spare	Word-initial cluster	*Melissa*	Word-medial
so	Word-initial	*dress*	Word-final
instead	Word-medial	*pants*	Noun carrying a plural -s
stars	Word-initial cluster	*case*	Word-final
solution	Word-initial	*smokes*	Word-initial cluster, third person singular suffix -s
some	Word-initial	*cigarettes*	Word-initial, noun carrying a plural -s
stories	Word-initial cluster	*roast*	Word-final cluster
stressful	Word-initial cluster	*Melissa's*	Word-medial
since	Word-initial	*niece*	Word-final
scared	Word-initial cluster	*sleeping*	Word-initial cluster
monsters	Word-medial	*sleep*	Word-initial cluster
story	Word-initial cluster	*canvas*	Word-final
see	Word-initial	*wants*	Third person singular suffix -s
salmon	Word-initial	*this*	Word-final
silence	Word-initial	*escape*	Word-medial
stakes	Word-initial	*ghost*	Word-final cluster
soap	Word-initial	*first*	Word-final cluster
sunscreen	Word-initial, word-medial	*stressful*	Word-medial

sunny	Word-initial	*since*	Word-final
insect	Word-medial	*princesses*	Word medial, word-medial
spray	Word-initial	*decides*	Word-medial
		next	Word-final cluster
		must	Word-final cluster
		axe	Word-final cluster
		bass	Word-final
		tortoise	Word-final
		rocks	Noun carrying a plural -s
		slippery	Word-initial cluster
		exercise	Word-medial cluster, word-medial
		silence	Word-final
		nest	Word-final cluster
		extra	Word-medial
		exhausted	Word-medial
		license	Word-medial, word-final
		stakes	Word-final
		small	Word-initial cluster
		plasters	Word-medial

9.4 Questions Afterward

Name:

Place of Birth:

Residence:

Did you like it to take part in this experiment?

Do you have any idea of what I might be testing?

Would you like to be updated on the results?

The following questions were not included in the LEAP Questionnaire but are valuable for analysis of the data.

Do you speak a local variety of Italian or an Italian dialect (e.g. Piedmontese, Lombard)?

To what extent do you use it (e.g. with friends, family, at university, do you use it in written form, or do you only speak it)?