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The voiced and voiceless outcomes of intervocalic -sj- in Old Tuscan

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Abstract:

This paper deals with the non-systematic voicing of intervocalic sj in Old Tuscan. Old Tuscan displays both voiceless [ʃ] and voiced [ʒ] as outcomes of intervocalic sj, without an obvious phonological conditioning determining them. None of the existing attempts to account for this dual outcome – the search for a Neogrammarian regularity, the supposed introduction of [ʒ] through lexical borrowing, the hypothesis of a variable sound change – is completely satisfactory. It will be proposed that the hypothesis of a variable result of this sound change can be theoretically refined and given new empirical arguments. Specifically, it will be argued that an allophonic voicing rule may be followed by a partial lexical re-categorization of its output, and it will be shown that the outcome [ʒ] is most likely when the following vowel is low and/or stressed.

Keywords: Intervocalic Voicing, Sound Change, Tuscan

1. *Introduction*[*]

The Latin cluster -sj- has become a postalveolar fricative in Tuscan. In non-intervocalic position this outcome is always voiceless (i.e., [ʃ]); interestingly, when it is intervocalic this outcome is voiceless in some words (e.g. in

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bacio 'kiss' [ˈbaːʃo] < BASIUM) but a voiced [ʒ] in others (e.g. in *fagiolo* 'bean'[1] [faˈʒɔːlo] < PHASEOLUM), without any obvious conditioning determining the two different outcomes.

The palatalization process poses hardly any difficulty, considering that it is virtually exceptionless,[2] that it is a typologically very common change and that in Tuscan other clusters containing a front glide became palatal consonants (NJ > [ɲː], LJ > [ʎː]).[3] However, the [ʒ] outcome is more problematic. First, being voiced it raises the question whether it is related to other intervocalic voicing processes in Tuscan (if they existed at all). Second, the apparently unpredictable presence of one outcome or another poses several problems, which this paper will try to address presenting the preliminary results of an ongoing research. The first issue is the very cause of this dual outcome: why has this sound change not been uniform? This question is closely related to the debate about the nature of -SJ- voicing; it has been argued that the voiced consonants are the result of lexical borrowing from languages having [ʒ] rather than of a sound change in the strict sense. The alternative solution – that also [ʒ] was created by a sound change – in its turn implies another question, that is what phonetic conditioning (if any) determined the two outcomes.

The issue of the voiced outcome is also intertwined with other problems. For example, due to a spelling pronunciation (see Section 3.3) the outcomes of -SJ- in standard Italian (but not in Tuscan) are affricates rather than fricatives; for instance, the two words mentioned above are [ˈbaːtʃo] and [faˈdʒɔːlo] respectively. Italian and Tuscan also differ as regards [ʒ], which is present in modern Tuscan but absent from contemporary standard Italian (in which the voiced outcome of -SJ- is [dʒ]). Moreover, the vast majority of occurrences of [tʃ] and [dʒ] in the lexicon of contemporary Italian (as well as of [ʃ] and [ʒ] in modern Tuscan) are not outcomes of -SJ-, but of (voiceless and voiced) velar stops before front vowels, since the once distinct outcomes of these clusters later conflated.

[1] In modern Tuscan, but originally 'cowpea' (*Vigna unguiculata*) before the discovery of the Americas and the subsequent introduction of beans (*Phaseolus vulgaris*) in Europe. Also, its phonetic form was [faˈʒwɔːlo] before the diphthong [wɔ] monopthongized to [ɔ] before palatal consonants in the 13th century (Castellani 1965 [1980]: 129).

[2] The few cases of intervocalic [sj], [zj] in modern Tuscan are not real exceptions; either they are learned words preserving their Latin phonological make-up (e.g. *pensione* 'pension' – cf. the 'popular' outcome in *pigione* [piˈʒoːne] 'rent' < PENSIONEM), or are created by morphological concatenation (e.g. *possiamo* 'we can', *osiamo* 'we dare'), or were created by later sound changes after /sj/ palatalization had ceased to be active (e.g. *insieme* [insjɛːme] 'together' < *INSEMEL, *Siena* [sjɛːna] 'town name' < SÆNAM, whose [j]'s are the result of a diphthongization process which occurred after palatalization).

[3] Although these two changes are not totally identical to -SJ- palatalization; the intervocalic outcomes of -NJ- and -LJ- are phonetically long (but see fn. 5), while intervocalic -SJ- yielded a short segment in Old Tuscan; furthermore, the latter consonant is a postalveolar, while the former two are palatal.

In general, in Tuscan the relationship between the phones [tʃ] and [dʒ] on the one hand and [ʃ] and [ʒ] on the other is a complex one and has changed over time, with different paths in Tuscan and Italian. Therefore, before presenting a review of the previous attempts at accounting for the dual outcome (Section 4), and offering a possible explanation for its causes (Sections 5 and 6), we will briefly examine the distribution of [ʃ] and [ʒ] in both modern Tuscan and modern Italian (Section 2), and the chain of sound changes in Old Tuscan (Section 3). This will be the starting point for us to argue that -SJ- voicing is the product of a sound change native of Tuscan and influenced by vowel height and stress position, but without a systematic Neogrammarian regularity.

2. *Current situation*

In order to understand the diachronic evolution of -SJ- in Old Tuscan, it may be useful first to compare the realization and distribution of its outcomes in modern Italian and modern Tuscan with those attested in medieval Tuscan texts. In modern standard Italian the outcome of intervocalic -SJ- is not [ʃ] or [ʒ], but [tʃ] or [dʒ].

(1)	*baciare*	[baˈtʃaːre]	'to kiss'	<	BASIARE
	cacio	[ˈkaːtʃo]	'cheese'	<	CASEUM
	fagiano	[faˈdʒaːno]	'pheasant'	<	PHASIANUM
	pertugio	[perˈtuːdʒo]	'hole'	<	*PERTUSIARE

Italian /ʃ/ "tend[s] to have geminate-like duration, most saliently in intervocalic position" (Bertinetto and Loporcaro 2005: 134). In fact, /ʃ/ is part of a group of Italian consonants, the so-called 'intrinsic geminates'[4] (the others being /ts/, /dz/, /ʎ/ and /ɲ/) which are phonetically realized as geminates[5] when intervocalic, although their duration alone is never contrastive (that is, minimal pairs /ʃ/ ~ /ʃʃ/ do not exist). As for [ʒ], it is only attested in a fairly small number of loanwords (*garage*, *abat-jour*, *triage*, *stage*, *jihad*, etc.).[6]

Phonologically, /ʃ/ and /tʃ/ are two distinct phonemes, as minimal pairs like [ʃˈi] *sci* 'ski' and [tʃi] *ci* 'us-CLT', or [ˈʃˈɔkːo] *sciocco* 'fool' and [ˈtʃɔkːo]

[4] At least in standard Italian; in northern Italy they usually are short.

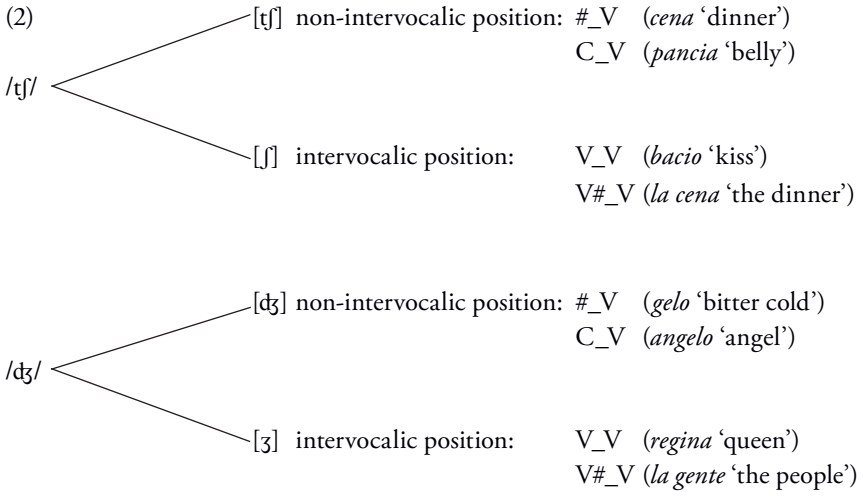
[5] Experimental data (Endo and Bertinetto 1999) have questioned the traditional statement that these consonants are as long as the 'true' geminate consonants of Italian, but in any case at least /ʃ/ shows a duration consistent with gemination.

[6] As evident from these examples, they were mostly borrowed from French.

ciocco 'log' demonstrate. We will leave open the question whether gemination is a phonological or phonetic aspect of the intervocalic fricative – in other words, we will not discuss which one of the word pairs *fascia* [faʃːa] vs *faccia* [fatːʃa] and *pasce* 'grazes' [paʃːe] vs *pace* 'peace' [paːtʃe] is a minimal pair in Italian.

Unlike standard Italian, in modern Tuscan both (short) [ʃ][7] and [ʒ] exist in the native lexicon. However, the phonological inventory of Tuscan does not differ from Italian (at least in this respect): intervocalic short [ʃ] and [ʒ] are not independent phonemes, but rather are the intervocalic allophones of /tʃ/ and /dʒ/.[8]

(2)



[7] It has to be added that, besides duration, other fine phonetic differences exist between the realization of /ʃ/ and the intervocalic realization of /tʃ/, making the use of the IPA symbol [ʃ] for both more a convenient approximation than a totally accurate transcription. As also happens to other intervocalic voiceless obstruents, in Florentine Tuscan the intervocalic allophone of /tʃ/ may optionally have some degree of voicing (Giannelli 2000: 30). Furthermore, in most – but not all – of Tuscany the intervocalic allophones of the two affricates usually have a more retracted place of articulation than the sibilant, as well as less lip rounding (*Ibidem*, fn. 57). Additionally, in Florentine [ʃ] and [ʒ] may also occasionally be a stylistically 'emphatic' realization of /s/ followed by a consonant: /ˈfresko/ → [ˈfreʃko] 'fresh', /sveˈʎatevi/ → [ʒveʎˈʎahevi] 'wake up!' (*Ibidem*, 31).

[8] At least in Florentine, [ʒ] seems to be optionally possible also after a nasal, for example [ˈundʒere]/[ˈunʒere] 'to grease' (*Ibidem*, 30 fn. 57). In Aretino and near areas [ʃ] and [ʒ] also occur in absolute word-initial position instead of [tʃ] and [dʒ] (e.g. Aretino [ˈʒɛːlo] vs Florentine [ˈdʒɛːlo]); see Loporcaro (2006: 69-84) for an explanation of the diachronic origin of this distribution.

3. *Diachronic changes*

3.1 *Distribution of the outcomes of -SJ- in medieval Tuscan*

The outcomes of -SJ- in Old Tuscan differed from both modern Tuscan and modern Italian. For Old Tuscan we can reconstruct the existence of phonetic [tʃ], [dʒ], [ʃ] and [ʒ] – as in modern Tuscan – but, unlike modern Tuscan, these phones up to at least the late 11th century were realizations of four different phonemes: /tʃ/, /dʒ/, /ʃ/ and /ʒ/. We know that the intervocalic outcomes of -SJ- were not yet allophones of /tʃ/ and /dʒ/ because at that time the spelling still distinguished them: the intervocalic postalveolars of words like *baciare*, *fagiolo* on the one hand and those in *pace* 'peace', *gelo* 'bitter cold' on the other were still represented by different graphemes (most frequently <sc(i)> and <sg(i)> were used for /ʃ/ and /ʒ/ respectively, while <c(i)> and <g(i)> were used for /tʃ/ and /dʒ/, although with a certain variability in the spelling conventions, especially with regard to the fricatives – see 3.2 for more details).

Therefore, up to the early Middle Ages Tuscan [tʃ] and [dʒ] were the historical outcomes of Latin C and G before front vowels; they were always affricates, also in intervocalic position (3). As for [ʃ] and [ʒ], they only were outcomes of intervocalic -SJ-.

(3) ['paːtʃe] 'peace' < PACEM
['dʒɛːlo] 'bitter frost' < GELUM

(4) [ka'miːʃa] 'shirt' < CAMISIAM
[ba'ʃaːre] 'to kiss' < BASIARE
[fa'ʒwɔːlo] 'cowpea' < *fasjɔlu < PHASEOLUM
[pi'ʒoːne] 'rent' < PENSIONEM

[ʃʃ] was also present in Old Tuscan, but it was neither an outcome of C before front vowels nor of -SJ-; rather, it derived from the clusters RS, SC and CS (the outcome CS > [ʃʃ] may be due to lexical borrowings rather than a native sound change – see Baglioni 2001).

(5) SC > [ʃʃ] ['peʃʃe] 'fish' < PISCEM
['faʃʃa] 'band' < FAXAM

CS > [ʃʃ] ['kɔʃʃa] 'thigh' < COXAM

	[laʃˈʃaːre]	‘to leave’	<	LAXARE
RS > [ʃʃ]	[roveʃˈʃaːre]	‘to overthrow’	<	*REVERSIARE

This is the situation attested in the earliest Tuscan texts, which date approximately from 1100 AD. The subsequent development of this synchronic state was the lenition of intervocalic /ʤ/ and /ʧ/, which became fricatives. Again, our source in evidence is spelling: first /ʤ/ and later /ʧ/ began to be spelled the same way as the two outcomes of -SJ- (since the latter half of the 13th century for /ʤ/ – the earliest sporadic traces possibly dating to the late 11th century, and since the early 15th century for /ʧ/ – the earliest traces possibly dating to the late 13th century). Initially, the spelling previously used for [ʃ] and [ʒ] started to be sporadically used to also represent /ʧ/ and /ʤ/ in non-intervocalic position, and at the same time the spelling of /ʧ/ and /ʤ/ was sporadically extended to intervocalic [ʃ] and [ʒ]; later on, the latter spelling convention settled down (that is, <bacio> and <pertugio> became the most common spellings). The change apparently started in western Tuscany, then spread to the rest of Tuscany (Castellani 1952: 29-33).

As a consequence of this lenition process, the contrasts between /ʧ/ and /ʃ/, as well as between /ʤ/ and /ʒ/, were lost: the formerly affricate intervocalic /ʧ/ and /ʤ/ became phonetically identical (or nearly identical, see fn. 7) to the fricatives. The ‘original’ intervocalic [ʃ] and [ʒ] (i.e., those coming from -SJ-) were therefore reinterpreted as the allophones of /ʧ/ and /ʤ/ in intervocalic position ([ʃʃ] remained intact, but with the disappearance of short /ʃ/ its phonetic length was no longer contrastive).

3.2 *Spelling*

It should be noted that the spelling of [ʃ] and [ʒ] in medieval texts is highly variable (Castellani 1960a [1980]: 232-233 fn. 107; Aski 2001: 273-279; Larson 2002). Before their phonological merging with /ʧ/ and /ʤ/, [ʃ] was usually represented by <sc(i)>, while [ʒ] was variously represented by <sg(i)>, <g(i)>, <si> and <s>. However, the opposite spellings are also attested, and in some texts only one grapheme (or sequence of graphemes) is (nearly) systematically used for both [ʃ] and [ʒ], as well as for [ʃʃ]. Furthermore, <s> was also used for both [s] and [z], and <g(i)> for [ʤ]. Indeed, the complexity of the graphic conventions, coupled with the differences between the modern phonological system and the old one, has sometimes misled even philologists, as reported by Larson (2002). As we will see in Section 4, different interpretations of the intricate and fluctuating spelling conventions may even lead to different reconstructions of the chronology of the sound changes discussed here.

3.3 *Affrication of the intervocalic fricatives in Italian*

In modern Italian standard /ʧ/ and /ʤ/ are always realized as affricates, also intervocalically. However, this does not mean that Old Tuscan intervocalic [ʃ] and [ʒ] underwent a phonological process of fortition. In all likeness the change from [ʃ] and [ʒ] to [ʧ] and [ʤ] is rather due to a spelling pronunciation by speakers outside of Tuscany (this explanation has a long history, as it was originally put forth by D'Ovidio (1895); see Loporcaro (2006) for a recent reformulation and revision). While until a few decades ago Italian was the L1 of almost no Italian speakers outside of Tuscany (they were, and in many cases still are today, L1 speakers of their local vernacular), it had asserted itself as the language of culture and written communication centuries earlier.

This means that, outside of Tuscany, speakers adhered to one and the same written norm, but their pronunciation of Italian often did not precisely mirror the actual Tuscan pronunciation. It was rather influenced by several factors – most prominently the phonology of their local vernacular, but also spelling.[9] As seen above, after the lenition of intervocalic /tʃ/ and /ʤ/ their spelling (<c(i)> and <g(i)> respectively) was also used for intervocalic (short) [ʃ] and [ʒ]. Non-Tuscan speakers of Italian apparently interpreted the use of the letters <c(i)> and <g(i)> to represent every occurrence of /ʧ/ and /ʤ/ as implying that they always had the same phonetic realization, in non-intervocalic and intervocalic position alike, and generalized [ʧ] and [ʤ] to every environment. This obviously did not happen in Tuscany, where [ʃ] and [ʒ] have been the uninterrupted realizations of intervocalic /ʧ/ and /ʤ/ since the Middle Ages.

4. *Voiceless and voiced outcomes: some previous analyses*

As shown in Sections 2 and 3, some apparent puzzles concerning the current distribution and diachronic origin of [ʃ] and [ʒ] have a relatively straightforward explanation. On the other hand, the apparently haphazard alternation between the two outcomes of -SJ- is still an open question; this paper aims to provide a (partially) new explanation, which will be detailed in this and the following sections. This problem has received comparatively little attention recently, the most recent work specifically devoted to it being, to my knowledge, Aski (2001). However it is, to quote Aebischer (1958: 191), a "[p]etit problème qui a bien souvent été traité" – being debated since the late 19th century, with opinions varying widely.

[9] For example, as seen above intervocalic /ts/, which is spelled <z>, is always realized as a geminate in standard Italian; however, many northern Italian speakers have a spelling pronunciation when only one <z> appears in the spelling of a word: for example ['spattsi] *spazzi* 'you sweep', but ['spa:tsi] *spazi* 'spaces', in spite of the latter word also being ['spattsi] in the standard language (Maiden 1995: 56).

One early influential proposal came from Wilhelm Meyer-Lübke. According to Meyer-Lübke (1890: 142), the dual outcome is phonologically motivated, as it would depend on stress position:[10] [ʃ] would be the outcome of post-tonic -sj- (for example *bácio*, *cácio*), while [ʒ] would be the pre-tonic outcome (for example *prigióne*, *pigióne*). Meyer-Lübke's conclusion was accepted by some authors, including Bourciez (1946) and Aebischer (1958). However, it was sharply criticized by Rohlfs (1952, 1966: 403-406), who argued for a radically different, non-phonological, explanation (with slight differences between his two works, which does not concern us here). Rohlfs (1966: 404) observes that Meyer-Lübke's idea does not easily hold up against the empirical data: words as *rágia*, *Biágio*, *ciliégio*, *pertúgio* have a voiced outcome despite the fricative being post-tonic, while words as *baciáre*, *cucíre* have no voicing of their pre-tonic fricative. According to Rohlfs, instead of depending on different phonological environments, the dual outcome is simply not dual; the only Tuscan outcome of -sj- is [ʃ], while [ʒ] was introduced into Tuscan by lexical borrowings from Old French, Old Occitan and northern Italian vernaculars.[11]

Rohlfs (1952, 1966) lists about thirty Tuscan words containing [ʒ] as the outcome of Latin -sj-, and states that under his borrowing hypothesis only one unexplained case of -sj- voicing exists, namely that in *pigione* (as it is not attested in the lexicon of French, Occitan and northern Italian vernaculars). Concerning all the other words, he notes that for twenty of them a cognate exists in Old French and/or Occitan, and five of them may come from northern Italian dialects (for example Rohlfs states that the suffix *-igiano* – indicating the inhabitants of the suffixed place name – was mostly used with northern Italian place names). He therefore argues that these culturally prestigious, "fashionable words (largely coming from the courtly society) [parole di moda (che provenivano in gran parte dalla società cortese)]" (1966: 405) were borrowed into Tuscan, sometimes even substituting already existing native Tuscan words which had [ʃ]. Finally, a more general point of Rohlfs' argumentation – indeed, in his own words the most important – is the general of lack of intervocalic voicing processes of Tuscan obstruents:

what most clearly shows the native Tuscan origin of š [i.e. [ʃ] in the phonetic alphabet Rohlfs adopts] is the fact that *cacio*, *bacio* and *camicia*, with their voiceless š,

[10] The methodological influence of the then relatively recent Verner's law is not stated explicitly, but is apparent.

[11] Rohlfs' hypothesis is complicated by the fact that the outcome of -sj- in Old French is standardly assumed to be [iz] (*prison* < PREHENSIONEM, *faisan* < PHASIANUM and so on); Rohlfs (1966: 405) supposes that in the 12th century it was not yet [iz] but [iʒ], or in any case the consonant of that cluster had a place of articulation intermediate between [z] and [ʒ].

perfectly agree with the other pure Tuscan forms (*fuoco*, *dato*, *ripa*, *mese*, *stazzone*), unlike the voiced *ž* [i.e., [ʒ]], which instead aligns with a series of other forms with a northern Italian development (*lago*, *dado*, *riva*, *paése*, *stagione*) [quello che più di tutto dimostra la schietta toscanità di š è il fatto che *cacio*, *bacio* e *camicia*, con la loro š sorda, vanno perfettamente d'accordo con le altre forme toscane pure (*fuoco*, *dato*, *ripa*, *mese*, *stazzone*), di contro alla sonora *ž*, che va invece ad allinearsi con una serie di altre forme a sviluppo nord-italiano (*lago*, *dado*, *riva*, *paése*, *stagione*)].
(*Ibidem*, 406)

Criticizing Rohlfs' proposal, Aebischer (1958) revives Meyer-Lubke's idea of a stress-dependent outcome. After examining medieval Latin documents, he notices that the earliest and most frequent attestations of the suffix *-igiano* in place names – which Rohlfs claims to be more common in northern Italy than in Tuscany – are actually in Tuscany. This obviously militates against Rohlfs' conclusion that *-igiano* is a loanword; likewise, Aebischer also points out that the fact that many Tuscan words having [ʒ] as the outcome of -SJ- have a cognate in French and/or Provençal by itself is no evidence that they should be loanwords from these languages: it is a necessary condition for them to be loanwords in Tuscan, but not a sufficient one.

Also Castellani (1960a [1980], 1960b [1980], 2000: 138-140) observes that many of Rohlfs' arguments either are irrelevant or empirically debatable. First, Castellani follows Aebischer (1958) in observing that the earliest attestations of the suffix *-igiano* are Tuscan rather than northern Italian, contrary to what Rohlfs states. Second, according to Rohlfs spellings as <priscione>, with <sc(i)> used in words which have [ʒ] in modern Tuscan, show the original voiceless Tuscan outcome, later supposedly supplanted by a more 'fashionable' cognate loanword; but the spelling <sci> was sometimes used to also represent [ʒ] (see Section 3.2 above). Third, Rohlfs' hypothesis of the outcome of -SJ- in Old French and many northern Italian dialects having had a place of articulation intermediate between [ʒ] and (attested) [z] is a rather *ad hoc* assumption. Fourth, an aspect which is largely ignored by Rohlfs is toponymy, which by its very nature rarely includes loanwords. Castellani, after examining data from two etymological works on Tuscan place names (Pieri 1898, 1919), observes that in Tuscan place names the voiced outcome of -SJ- is common; indeed, [ʒ] seems to be more frequent than [ʃ], as it appears in half or more of the place names he lists (25 with [ʒ] vs 23 or[12] 18 with [ʃ] – Castellani 1960a [1980]: fn. 69). Fifth, he criticizes some of Rohlfs' conclusions about specific words, as the etymon of *ciliegia* 'cherry' < CERASEAM. Finally, his acceptance of many of Aebischer's (1958) arguments notwithstanding, it must be added that Castellani does not follow his idea about the

[12] Depending on the interpretation of some ambiguous Aretine place names.

role of stress position, which he shows to be often contradicted by the data. This means that he does not explain the two different outcomes in terms of phonetic conditioning; the alternative explanation he offers supposes an interaction between the two processes of palatalization and intervocalic voicing.

In fact, -sj- voicing is part of a more general issue concerning the nature of intervocalic obstruent voicing in Tuscan. Just as Rohlfs saw in the alleged overall absence of intervocalic voicing processes in Tuscan a sign of the non-native origin of [ʒ], so Castellani thought that -sj- voicing was a part of a more general Tuscan trend towards partial intervocalic voicing. While Latin intervocalic voiceless obstruents mostly remain so in Tuscan, a not insignificant number of words display a voiced outcome; aside from the outcome -sj- > [ʒ], also Latin -s- and the stops -c-, -t-, -p- may yield [z], [g], [d], [b/v] in Tuscan. These dual outcomes have generated a huge amount of debate among Romance historical linguists, which is impossible to summarize here. Suffice it to say that authors like Rohlfs rule out the existence of intervocalic voicing in Old Tuscan, and consider all words with a voiced outcome to be loanwords from Western Romance languages (which did have intervocalic voicing). On the contrary, Castellani saw in the partial voicing an "imitative voicing"; in his opinion, Tuscan initially preserved voicelessness, but the alleged prestige of northern Italian vernaculars in Tuscany made words with a voiced obstruent "fashionable" and triggered an "imitation" by Tuscan speakers; they not only borrowed words from their northern neighbours, but also extended the voicing process to their own lexicon (Castellani 1960a [1980]: 240-241 fn. 111; 2000: 136).

According to Castellani (1960a [1980]: 240), especially the behaviour of the other Tuscan sibilant is revealing: "it seems to me impossible to solve the problem we are discussing without considering /s/ voicing. This voicing is partial, [...] and it is due [...] to a fashion which consisted in imitating the northern pronunciation [[n]on mi sembra possibile risolvere il problema che c'interessa senza tener conto della sonorizzazione dell'esse. Tale sonorizzazione è parziale, [...] ed è dovuta [...] ad una moda consistente nell'imitare la pronuncia settentrionale]".[13] According to Castellani (*Ibidem*, 243), -s- voicing was close to regular, and the few words preserving [s] were high-frequency words or words "protected by an emotional barrier [protette da una barriera emotiva]" (whatever this may mean). Being a special case of intervocalic -s-, -sj- would have been voiced too, yielding [zj] or more rarely remaining [sj]; voicing would have been more or less simultaneous with palatalization, causing the coexistence of [sj], [zj], [ʃ] and [ʒ] for a relatively long period.

[13] Although Castellani (1960a [1980]: 241, 243) also states (somehow contradictorily, since the mechanism is supposed to be the same), that -s- voicing was much more systematic than stop voicing.

What Castellani (*Ibidem*, 244) calls "il gioco delle oscillazioni tra i continuatori di SJ [the interplay of fluctuations among the outcomes of -SJ-]" would have variably favoured one or another, generating the dual outcome we observe today in Tuscan.

After Castellani (1960a [1980], 1960b [1980]) few works on the topic of -SJ- voicing have appeared. Rohlfs (1966: 404 fn. 2) mentions Castellani (1960a [1980]) only to say that he finds his arguments unconvincing, but his discussion of -SJ- is otherwise the translation from German of the arguments he made in the 1949 original; Tuttle (1976) ascribes the outcome [ʒ] to a voicing rule caused by the influence of northern Italian vernaculars, but most of his paper is devoted to other aspects of the diachronic evolution of -SJ-. One notable exception is Aski (2001); the core idea of her proposal is that Tuscan had an intervocalic voicing process, but its output was only partial. Here the phrase 'partial voicing' has a meaning different from Castellani's; while in Castellani's explanation of this sound change it meant that voicing did not reach every *lexeme* including an outcome of Latin -SJ-, in Aski's account it meant that voicing (at least initially) did not reach completion within the *phoneme* that developed from -SJ-.

She assumes that palatalization of -SJ- occurred regularly; the outcome /ʃ/ was then subject to an allophonic voicing process when intervocalic, with more or less voiced realizations ranging from [ʃ] to [ʒ]. Indeed, something similar exists in Florentine Tuscan even today (see fn. 7), as well as in other parts of central and southern Italy. For example, in Lazio intervocalic /ʧ/ is spirantized (as in Tuscany), but can also be partially voiced, especially in fast speech (Troncon and Canepari 1989: 49-50; Suzuki 1976-1977). According to Aski (2001), the re-analysis of the variable output of this allophonic process as two different phonemes /ʃ/ and /ʒ/ was caused by the intervocalic lenition of /ʧ/ and /ʤ/. Whereas any occurrence of [ʃ] vs [ʒ] (or any laryngeally intermediate realization) was a matter of allophony before this lenition process took place, when intervocalic /ʧ/ and /ʤ/ were lenited the difference between [ʃ] vs [ʒ] became phonologically contrastive. This supposedly caused the re-categorization of the variably voiced outcome of -SJ- as instances of either intervocalic /ʧ/ or /ʤ/. Allophones of /ʃ/ closer to [ʃ] were re-interpreted as intervocalic occurrences of /ʧ/, while allophones closer to [ʒ] were re-interpreted as intervocalic occurrences of /ʤ/.

4.1 *Discussion of the previous proposals*

As the previous section shows, stating this sound change as a classical sound law is arduous; the only serious attempt at it, i.e. Meyer-Lübke (1890), fails rather miserably when confronted with the empirical data. All the other proposals try to find a reason for the coexistence of [ʃ] vs [ʒ] which does not recur to the assumption of a wholly regular sound change. Rohlfs' (1966) hy-

pothesis of lexical borrowing adopts one of the most classical and common solutions to seemingly dual outcomes: one of the two outcomes is not native, but of exogenous origin. Without entering into a point-by-point discussion of each word for which Rohlfs proposes a borrowing, it is clear that some words are almost certainly loanwords (for example *magione* 'house', *cervogia* 'kind of beer' from French), or probably are (for example *tregenda* 'alley' from northern Italy). However, Castellani (1960a [1980], 1960b [1980]) convincingly demonstrates that several of Rohlfs' alleged loanwords probably are native Tuscan words. More broadly, Castellani's general conclusion is hardly disputable: words containing [ʒ] are too many and, even more importantly, too frequent in areas of the lexicon which usually are native (place names, for instance) for all of them to be loanwords. Therefore, both outcomes have to be native (there is no serious argument to hold a sort of mirror version of Rohlfs' view, i.e. imagine that only [ʒ] is the native outcome).

But while Castellani shows *that* there has been a double outcome, he does not provide an entirely convincing explanation of *how* and *why* it happened. His hypothesis that northern Italian vernaculars had a prestigious status in early Middle Ages Tuscany is, ultimately, an assumption difficult to prove (being more or less as firm as our knowledge of Early Middle Ages Italo-Romance sociolinguistics). Furthermore, it seems unlikely that a mere "fashion" was sufficient to establish a new phonological process, and in any case this supposed mechanism does not explain why, if Tuscan speakers "imitated" intervocalic voicing, it only reached a part of the lexicon (and a relatively small one, in the case of intervocalic stops); his reference to a not further defined "interplay of fluctuations among the outcomes of -sj-" (Castellani 1960a [1980]: 244) as the cause of the dual outcome falls short of sufficient explicitness. With respect to more specific points of his proposal, the pervasivity of -s- voicing in the lexicon (of which according to Castellani -sj- voicing is merely a special case) is debatable, as several clearly native words (e.g. *casa* 'home', *cosa* 'thing') preserve [s]. It is also far from obvious that -s- voicing preceded (or at most coexisted with) -sj- palatalization, although this again is a necessary prerequisite for Castellani's argument; actually, palatalization of -nj- and -lj- occurred quite early, probably before any intervocalic voicing process.

Instead, Aski's (2001) model of sound change is precisely designed to deal with non-systematic changes. It is based on the assumption that there was phonetic variability in the output of the voicing rule affecting intervocalic /ʃ/; once lenition of intervocalic /ʧ/ and /ʤ/ caused the loss of /ʃ/ as an independent phoneme, the possibility of phonological reassignment of its variably voiced output to two different phonemes (voiceless /ʧ/ or voiced /ʤ/) follows fairly straightforwardly.

However, a crucial problem for her proposal is the assumption that the split in the outcome of -sj- was chronologically more recent than the lenition

of /ʧ/ and /ʤ/ (because the latter change is the supposed trigger of the former). Unfortunately for this idea, a spelling distinction between /ʃ/ and /ʒ/ < -SJ- (although not always present, and if present used waveringly and not systematically), was already attested in texts that precede by many decades if not centuries the lenition of /ʧ/ and /ʤ/ – which is at odds with the idea that the split between /ʃ/ and /ʒ/ did not exist until the 14th century. Aski's (2001) argument also seems to ignore the fact that the lenitions of /ʧ/ and /ʤ/ were not simultaneous.

Aski sees the non-systematic use of different spellings as a proof that up to the 14th century there was still only one phoneme /ʃ/ with variable realizations. But a simpler interpretation is that an established norm did not yet exist for the spelling of phonemes which were not already present in the phonological inventory of Latin, and therefore did not have a well-established spelling convention; the frequent use of <si> for both voiceless and voiced sounds was probably justified by etymological considerations. A sign that <si> was also used to represent voiced sounds is its use to spell Gallo-Romance loanwords (e.g. *ragione* < Fr. *raison* < RATIONEM, *palagio* < Fr. *palais* < PALATIUM, *malvagio* < Occ. *malvatz* < MALIFATIUM, *servigio* < Occ. *servizis* < SERVITIUM, often spelled <rasione>, <palasio>, <malvasio>, <servisio>), which certainly had a voiced sound (although it is not obvious that it was [ʒ], see Section 4). Moreover, when a scribe uses two different spellings, it is quite rare to find <sg(i)> (or any other spelling that is typically used for [ʒ]) in words that have a voiceless alveopalatal fricative in modern Tuscan. Furthermore, Aebischer's (1958) survey of Latin documents shows that [ʒ] was often spelled as <s(i)> in Tuscany even before the earliest texts written in Tuscan appeared. Overall, these orthographic forms concur to suggest that the phonological split had already occurred before the earliest written documents, but a spelling convention to represent the voicing of [ʒ] was not yet fully established.

Another problem lies in Aski's notion of variability. Her assumption of a phonetic continuum along the voiceless/voiced continuum is plausible, as a similar process exists even in modern varieties of Tuscan (cf. Aski 2001, fn. 7) and an allophonic voicing process of intervocalic stops can be reconstructed for Old Tuscan (see Section 5). But it is not clear how a merely 'variable' allophonic rule can produce such a wide range of variation, to the extent that both voiceless and voiced outcomes are possible. In this respect, her model of sound change is not significantly more explicit than Castellani's "interplay of fluctuations" which she aims to replace; in fact, she acknowledges (*Ibidem*, 284-285) that in itself the notion of 'variable rule' is closer to a descriptive statement than to an explanation. Thus, an obvious question arises: was the variation of the supposed voicing process governed (or at least influenced) by any phonological factor, or was it completely random and merely 'variable'?

Given these considerations, in the next sections I will make the following assumptions:

- as argued by Castellani, both [ʃ] and [ʒ] are native outcomes in Tuscan (at the risk of sounding obvious, I stress this does not imply that loanwords containing [ʒ] do not exist at all in Tuscan).
- Although it is difficult to date it with precision, /ʃ/ voicing was earlier (and presumably much earlier) than the lenition of intervocalic /tʃ/ and /dʒ/. This means that the part of Aski's hypothesis about lenition as the 'catalyst' of /ʃ/ voicing has to be rejected.[14]
- However, Aski's idea that the driving force behind the dual outcome of -sj- was an allophonic intervocalic voicing rule is still valuable, and will be adopted here.
- I will also assume that the voicing of intervocalic /ʃ/ is but an aspect of a broader phenomenon of intervocalic obstruent voicing of Tuscan; hence, observations about other Tuscan voicing processes may be relevant to understand the problem of /ʃ/ voicing.
- The variation of the allophonic voicing process was not random; some form of phonological conditioning existed (see Section 6).

5. *Some arguments for reconstructing allophonic intervocalic voicing in Tuscan*

As mentioned in Section 2, allophonic intervocalic voicing of /tʃ/ is a feature of modern Tuscan and other central and southern Italian dialects. This is but an aspect of a much broader range of Italo-Romance lenition processes (see Giannelli and Cravens 1997 for a review of them), which among others include intervocalic spirantization of voiceless and, to a lesser degree, voiced stops (for example the so-called *gorgia toscana*, see Giannelli 2000: *passim*), allophonic voicing of stops (for example in Rome, see Troncon and Suzuki, 1976-1977; Canepari 1989), allophonic lenition of intervocalic fricatives (for example in southern varieties of Italian, Nocchi and Schmid 2008); they usually cross word boundaries (for example Florentine /in ˈkasa/ → [iŋˈkaːsa] *in casa* 'at home', but /la ˈkasa/ → [laˈhaːsa] *la casa* 'the home'). Furthermore, in several dialects two or more of these lenition processes coexist, resulting in the voicing and/or fricativization/spirantization of intervocalic stops and/or fricatives and/or affricates. These

[14] However, Aski's idea that the appearance of words containing an unequivocal [ʒ] (rather than a continuum from [ʃ] to [ʒ]) may have triggered the reanalysis could still be saved in some way. The presence of a small, but not insignificant, group of loanwords from Gallo-Romance having [ʒ] (*magione*, *ragione*, *Parigi*, and so on), might have caused the reanalysis of the most voiced outputs of intervocalic /ʃ/ as [ʒ], or at least might have strengthened an already existing tendency to re-categorize them. A crucial uncertainty about this revised version of Aski's hypothesis lies in the difficulty of dating the entry of these loanwords in Tuscan and the voicing of intervocalic /ʃ/; if voicing was a very early process, it also predated the entry of the Gallo-Romance loanwords listed above.

processes are usually also subject to a degree of variability, being influenced by sociolinguistic variables, speech rate, and so on.

Whereas these processes are allophonic, in many other Romance languages (the so-called 'Western Romance' branch) intervocalic obstruents underwent diachronic lenition processes which made the voiceless phonemes voiced and/or changed stops to continuants. -SJ-, for example, usually yielded [z] or [ʒ] in northern Italian vernaculars, [iz] in Old French; intervocalic -K-, -T-, -P- were voiced to [g], [d], [b], with further lenition in some languages changing [b] to [v] or even zero, [d] to zero, and so on. The difference between the two areas – Western Romance with a phonological leniting diachronic change, and Eastern Romance with 'only' allophonic lenition – seems to be more a matter of degree than kind. In fact, some authors have argued that allophonic lenition processes similar to those attested in modern Eastern Romance were once present in most Romance languages; they were lexicalized in Western Romance, while they remained allophonic in Eastern Romance (see Weinrich 1958 for an early proposal along these lines; Cravens 2002; Hualde 2011 for recent versions).

Interestingly, Tuscan lenition seems to belong in both: most obstruents of modern Tuscan undergo some form of allophonic lenition, but signs of lexicalized lenition are also present. As regards stops, while Latin intervocalic -K-, -T-, -P- are usually preserved as voiceless phonemes (although realized with allophones having varying degrees of lenition – [h], [θ], [ɸ] being common outputs, but not the only ones), in a good number of words they have a voiced outcome (e.g. *lago* 'lake' < LACUM, *spada* 'sword' < SPATHAM, *riva* 'shore/bank' < RIPAM). They have been frequently interpreted as loanwords from Western Romance languages (e.g. Rohlfs 1966) – but voicing can be found even in words that have no cognates or no intervocalic voicing in Western Romance languages, as *codesto* 'this, that' < *ECCUM TĬBI ISTUM and Pisan *pogo* 'a little' < PAUCUM respectively – or as a Tuscan 'imitation' of Western Romance voicing (Castellani 1960a [1980], 2000; doubts about 'imitation' hypotheses already raised above also apply to this case). An alternative solution is to see the voiced stops as the outcome of a non-systematic voicing process (as argued, among others and from different viewpoints, by Giannelli and Savoia 1979-1980; Wanner and Cravens 1980; Maiden 1995; Cravens 2002; Canalis 2014, 2015).

One argument to rule out borrowing or imitation in favour of reconstructing a native phonological change is the presence of a phonological conditioning; if, despite not being systematic, voiced outcomes are more frequent in certain phonological environments than in others, such an asymmetric distribution cannot be ascribed to borrowing or imitation – since in Western Romance languages intervocalic voicing regularly targeted all intervocalic stops. In fact, it was noticed as early as Pieri (1901) that in Tuscan voiced outcomes are more frequent among velar stops rather than labials and coronals,

and Wanner and Cravens (1980: 340) explicitly mention it as an argument against the hypothesis of lexical borrowing. Canalis (2014, 2015) builds on these observations examining a list of about 350 words containing the outcome of Latin intervocalic voiceless stops, and finds that voiced outcomes are more likely (at a statistically significant or highly significant level) next low vowels, next to word stress, and if they are velar stops.

While these results strongly suggest that stop voicing is not the product of borrowing or 'imitation', they do fit the classical model of Neogrammarian sound change either. Many (most, indeed) words do not show voicing, making the change not regular. However, the possibility of such a change – lexically non-systematic but only governed by phonological factors, rather than analogy or borrowing – has already been recognized by others; cf. for example Durie's (1996) concept of 'probabilistic sound change' to account for the non-systematic lowering of Proto-Germanic **i* and **u* followed by a non-high vowel in Old Icelandic, Old High German and Old English, and Hualde *et al.*'s (2011) analysis of intervocalic lenition in contemporary Spanish. These changes provide evidence to the idea that the lexicalization of an allophonic process may operate on a word-by-word basis, thus producing a dual outcome.

As for the mechanism allowing this partial re-categorization, a possibility is that the output of the allophonic voicing process, without being a fully voiced consonant, was very similar to it; this partial phonetic overlapping would have caused the realizations of intervocalic /p, t, k/ to be close enough to [b, d, g], and therefore perceptually ambiguous between voiceless and voiced segments, leading to their non-systematic recategorization as instances of /b, d, g/. Something similar is actually attested in modern Rome Italian, where intervocalic /p, t, k/ are partially voiced and lenited; sporadic spelling 'errors', as *marido* for *marito*, *rigavare* for *ricavare*, and so on are produced by less educated speakers (Troncon and Canepari 1989: 47).

If this explanation for the voicing of intervocalic stops in Tuscan is credible, a comparable approach is conceivable for -sj- voicing: variably voiced occurrences of intervocalic /ʃ/ were re-interpreted as /ʒ/, this re-categorization being easier in the phonological environments that caused a stronger allophonic voicing (also in this case a parallelism exists with modern vernaculars: in some varieties in which intervocalic /tʃ/ is lenited to [ʃ], it may also be partially voiced).

Apparently, there is a fundamental difference between Tuscan stop voicing and /ʃ/ voicing; while /g, d, b~v/ already existed in the phonological inventory of Tuscan – and therefore intervocalic voicing merely increased the number of their occurrences in the lexicon – /ʒ/ did not exist before the voicing process. This means that the supposedly voiced realizations of intervocalic /ʃ/ did not overlap with a pre-existing /ʒ/, seemingly making the idea of a phonetic ambiguity less compelling. However, a new phoneme /ʒ/ was

relatively easy to accommodate within the Tuscan consonant system. Almost all the Tuscan obstruents contrasted for voicing, /ʃ/ being (with /s/) the only one without a voiced counterpart; given the pervasiveness of the feature [±voice] in the phonological inventory of Tuscan and the typological tendency towards symmetric inventories, the absence of the two voiced fricatives was a relatively easy to fill gap. Therefore, if a general allophonic voicing process targeting most intervocalic obstruents was at work, it was fairly natural to interpret outputs close to [ʒ] as instances of a [+voice] counterpart of /ʃ/.

6. *Analysis*

6.1 *Method and data*

The clearest proof for the hypothesis of a partial phonological recategorization of /ʃ/ triggered by an allophonic voicing process would be a phonological conditioning influencing the distribution of the voiced and voiceless outcomes of -SJ-. As explained above, this hypothesis does not assume that only one outcome of -SJ- is expected in Tuscan (what Rohlfs believed, as he ascribed the existence of [ʒ] to loanwords), or that the distribution of the two outcomes can be stated in terms of an exceptionless Neogrammarian sound law (which was Meyer-Lübke's hypothesis). However, neither it assumes that the distribution of the two outcomes is simply random (which both Castellani and Aski, despite their otherwise different analyses, basically say). Rather, it predicts that phonological environments that plausibly cause more intervocalic voicing should have a higher ratio of [ʒ] outcomes when compared to less favourable environments.

If the frequency of -SJ- voicing is related to phonological parameters, the most promising to investigate are those already known to be associated to stop voicing. As seen above, vowel height, place of articulation and stress were relevant factors. However, differences in place of articulation do not pertain to -SJ- voicing, as only one place is involved. As for stress, the presence of a stressed vowel next to -SJ- might induce more voiced outcomes than two unstressed vowels surrounding the consonant; however, we will ignore this parameter as well, since there are very few instances of sibilants between two unstressed vowels. This does not mean that stress is to be ignored altogether; a possibility which (in the spirit, if not the letter, of Meyer-Lübke's and Aebischer's proposal) we will test is the role of stress position, comparing the pre-tonic and post-tonic outcomes of -SJ-. Finally, the height of the preceding and following vowel is included among the parameters examined.

Such an approach ideally works with a relatively large number of words, since the observation of a higher frequency of voicing in a certain environment over another might be merely casual if based on a small population.

A fundamental practical problem with the outcomes of -sj- is the relatively low number of words containing them; while Canalis (2014, 2015) was able to examine about 350 items containing an intervocalic stop, Rohlfs (1952) lists 24 Tuscan words having [ʒ] (including some patent loanwords as *Parigi* 'Paris' and *Tamigi* 'Thames'); words having [ʃ] amount to more or less the same. For this reason, results cannot be as unequivocal as those obtained for intervocalic stops. Moreover, the results presented here are still preliminary, as a more in-depth investigation would require solving some puzzles posed by spelling (see especially Section 3.2).

A precondition for this approach is the definition of which words to consider, as loanwords are to be excluded (their inclusion would blur the effect of the phonological conditionings, provided that they exist). One of the major issues in the debate about -sj- voicing has been precisely the amount of Western Romance loanwords in Tuscan; Rohlfs holds that nearly all occurrences of [ʒ] can be proved to be loanwords, while others (for example Castellani) have strongly disputed this claim. To make a concrete example, is Tuscan *fagiolo* [faˈʒoːlo] a native word or a "fashionable" (Rohlfs 1966: 405) loanword from Occitan that replaced a previous native [faˈʃoːlo]? Ultimately, until we focus only on this specific word (or on any specific word, for that matter) we may never know conclusively; both opinions have their points, but neither is demonstrable with absolute certainty. Rohlfs (1966: 404-406) observes that [faˈʃoːlo] is the regular outcome in the closely related vernaculars of Umbria and Latium, and supposes that in Tuscan it was replaced by the similar and "fashionable" loanword *faizol* from Old Occitan; but in several other cases Tuscan outcomes differ from those of the other Central Italian vernaculars, which makes his argument hardly decisive. He also mentions the existence of spellings as the surname *Manducafascioli* (literally 'cowpea eater') in medieval Tuscan texts, but as seen above the spelling <sc(i)> could be also used to represent [ʒ]. Castellani (1960b [1980]: 245) retorts that the Latin etymon PHASEOLUM is scarcely continued in southern France (FEW VIII: 373). In any case, it is a basic tenet of historical linguistics that words whose referents belongs to everyday life typically are not loanwords; since *fagiolo* denotes a crop indigenous to Tuscany, it is unlikely to be a loanword from Old Occitan (*contra* Rohlfs' conclusion). Nevertheless, unlikely is not equal to impossible; Castellani himself argued that the Florentine words *coniglio* 'rabbit' (Castellani 2000: 103) and *piccione* 'pigeon' (Castellani 1967 [1980]: 30-31) were borrowed – from France and central Italy, respectively – without this implying that Tuscans did not know rabbits or pigeons before the two supposed lexical borrowings.

A different approach to the question is adopted here: once clear loanwords are factored out, it is more fruitful to examine whether the remaining words display signs of phonological conditioning, without discarding

words that cannot be proved conclusively to be native, because in many cases a decisive proof for or against borrowing is not available. We included all the words mentioned by Rohlfs and Castellani which meet these criteria, for a total of 26 words or suffixes (see the word list in the Appendix).

A further problem is spelling: does spelling variation between <sci> (and <si>, etc.) and <sg(i)> (and <s(i)>, etc.) for the same word reflect actual phonetic differences between [ʃ] and [ʒ] (much as in Old Tuscan spellings as *lacrima* and *lagrima*, *laco* and *lago* coexisted), or is it only graphic variability? As discussed above, this issue is difficult to settle; we will provisionally assume that consonants that are voiced in modern Tuscan were also voiced in Old Tuscan, even if in Old Tuscan texts they are written with a spelling often used for [ʃ] too. A more thorough investigation would require a (time consuming) examination of each text's spelling conventions, which we will postpone to future research.

6.1.1 *Vowel height*

There is reason to suppose that the height of the adjacent vowels could affect the probability of having a voiced outcome of -sj-. First, because such an effect seems to be relevant in the voicing of Tuscan intervocalic stops (Canalis 2014, 2015); second, because it is known that vowel height interacts with the perception of voicing in adjacent obstruents.

We know that there is an inverse correlation between vowel height and F_0: all else equal, lower vowels have lower F_0 (a phonetic universal that has been found to be valid in all the about 100 languages in which it has been investigated, Whalen and Levitt 1995). We also know that the value of F_0 at the start of a post-consonantal vowel, as well as at the end of a pre-consonantal vowel, influences the perception of the preceding/following consonant as voiceless or voiced:

> [w]hen listeners categorize synthetic or digitally manipulated natural speech tokens of a phonetic series varying from perceptually voiced to voiceless (e.g., from [ba] to [pa]), listeners more often identify tokens as voiced (i.e., as [ba]) when f_0 is low. For higher f_0's, listeners more often report hearing voiceless consonants (i.e., [pa]). This finding is extremely robust, and has been reported across multiple phonetic contexts (Holt *et al.* 2001: 764).

For example, Castleman and Diehl (1996) created a scale of synthetic stimuli perceptually intermediate between [ɑpə] and [ɑbə], and also varied the value of F_0 at the onset of the post-consonant vowel; when F_0 was lower, English speakers perceived more often the ambiguous labial stop as [b] rather than [p]. These two facts combined imply that low vowels, all else equal, might cue the perception of an obstruent as voiced more

than high(er) vowels would. Table 1 shows how the outcomes of -SJ- correlate with the height of the preceding vowel, while Table 2 show the data concerning the following vowel. Both tables are based on the data in the Appendix. It must be added that inflection in Tuscan changes the quality of word-final vowels in nominal words; this means that when the post-consonantal vowel examined here is word-final, its quality may vary (e.g. *bacio* 'kiss.SG', but *baci* 'kiss.PL'). These vowel alternations make it less clear which is the post-consonantal vowel; we tentatively consider it to be the vowel of the singular form. Also, verbal inflection may change both vowel quality and stress position (e.g. *bácio* 'I kiss', but *baciávo* 'I kissed'). Tuscan (and more generally Romance) verbs can be divided into three[15] different inflectional classes or conjugations; since one of their most salient features is the 'thematic vowel' which appears in many cells of the paradigm after the verb root, we tentatively consider the thematic vowel to be the post-consonantal vowel when vowel alternations occur. As for stress position (Section 6.1.2), it is more difficult to determine which of the two options is the prevailing one, so outcomes of -SJ- in verbs are treated as an intermediate category between pre-consonantal and post-consonantal stress.

Table 1. Height of the preceding vowel

	/a/	/ɛ, ɔ, e, o/	/i, u/
Voiceless outcomes	3	0	6
Voiced outcomes	7	2	8

Table 2. Height of the following vowel

	/a/	/ɛ, ɔ, e, o/	/i, u/
Voiceless outcomes	2	5	2
Voiced outcomes	11	6	0

The data show that the height of the preceding vowel is virtually irrelevant. On the other hand, the height of the following vowel appears to show the expected correlation: words with a low(er) post-consonantal vowel have much more [ʒ] outcomes than words with a high(er) post-consonantal vowel.

[15] Actually, traditional grammar identifies three conjugations, but it would be more accurate to distinguish four classes (splitting the traditionally 'second' conjugation in two); however, since the thematic vowel of both these classes is [e] (they differ in other respects), for our present purposes the difference may be ignored.

6.1.2 *Stress position*

As seen above, Meyer-Lübke (1890) and later Aebischer (1958) have already supposed that stress position causes the two different outcomes. Our data also suggest that it is the post-consonantal position which favours voicing:

Table 3. Stress position

	Pre-C stress	Verbs	Post-C stress
Voiceless outcomes	6	3	0
Voiced outcomes	6	4	7

The impact and statistical significance of vowel height and stress position on the outcome of -SJ- (which is obviously a dichotomous variable – either [ʃ] or [ʒ]) can be estimated by a logistic regression. The results are shown in (6) (the function *lrm* from the *R* package *Design* was used).

(6)

	Coef.	Std. Error	Wald Z	Pr(>|Z|)
(Intercept)	-4.3731	1.9983	-2.19	0.0286
Pre-C Vowel Height	0.9584	0.7205	1.33	0.1835
Post-C Vowel Height	2.0267	1.0064	2.01	0.0440
Stress position	2.1325	1.1105	1.92	0.0548

Despite the small number of words available, the effect of vowel height of the post-consonantal vowels is statistically significant, and the *p*-value of the effect of stress position is just slightly above the conventional threshold of 5%.

The role of post-consonantal stress seems to be confirmed also by another set of data. As seen above, Aebischer (1958) thought to have found a confirmation of Meyer-Lübke's idea in medieval Latin documents written in Tuscany. He supposed that the alternative spellings <sc(i)> and <s(i)> in place and people names depended on stress position: the spelling <sc(i)> (for [ʃ]) would be used for post-tonic consonants, while <s(i)> (for [ʒ]) for pretonic consonants (for example he reports the spellings *Campo de Cerásca*, *vinea Ceráscio* vs *Cerasiólo*, *in Cerasólo*).[16] Castellani (1960a [1980]) expanded these observation to other Latin documents and expressed scepticism about Aebischer's conclusion, given the large number of exceptions to the purported sound law. It is certainly true that Castellani's data are incompatible with the

[16] Stress was not marked in the spellings, but it has been added for clarity purposes.

Neogrammarian sound law Aebischer imagined; but, interestingly, they display a certain asymmetry in the distribution of the two spellings. Castellani's scrutiny of the *Regestum Senense* shows the following variation in spelling:

Table 4. Spelling and stress in the *Regestum Senense*

	Pre-C stress	Post-C stress
<si> spelling	27	11
<sci> spelling	6	9

A chi-squared test shows that the results are just above the threshold of statistical significance (p=0.074); considering the small number of observations, it is anyway interesting that they, like the results presented above, suggest a certain correlation between stress position and the outcomes of -sj-. Two things are to note about these results. First, their asymmetry is seemingly the opposite of what Aebischer supposed (and of what was found in Table 2). Despite his claim that [ʒ] was the outcome before stress and [ʃ] the outcome after stress, the data from the *Regestum Senense* do not say so: <si>, which is the spelling usually used for [ʒ], is most frequent after stress.

Second, if they are not an illusion, pairs like *Cerásscio* vs *Cerasiólo* point to the possibility that synchronic alternations still existed, and thus that -sj- voicing was still active when recordings were written in the *Regestum Senense* (which was no later than AD 1200).

7. *Conclusions*

In this paper, we have tried to demonstrate the following points:

- the occurrences of [ʒ] are too many and too rooted in the core lexicon of Tuscan to satisfactorily explain most of them as loanwords; therefore, both [ʃ] and [ʒ] are native outcomes of -sj-;
- however, a Neogrammarian sound law is not a viable solution to describe the distribution of [ʃ] and [ʒ], as there are too many exceptions to its predictions;
- the hypothesis of an allophonic voicing processes with partial lexical recategorization may offer a solution to this puzzle; analogies with other intervocalic voicing processes in Old Tuscan may help shed light on the nature of -sj- voicing;
- a specific prediction of this hypothesis is a distribution of [ʃ] and [ʒ] probabilistically related to phonological parameters that are known to favour intervocalic voicing; interestingly, this prediction is consistent with the (admittedly small) set of data examined here.

In any case, these results are only preliminary, and many questions remain open; furthermore, the relatively low number of words having an outcome of -SJ- makes it difficult to reach firm conclusions. One way to extend the data set may be the examination of spelling alternations in medieval Latin texts, but, as seen above, a preliminary understanding of the intricate spelling conventions is a crux. Further research is needed to shed more light on this aspect.

Appendix

Words with an etymological intervocalic -SJ-

	Item	Meaning	Etymon
1	*-igiano*	suffix	-ISIANUM
2	-V*giano*	suffix in place names (more common than -V*ciano*)	-SIANUM
3	*bacio*	kiss	BASIUM
4	*bastagio*	porter	Med. Latin BASTASIUM
5	*brace*	embers	*BRASEAM
6	*bragia*	embers	*BRASEAM
7	*brici(ol)a*	crumb	*BRISIARE
8	*bruciare*	to burn	*BRUSIARE
9	*bugia/bugiare*	lie / to lie	Med Lat. *BAUSIA < Germanic *BAUSJA
10	*cacio*	cheese	CASEUM
11	*cagione*	motive	OCCASIONEM
12	*camicia*	shirt	CAMISIAM
13	*ceragia*	cherry	CERASEAM
14	*cinigia*	hot ashes	CINISIAM
15	*cucire*	to sew	COSIO < CONSUO
16	*fagiano*	pheasant	PHASIANUM
17	*fagiolo*	cowpea	PHASEOLUM
18	*mantrugiare*	to damage sth. with hands	*MANU TRUSIARE
19	*pertugio*	hole	PERTUSIUM
20	*pigiare*	to press	PINSIARE
21	*pigione*	rent	PENSIONEM

22	*pregione*	prison	PREHENSIONEM
23	*ragia*	resin	*RASIA
24	*sdrucire*	to tear	RESUERE + S-
25	*trangugiare*	to gulp down	*INGAUSIARE + TRA-
26	*truciolo*	shaving	*TRUSIARE

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