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Yod dropping in English and Croatian: some consonantal problems

1 Introduction

This article investigates some aspects of Croatian and English yod dropping vis-à-vis problematic consonantal representations. The analysis is couched in the framework of Government Phonology (GP) (Kaye et al. 1990) and its conception of melodic complexity (Harris 1990, 1992, 1994, 1996, 1997, Harris & Lindsey 1995). However, not only GP but also the apparatus of CV (Lowenstamm 1996, Scheer 1998a, 1998b, Ségéral & Scheer 1999) and VC (Dienes & Szigetvári 1999, Szigetvári 1999) phonology is tackled in connection with "branching" onsets. The underlying assumptions on melodic elements are not discussed (cf. Starčević 2001a, 2001b) for an analysis on the inerpretation of melodic primes). The separation of the melodic (qualitative) and the timing (quantitative) tiers is also taken for granted (cf. Goldsmith 1976, 1990, among many others). This paper is mainly concerned with problematic aspects of consonantal relations and will not so much offer a solution than add its bit to the corpus of unresolved issues.

If one views the question of branching onsets as basically one of static distribution, important generalisations regarding melodic structure are left unresolved. The empirical observation that there is no aspiration following [s] is no reason *per se* to reject such a possibility in English. Indeed, if **h** and **H** are taken to be present in [s] and [p^{h}] respectively, the exclusion of **H** from the latter cannot be explained on the basis of OCP[1] effects, for example. If, however, both [s] and [p^{h}] are regarded as containing the same element **H**, invoking OCP violations is more plausible and less ad hoc an

[1] The OCP, i.e., the Obligatory Contour Principle has originally been proposed to explain phenomena in tone languages such as the general prohibition on two identical tones in both underlying and surface representations (Leben 1973, Goldsmith 1976, etc.). In subsequent work, it has been extended to segmental phonology to explain the empirical fact that many languages avoid (partially) identical segments. McCarthy (1988) stated this principle in its most general format: adjacent identical elements are prohibited. The OCP applies to elements adjacent on a

explanation (cf. Starčević 2001b). Nevertheless, the question reveals another problematic area: there are also elements that are not lost due to the OCP but rather interpreted simultaneously in two consecutive positions (in other words such elements exhibit spreading).

2 The diphthongs [juː] and [je]: complementation versus fusion/fission

2.1 The distribution of [j] in English

While the distribution of post-consonantal [j] is rather restricted, that of word-initial [j] is free: it can occur with any of the vowels (e.g., *yeast, yoke, yard, your,* etc.). Post-consonantal [j] is almost exclusively found before [uː]. This cooccurrence has been interpreted as a very close relationship between the two, even to such an extent that they are considered as being dominated by the same node, i.e., by a nucleus owing to which the pronunciation of this composite element is [iuː]. This compound element is rather unstable for a number of reasons: (i) theoretically, a nucleus cannot support more than two positions (as per STRICT ADJACENCY and STRICT LOCALITY, cf. Kaye et al. 1990) and accordingly the element **I** looks for another docking site and (ii) it is not possible for **I** to fuse with **U** (a possibility for it to remain anchored within the nucleus) because such a compound would yield [yː] which is ruled out in English since **I** and **U** occupy the same autosegmental tier and are thus unable to combine (as opposed to **A** which moves on a tier of its own and can fuse freely with either **I** or **U** producing compound structures such as [e], [o], [æ], etc.).

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given tier and its effects are three-fold: (i) it may prohibit underlying representations violating it, (ii) it may motivate rules which suppress violations of it and (iii) it may block rules that would create violations of it. An even more abstract area of its application can be observed in the framework of VC Phonology (Dienes & Szigetvári 1999, Szigetvári 1999): in this framework, the skeleton is comprised of strictly alternating vocalic and consonantal positions, i.e., Vs and Cs. No two Cs and no two Vs can ever be adjacent on the skeleton: two identical occurrences of the same element would mean a violation of the OCP (or, alternatively, the OCP would merge the two identical instantiations). Thus, the OCP cannot only be evoked to account for suprasegmental and segmental phenomena but also for skeletal distribution. The characteristics of the skeleton and the melodic tier may not be so fundamentally different. It must be emphasised that the OCP is not concerned with prosodic structure. In VC phonology, there is no prosodic structure (i.e., no syllabic constituents, for example) and C/V are part of melodic bundles.

The only possibility for the expelled **I** to avoid stray erasure is to dock onto an appropriate landing site. There exist a number of such possibilities: (i) **I** can occupy an empty onset position if such a position exists: the floating **I** in *ewe* or *use* finds an empty onset to its left and is, accordingly, rendered as a consonantal **I**, i.e., [j]. This is corroborated by the use of the articles: *a ewe/use* vs. **an ewe/use,* [ðə] *ewe/use* vs. *[ðɪ] *ewe/use,* (ii) if the onset position to its left is occupied, **I** can either (a) fuse with the onset: *Tuesday* [ʧ-], *issue* [-ʃ-], *azure* [-ʒ-], etc. or (b) associate to it without causing fusion (i.e., it becomes a complement): *s*[j]*ue, Z*[j]*eus, T*[j]*uesday, p*[j]*ure, c*[j]*ure* and (iii) if the onset already contains **I** or is bisegmental, (a) **I** remains unassociated to a skeletal slot and is hence unpronounced: *ch*[∅]*ew, bl*[∅]*ew* in cases where such onsets do not contain [s] and (b) **I** can associate to bisegmental onsets as a complement if the first member is [s]: *st*[j]*ew* (also: *s*[ʧ]*ew,* [ʃʧ]*ew*), *sp*[j]*ew, sk*[j]*ewer.* This is also true for some of the "unnatural" sC-onsets: *sl*[j]*euth, sm*[j]*ew*, ?*sn*[j]- is still missing (though both *sn* and *n*[j] exist).

Some of these processes are diachronic in nature, i.e., there are no active synchronic alternations, only static distribution: e.g., *nature* shows a diachronic fusion of [t] and [j] into [ʧ]: *na*[ʧ]*ure* < *na*[tj]*ure.* Some of the processes involving the fusion of [j] are still motivated synchronically: *i*[ʃ]*ue/a*[ʒ]*ure* have alternative realisations of the form *i*[sj]*ue/a*[zj]*ure,* cf. also the pronunciation of *associate* which can be rendered in a number of ways: [-sieɪ-], [-ʃieɪ-], [-ʃjeɪ-]. The question of *j*-fusion is particularly intriguing in the case of coronals versus non-coronals. Turning the focus to coronal fricatives, i.e., [s], [z] ([θ] and [ð] are mysterious since [θ] shows no palatalisation before [j] (cf. *thew*) and there are no cases of [ð] followed by [j]), a number of observations are in order: (i) intervocalically (cf. *issue, associate, azure*) the palatalisation of [s/z] to [ʃ/ʒ] is well-established (sociolinguistic factors which may block the process are immaterial for the present discussion) whereas (ii) in word-initial position such palatalised variants are problematic, if not incorrect (e.g., *s*[j]*ewer* ∼ *?[ʃ]∅*ewer, s*[j]*ue* ∼ *?[ʃ]∅*ue,* etc.). Nevertheless, on the phrase level, palatalisation is common: e.g., *miss you* ∼ *mi*[ʃ (j)]*ou,* etc. Coronal stops exhibit both palatalised and non-palatalised versions syllable initially: e.g., *Tuesday, tune* ([tj] and [ʧ]), *duty, dune* ([dj] and [ʤ]). Palatalisation involving coronal stops across the word-level is also well-established: e.g., *pat yourself* ([ʧ]), *kid you* ([ʤ]) (cf. also Kreidler 1989 on other processes involving the coronals). However, such processes involve a SPLIT (cf. Szigetvári 1994) in the affected coronal stop, i.e., the FUSION of [j] with [t], for example, produces FISSION at the same time (the stop element **ʔ** is partly expelled from the melodic bundle, and now anchors independently to the C slot (Harris (1994) analyses this constellation of melodic elements as an affricate) (cf. the representation in (1a)).

(1)	a.	C	+	C	→	C		b.	C	+	C	→	C
		|		|		ʔ	<u>**R**</u>		|		|		|
		ʔ		**I**			**I**		**R**		**I**		**R**
		<u>**R**</u>					**h**		<u>**h**</u>				<u>**h**</u>
		h											**I**
		t		j			ʧ		t		j		ʃ

As can be seen, in (1b) no such split results when **I** enters [s] (fricatives do not contain **ʔ** and accordingly there can be no fission/split).

Coronal sonorants also show a number of difficulties: only [n] and [l] tolerate a postconsonantal [j], yet no fusion results ([j] enters the element as a complement only): *n*[j]*ew* ∼ *[ɲ]*ew*, *l*[j]*ewd* ∼ *[ʎ]*ewd*, etc. Why the entrance of **I** fails to produce a split is unclear. A weak explanation as it may seem is the following: the resulting structures would be unrecorded in the inventory of English. It can be claimed that such a split would be a STRUCTURE CREATING process, i.e., it would produce a segment which is not a member of the phonemic inventory of English and as such is BLOCKED (cf. Nádasdy 2001). To make things worse, [r] cannot tolerate a postconsonantal [j] in any form: the floating element **I** can neither fuse with it (to produce [r^j]), nor enter the structure as a complement (yielding [rj], for instance).

As opposed to this, non-coronal stops and fricatives tolerate a postconsonantal [j]: e.g., *p*[j]*ure*, *b*[j]*eauty*, *f*[j]*ew*, *v*[j]*iew*, *c*[j]*ure*, *g*[j]*ules*, *h*[j]*ew*, etc. In none of these cases is there fission (cf. [t] + **I** > [ʧ]) or fusion (cf. [s] + **I** > [ʃ]); **I** joins these non-coronals as a complement. The explanation for this lies in the fact that **I** is already a place-defining element (inherent in palatal(ised) stops and fricatives) and given that all of the above-mentioned non-coronals already contain a place-defining element ([k/g] and [h] are problematic since the former are empty-headed and the latter is placeless; at this point only the labials which contain **U** are unproblematic): there is no empty tier for **I** to enter the structure. This accounts for why there is no fission/fusion and the lack of the characteristic acoustic signal accompanying this process: the fission of [t/d] is accompanied by friction ([ʧ] and [ʤ] are all headed by **H** in the standard framework and thus strident, which is not true for either [t/d] or [j]).[2]

If **I** is unable to fuse with the non-coronals on account of their being specified for some resonance element, the prediction is that this process involving coronals should not exhibit fusion/fission but complementation only since coronals are also specified for the place of articulation (**R** in some analyses, cf. Harris 1997). Thus, only, [tj/dj/sj] and [zj] are predicted to exist, but not [ʧ/ʤ/ʃ] or [ʒ]. This again points to the special status of coronals. Coronals should perhaps be reinterpreted as empty-headed (i.e., headed by @ or simply marked as _) or as not containing any specification for headedness at all. This move would render the velars even more problematic: perhaps another element is needed as head.[3] This could be labelled **K**, for instance (as is suggested in Kaye et al. 1985 : 324, Szigetvári 1994). Another possibility would be to allow for cross-linguistic variation on this matter (compare the representations below).

(2)	a.	b.	c.	d.
	C C	C C	C C	C C
	ʔ		ʔ	ʔ
	$\underline{\mathbf{U}} \not\leftrightarrow \mathbf{I}$	$\mathbf{U} \not\leftrightarrow \mathbf{I}$	$\underline{\mathbf{K}}$ $\mathbf{I}$	_ $\leftarrow \mathbf{I}$
	(**H**)	$\underline{\mathbf{H}}$	(**H**)	(**H**)
	p(^{h}) j	f j	k(^{h}) j	t(^{h}) j
	pure, beauty	few, view	cure, gules	tune, dune ([ʧ/ʤ])

[2] The [s/z] ~ [ʧ/ʤ] process is redundantly marked for this characteristic, since both input and output are strident (these elements are all coronal stridents, a.k.a. SIBILANTS). Another comment is in order here: [k/g] are not affected by fission/fusion when **I** enters their structure. However, a process known as Velar Softening seems to contradict this: [k/g] surface as [s/ʤ] before a front vowel. A number of questions are imminent: (i) why are [k/g] in onset position not affected by this change when followed by **I** (the answer that Velar Softening applies at Stratum 1 (as per Harris 1994 : 27) — whereas the question of onsets is reducible to lexical information — is incompatible with the MINIMALIST HYPOTHESIS which claims that processes apply whenever the conditions for their application are met (cf. also Kaye (1995), who claims that non-cyclic suffixation can be equated with monomorphemic words, i.e., words without internal structure) and (ii) why does [k] not surface as [ʧ] (or alternatively, [g] as [z]) when affected by the following front vowel. This is certainly problematic.

[3] Velars, similarly to the other non-coronals, and contrary to the coronals, exhibit no **I**-related effects across the word-boundary: e.g., *pack yourself* *[-suː-/-ʧuː-] (cf. however, the previous footnote on Velar Softening). Whether this necessitates the introduction of another place definer for the velars is unclear.

(2)	d′.			e.			f.		
		C	C		C	C		C	C
		ʔ							
		<u>R</u> ←//–	**I**			←**I**			←//–**I**
		(**H**)			**<u>H</u>**			**H**	
		t(ʰ)	j		s	j		h	j
		tune, dune			issue, azure ([ʃ/ʒ])			huge	

The representations in (2a) and (2b) show the problematic cases: **I** can only join the structure as a complement since these structures already contain a resonance element **U**. The problematic structure for velars is depicted in (2c): in this particular case, **K** is chosen to signal that **I** can only be a complement, not a place definer given that the place tier is already filled with the appropriate buccal element, i.e., **K**. This, however, does not *explain* Velar Softening at this point. If velars were represented as @-headed (in other words, they posses an empty place tier), **I** would be expected to enter the representation causing fission/fusion. Coronals are depicted in two different ways in (2d) and (2d′): in the former, **I** can enter the place tier since it is empty (this accounts for fission/fusion which accompanies the change to [ʧ/ʤ]). **I** can also enter the coronal fricatives since they also lack a filled place tier. In this case, **I** causes the palatalisation of [s/z] (fusion) but here is no fission (cf. (2e)). If, however, coronals are conceived of as containing the element **R** on the place tier, **I** should only be able to join as a complement (similarly to (2c)). If **R** is allowed into the inventory, it should be marked as special in some way: this would be an extrinsic manipulation and would not be sound theoretically (the exclusion of **R** would, however, merge [s] and [h] in the traditional melodic theory: [s] {**R<u>h</u>**} vs. [h] {**h**}). The last representation, (2f), shows the case when **I** enters the segment [h]: [h] is placeless and accordingly, **I** is precluded from functioning as a place definer. It can only join as a complement (there is no fission/fusion either).[4]

[4] One can suggest that *huge* be transcribed as [çuːʤ], in which case **I** would be a place definer defining the palatal allophone of [h] (similarly to German "ach-Laut" versus "ich-Laut") and producing fusion (similarly to [s] + [j] > [ʃ]). The entrance of **I** into [h] as a place definer is blocked in English since such a process would produce a segment which is absent from the phonemic inventory of the language and would thus be a STRUCTURE BUILDING process and not a STRUCTURE PRESERVING one (such processes appear to be avoided in languages, cf. Nádasdy 2001), as opposed to German in which [ç] is an attested and phonologically relevant segment (cf. Brockhaus 1995). In addition to this, Lukács (1997) discusses palatalisation

2.2 The problematic *je* of Croatian[5]

For the purposes of consonantal representation, the question of the diphthong [je] in Croatian may lend some support to the representation of velars as empty-headed. Similarly to the English yod, the Croatian [j] is equally unstable and its post-consonantal realisation is only possible before [e]. Prevocalically, it can precede any vowel: cf. *jesen* 'autumn', *jato* 'flock', *jorgan*

processes affecting Hungarian consonants followed by palatal segments, e.g., *pattan* + *tyú* 'cannon' surfaces as [-ɲc-]; yet, the process is blocked in *kopoltyú* 'gill' [-lc-], *[-ʎc-]. The reason for this is that [ɲ] is an independent phoneme of Hungarian, whereas [ʎ] is not (the process of palatalisation would create a segment absent from the inventory of the language). Nevertheless, in some southern dialects of Hungarian (especially the ones in Vojvodina, Serbia) the palatal(ised) cluster [ʎc] is well-formed given that in these dialects [ʎ] is still a phoneme, i.e., the distinction between *hej* [-j] (exclamation) and *hely* 'place' [-ʎ] is not neutralised (as opposed to standard Budapest Hungarian in which only [-j] is possible).

5 An important fact has to be borne in mind: the only diphthong of Croatian is *je*: which has an unstable palatal element (**I**) and can be realised as either [jeː] or [je] (in closed and/or unstressed syllables (e.g., [bjeːl ∼ bjeˈliːna] 'white' ∼ 'whiteness'; in some morphologically conditioned forms the yod can be lost altogether: [brjeg ∼ ˈbregovi] 'hill sg ∼ plur') or in morpho-phonologically conditioned alternations such as trisyllabic laxing, closed syllable shortening, etc.). The traditional orthography has two possibilities of indicating this diphthong: ⟨ije⟩ and ⟨je⟩. What is important is that there is no difference in pronunciation between the two. Thus, orthographic differences such as *riječ* 'word' versus *rječnik* 'dictionary' are *not* kept in actual pronunciation, i.e., both begin with [rj-]. It seems plausible, for expository reasons, to cite data in their phonetic/phonologic shape, rather than orthographic form. Thus, it should be remembered that some data may not coincide with their "dictionary" form, e.g., *bijel* 'white', *bjelina* 'whiteness', *nijem* 'mute' (as per the standard dictionary practice) are, for instance, transcribed in this analysis as *bjel, bjelina* and *njem.* It is also important to remember that vowel length is not phonemic. This means that although there may be phonetic differences in length between vowels in different structural positions (e.g., in closed vs. open syllables), the diphthong in question is really [je]. It should also be borne in mind that there are no oppositions between, for example, [nj]*em* versus [ɲ]*em* versus [nij]*em* (i.e., the unstable diphthong always causes the palatalisation of [n]) as opposed to a possible opposition between [ɲ]*em* and [n]*em.* This analysis uses the traditional set of Croatian orthographic symbols when transcribing data from this language: *c* (IPA [ʦ]), *š* ([ʃ]), *ž* ([ʒ]), *č* ([ʧ]), *dž* ([ʤ]), *ć* ([t͡ɕ]), *đ* ([d͡ʑ]), *lj* ([ʎ]), *nj* ([ɲ]).

'quilt', *jučer* 'yesterday'.[6] The reason for its instability lies in the fact that Croatian has no diphthongs other than [je] and no phonologically relevant long vowels either. The length of the basic five-vowel system (i.e., [i], [u], [e], [o] and [a]) is determined by syllable structure (if one is willing to accept such as a notion: cf. Kaye et al. 1990, as well as the logical conclusion of the rejection of the syllable as a relevant phonological entity in CV/VC phonology). What matters is that there are no phonologically relevant oppositions between short and long vowels. It follows from this that the status of the diphthong [je] should be unstable given that diphthongs, by their very nature, require two V's (with accompanying C's), for example, similarly to any phonologically long vowel. In this respect, [je] should be the only vowel in the language that requires two CV/VC units.

The expelled [j], similarly to the English yod, can either (i) reassociate to the empty onset position (cf. (3a) below), (ii) if the onset is filled it can join as a complement (cf. (3b–d)) irrespective of whether the onset is mono-, bi- or trisegmental or (iii) if the potential onset is palatal, [j] is subject to STRAY ERASURE (cf. (3e)).

(3)	a.	[j]esti 'eat'	b.	v[j]everica 'squirrel'	c. pr[j]elom 'break'
		[j]elo 'meal'		b[j]elina 'whiteness'	br[j]eg 'mountain'
		[j]er 'because'		s[j]ena 'shade'	kr[j]esnica 'glowworm'
				z[j]evati 'yawn'	bl[j]esak 'lightning'
				t[j]erati 'drive'	gr[j]ešiti 'to sin'
				d[j]evojka 'girl'	tr[j]ezan 'sober'
				l[j]evak 'funnel'	dr[j]emati 'doze off'
				r[j]ečnik 'dictionary'	sr[j]eda 'Wednesday'
				m[j]era 'measure'	st[j]ena 'rock'
				n[j]ega 'protection'	sm[j]ena 'shift'
				?k[j]-	sl[j]epoća 'blindness'
				?g[j]-	sn[j]ežan 'snowy'
				?h[j]-	zd[j]ela 'pot'
					sv[j]et 'world'
					zv[j]er 'beast'
					cv[j]et 'flower'

[6] The disquieting fact is that [j] never occurs before [i] (the only example is *jidiš* 'Yiddish' which is certainly suspect). This can be seen as another instance of an OCP-driven effect. A similar account is given for the non-occurrence of [ji] clusters in Korean in Clements & Hume 1995, for instance. This does not explain the presence of [vu-] clusters, e.g., *vuna* 'wool'.

(3) d. str[j]ela 'arrow'
ždr[j]elo 'throat'

e.[7] žØeljezo 'iron'
šØenuti 'go mad'
šØeva 'lark'
čØelik 'iron'
džØep 'pocket'

The fact that the dislodged [j] is really a *complement* and not an element **I** positioned in an *independent* onset is supported by syllabic-*r* formation: in Croatian the only syllabic sonorant is [r̩]. The following SPE-type of rule can be given: $\mathrm{r} \rightarrow \mathrm{\underset{\scriptscriptstyle|}{r}} \;/\; \left\{ \begin{smallmatrix} \mathrm{C} \\ \# \end{smallmatrix} \right\} \_\_ \left\{ \begin{smallmatrix} \mathrm{C}_1 \\ \# \end{smallmatrix} \right\}$ (e.g., *rt* 'cape', *grb* 'coat of arms', *krv* 'blood', *tr* 'rub-1sg.aor' versus *brak* 'marriage', *park* 'park', etc.). Recast in VC terminology: syllabic *r* formation occurs whenever [r] fails to be followed by a pronounced vocalic segment and is preceded by the traditional "coda" conjunction. If **I** occupied an onset position on its own, it would make the preceding [r] syllabic, which is not the case: [rj]*eč* ~ *[r̩j]*eč* 'word', *žd*[rj]*elo* ~ **žd*[r̩j]*elo* 'throat', etc. Syllabic *r* formation is thus a good testing ground for the affiliation of **I** to either an independent onset position where it would trigger syllabic *r* formation, which is not the case or to a position already filled with melodic material where it functions as a complement to [r] (this solution is supported by the data). The element **I** expelled from the unstable diphthong is thus a floating element which has to link to an appropriate onset position (either filled or empty) to avoid stray erasure.

The floating **I**, being a place definer, has no relevant role to play in melodic structures that already contain a place defining component. The supposition that velars are empty headed is supported by the Croatian data: there are no word-initial *kj* or *gj* clusters. Historically, all of these clusters have undergone palatalisation. In view of the present arguments, one can

[7] The problematic aspect of this set of data is obvious: there is no synchronic evidence (for example, no alternations of the *željezo* ~ *zjeljezo* type) to claim that there is an element **I**. The presence of **I** in some of the data can only be proved from the diachronic perspective. This problem, however, resembles the difficulty with the claim that there is (obligatory) yod-dropping (hence an active element **I**) in the English string *rule*: it is only the history of the language that could shed light on this supposition. The fact that the word is spelled with a *u* (and not with *oo*, for example) should be irrelevant from a synchronic point of view. In English, there is some evidence, however, that this *u* could possess an element **I**: in unstressed positions *r* can be followed by [jʊ] or [jə].

claim that the floating **I** has entered the structure of velars and caused palatalisation, i.e., both fission and fusion (cf. (4) below).

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(4) a.  C           V            b.  C           V
        |           |                |           |
        ʔ           |                ʔ           |
        @  ⟵I       e                U  ⟵I       e
       (L)                          (L)
    k/g + I > ʧ/ʦ/etc.[8]          p/b + I > pj/bj
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In (4a) the floating **I** is free to occupy the empty place tier of the velars causing subsidiary changes such as fission (**ʔ** is expelled from its position) and fusion (in the traditional framework à la Harris (1994) **h** would be fused with **I** resulting in [ʃ]. This is, however, problematic since there is no **h** (or **H** for that matter) in [k/g] in Croatian (Starčević 2001a). In (4b), **I** has no empty place tier to occupy and can only enter the structure as a complement and not as a place definer. In this respect English and Croatian are identical. The difference lies in the emptiness of the place/resonance tier of the velars in the two languages. Whereas in English the tier is occupied by a hypothetical **K**, in Croatian it is empty, hence the difference in the distribution of #[kj/gj] clusters. The distribution falls out naturally from the melodic structure but is not unproblematic (cf. Velar Softening, as well as the need of having to introduce a new element into the inventory which increases the model's generative capacity).

If velars are empty-headed, the distribution of coronal clusters should not be identical to that of the former given the theoretical assumption that

[8] The differences between the so-called FIRST and SECOND PALATALISATION in Croatian (e.g., *junak* ~ *junače* ~ *junaci* 'hero-nom.sing. ~ voc.sing. ~ nom.plur.'; *bog* ~ *bože* 'god-nom.sing. ~ voc.sing.'; *knjiga* ~ *knjizi* 'book-nom.sing. ~ dat.sing.') are irrelevant at this point; what is crucial for the present purpose is the fact that **I** has occupied the empty place tier causing affricatisation and/or spirantisation. Some diachronic changes in the Southern Slavic languages can be captured straightforwardly if the floating **I** hypothesis is accepted: Serbian has eliminated all instances of pre-consonantal floating **I** (cf. Croatian *vjera* ~ Serbian *vera* 'faith', *sjeno* ~ *seno* 'hay' versus *jelo* 'meal', *jesti* 'to eat' which are identical in both languages given that the floating element links to a completely empty onset position). As expected, there are no #[kj-/gj-/hj-] clusters in either language. As opposed to this, Macedonian has no floating **I**'s and, accordingly, no palatalisation of [k/g] (or empty onset positions filled with **I**): Serbian/Croatian *ćelav* ~ Macedonian *kelav* 'bald', *ćebe* ~ *kebe* 'blanket', *jesam* ~ *esam* 'I am', etc.

different elements cannot be headed by the same resonance element. This assumption is borne out: there is no palatalisation accompanied by either fission and/or fusion in coronal stop/fricative + **I** clusters either word-initially or word-finally: *sjeno* ~ *****šeno*** 'hay', *zjenica* ~ *****ženica*** 'pupil of the eye', *zasjeniti* ~ **za**__**š**__*eniti* 'make shady', *tjerati* ~ *****čerati*** 'drive', *djevica* ~ *****dževica*** 'virgin', *nadjenuti* ~ **na***__**dž**__*enuti* 'fill',[9] etc. Whether coronals are represented as placeless or as headed by **R** does not jeopardise the conclusion that **I** cannot enter the structure on any account: if the melodic structure is viewed as placeless, **I** has no place tier to link to (cf. (5a) below) or it is precluded from entering the structure by the presence of **R**, (5b).

(5) a.
```
 C          V
 |          |
 ʔ          |
 |  ⟵I      e
(L)
t/d
```
b.
```
 C          V
 |          |
 ʔ          |
 R  ⟵I      e
(L)
t/d
```

Both representations are problematic: (5a) suggests that [t] is only defined as **ʔ**, which makes the interpretation of [t] equal to that of[ʔ], i.e., to a glottal stop. This again suggests that [t] is the default consonant and accordingly a voiced **ʔ** is realised as [d]. This solution, however, merges [s] and [h] (Starčević 2001a, 2001b), which is inadequate for both languages: [h] and [s] do contrast (cf. *seven* versus *heaven, hitan* 'urgent' versus *sitan* 'miniature'), whereas [ʔ] and [t/d] do not. As opposed to this, (5b) suggests that coronality is on par with other resonance elements, which is again highly problematic (cf. Paradis & Prunet 1991). The question of [h] + **I** is not resolved, however. Since it is void of any buccal element, **I** should only link to it as a complement, which is not supported by the data (as opposed to English *h*[j]*ue,* for instance). This is a diachronic coincidence: [h] + **I** clusters have been palatalised to [s] or [ʃ]. Their absence is accounted for this way. Nevertheless, this fact undermines the representation of [h] as placeless. If [h] were placeless, **I** would not be expected to cause fusion (resulting

[9] Palatalisation affecting coronals is recorded in the diachrony (cf. Raguž 1997, Nedeljković 1974): *pisati* ~ *pišem* ~ *pišeš* 'write-inf.~1sg.~2sg.', *plesati* ~ *plešem* 'dance-inf.~1sg.', *pasti* ~ *paše* 'graze-inf.~3sg.', *hteti* ~ *hoćeš* 'wish-inf.~2sg.', *vezati* ~ *vežem* 'tie-inf.~1sg.' etc. In the synchrony, however, this process can be viewed as one of static distribution rather than active alternation (similarly to the English *nature*-problem): i.e., (*pisati* ~) **pisjem* ~ *pišem,* **pasje* ~ *paše,* **hotješ* ~ *hoćeš,* etc.

in [s/ʃ], e.g., *duh* ~ *duše* ~ *dusi* 'ghost-nom.sing.~voc.sing.~nom.plur.'), only to join the structure as a complement, given that [h] has no place tier onto which it could anchor and cause fusion (either an empty tier in the form of @ or a problematic one as the **R** tier in English, for example; **h** is "aspiration" with no buccal specifications). Given these considerations, #[hj] clusters should be as well-formed synchronically as the #[pj] type of clusters. An escape hatch is to posit [h] as having the following melodic structure: $\{\underline{\ }\mathbf{H}\} = \{\underline{@}\mathbf{H}\}$, i.e., [x] (cf. Backley 1993 for a similar approach). This representation indicates that **I** has an empty place tier into which it could enter and produce fusion of the [s/ʃ] type. This may be sound from a phonetic point of view. Phonologically, however, this is unnecessary since there is no opposition between [h] {H} and [x] $\{\underline{\ }\mathbf{H}\}$ either synchronically or diachronically (for an extensive discussion on the representation of the glottal fricative as **H** "aspiration" see Szigetvári 1996 and Starčević 2001a, 2001b).

The discussion of the floating yod in English and Croatian has shed some light on the representation of coronals and velars as opposed to the rather unproblematic case of labials. It has been proposed that the representation of Croatian velars contains the element @, i.e., they are empty-headed as opposed to the velars of English which contain some buccal specification preventing the floating **I** from entering the structure. Based on processes involving fission and/or fusion of **I** with the coronals, it seems correct to represent them as being headed by **R** in Croatian (hence the obligatory absence of fission/fusion and the presence of **I** as a complement only) and as empty-headed in English (hence the optional process of palatalisation).

2.3 L, H and I in branching onsets

It has been argued in Harris 1994 that English contains no active **L** "voice" component. It follows from this that voice cannot spread; as opposed to this, aspiration which is active in English could potentially spread to other skeletal positions. The fact that there are no instances of **H** spreading in #[sp] type of clusters can be demonstrated to involve an OCP violation (Starčević 2001a, 2001b): two instances of the same element (two occurrences of **H**) trigger the elimination of one of them in English, i.e., #[sp^{h}] is interpreted as #[sp]. It also follows from this that the opposition between #sC$_{\text{aspirated}}$ and #sC$_{\text{unaspirated}}$ clusters is suspended (cf. (6a) below). As opposed to this, in Croatian the opposition between #sC$_{\text{voiceless}}$ and #sC$_{\text{voiced}}$ clusters is suspended due to the active **L** which spreads onto [s]: there are only #zC$_{\text{voiced}}$ clusters to the exclusion of #sC$_{\text{voiced}}$ ones (cf. (6b) and (6c) below; hereafter v marks a melodically empty V)).

(6)	a.	C	v	C	b.	C	v	C	c.	C	v	C	d.	C	v	C
				ʔ				**ʔ**				**ʔ**				**ʔ**
		R		$\underline{\mathbf{U}}$		**R**		$\underline{\mathbf{U}}$		**R**		$\underline{\mathbf{U}}$		**R**		$\underline{\mathbf{U}}$
		$\underline{\mathbf{H}}$	$\xleftrightarrow{\text{OCP!}}$	**H**		$\underline{\mathbf{H}}$				$\underline{\mathbf{H}}$	↙	**L**		$\underline{\mathbf{H}}$		**L**
										L						
		[sp$^{\text{h}}$]y > [sp]y				spoj ‘connection’				zbog ‘because’				*sb		

The representation in (6c) shows the spread of **L** from [b] onto [s]: this way, the opposition between #[sb] and #[zb] clusters is suspended (cf. (6d) versus (6c)). In the case when there is no phonologically relevant **H** or **L**, oppositions can be established: cf. *plight* versus *blight, clue* versus *glue, zlato* ‘gold’ versus *slabo* ‘weakly’, *tlaka* ‘pressure-gen.sing.’ versus *dlaka* ‘hair-nom.sing.’. Nevertheless, a difficulty arises in this analysis: it seems that voice is more capable of spreading than (or, alternatively, it does not spread in the same manner as) aspiration; as it stands, the OCP cannot be given a uniform interpretation: it sometimes merges elements (as the two instances of voice in (6c)), at other times it deletes them (6a). This is certainly problematic since both primes are laryngeal, i.e., the same set of effects are expected; no satisfactory answer can be given at this point.

Another process involving the active presence of an element can be captured under yod-spreading. This process can be deployed in explaining the absence of #[sr] sequences in English and, similarly, the absence of #[slj/zlj] clusters in Croatian. The melodic representation given for the “clear” approximant *r* by Harris (1994 : 259) is {**I R**} as opposed to the “dark” approximant which is {**@ R**} and the tap which is the independent realisation of the element {**R**}. Assuming that heads do not spread (cf., for example, Cyran 1997), the English “clear” *r* receives the following representation: {**I R**}, cf. (7).

(7)	a.	C	v	C	b.	C	v	C
		R		$\underline{\mathbf{R}}$		**R**		**R**
		$\underline{\mathbf{H}}$	↙	**I**		$\underline{\mathbf{H}}$		$\underline{\text{ɨ}}$
		I						
		s		r		s		r
		shrew				sram ‘shame’		

As shown by (7a), the operator **I** spreads to the preceding [s] and fuses with it resulting in [ʃr] to the exclusion of [sr] in branching onsets. The active presence of **I** in [r] receives some justification in place assimilation effects in bogus clusters: **I** can optionally spread from [r] to [s] in e.g., *Miss Robins* > *Mi*[ʃ] *Robins.* Szigetvári (1994 : 221) views this process as an instantiation of a more general principle of PLACE SPREADING BACKWARD. In the framework of VC phonology (Szigetvári 1999) it is explicitly claimed that LICENSING and GOVERNMENT universally apply in a right-to-left manner: syncope (i.e., V-to-V government), V-to-V licensing (in diphthongs and long vowels) as well as consonantal licensing and government in coda–onset and branching onset clusters always proceed from right to left. Following this line of reasoning, it comes as a natural consequence of a universal tendency that an operator **I** is able to spread backward (admittedly, processes involving vowel harmony operate in both directions; this may be a case of an unbounded internuclear/intervocalic characteristic regulated on language specific basis, which does not jeopardise the present stance). This tendency of the floating **I** in [r] to anchor to an available skeletal slot, coupled with the observation that coronal consonants in English are empty headed, explains naturally the characteristic surface realisation of [t/d + [r] clusters: in *try* and *dry,* for instance, the **I** of [r] causes fission and fusion, i.e., affricatisation: [ʧr/ʤr].

As opposed to this, in (7b) a bound **I** is shown. In Croatian, it seems, **I** is bound; it follows naturally from this that *s* and *š* do contrast before *r* (e.g., *sreća* 'luck' versus *šraf* 'screw'). However, there is no reason to postulate a bound **I** for at least two reasons: (i) if both *š* and *r* contain the element **I**, OCP effects are expected, which is not the case and (ii) *r* can be complemented with the floating **I** expelled from the diphthong [je], which points to a palpable difference in the melodic structure of English versus Croatian *r*: *rječ* 'word', *rjeka* 'river' versus *rule,* for instance. The representations are provided in (8).

(8)


In the representations (8a) and (8b), the floating **I** is shown as not having an available V slot to anchor to and is thus prone to undergo stray erasure unless it finds an appropriate docking site. In Croatian, **I** is not prevented from landing onto an onset position by an already existing identical element in *r,* whereas in English **I** is subject to OCP effects given that *r* already contains the same element. This process has been called yod-dropping but it is in fact part of a more general regularity preventing the presence of identical elements in adjacent melodic bundles (this is not unproblematic, however).

3 Floating elements and consonantal relations

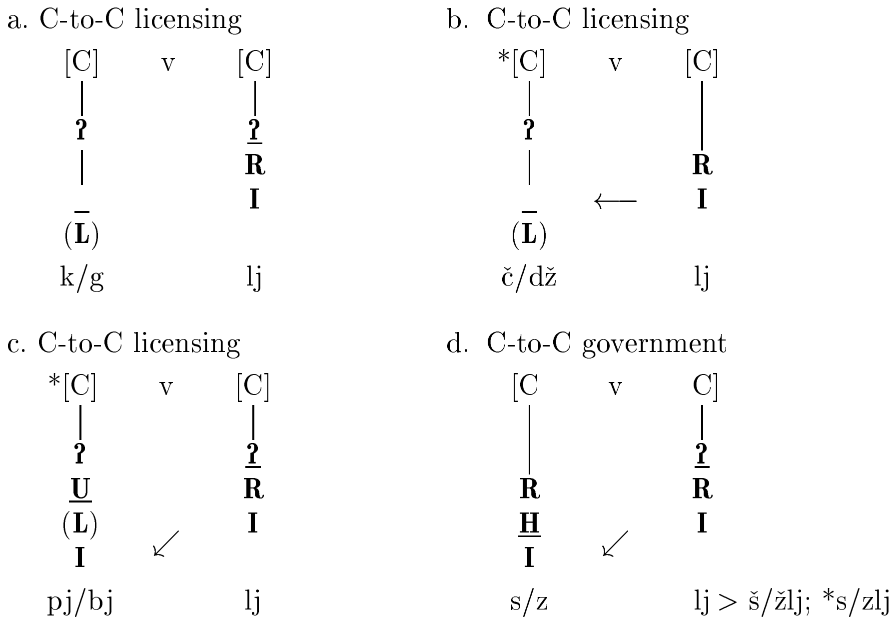
A similar account can be given for the absence of a contrast between *s/š* and *z/ž* before *lj* in Croatian: **I** is an operator in *lj* and can thus spread to the preceding element. The question remains why **I** is not stopped from entering the structure by the buccal element **R** (this observation applies equally well to (8a)) as opposed to *pljusak* 'downpour' and *bljunuti* 'vomit' which never acquire an additional secondary articulation, i.e., **p*[j]*ljusak,* **b*[j]*ljunuti,* etc. (where the place defining element **U** precludes **I** from entering the structure). This repeatedly points to the special status of the coronality element, cf. the representations in (9).

(9) a.	C	C		b.	C	C
	|	|			|	|
	R	**R**			**ʔ**	<u>**ʔ**</u>
	<u>**H**</u>	<u>**ʔ**</u>			<u>**U**</u>	**R**
		I			(**L**)	**I**
	I ↙					
	s/z	lj	> š/žlj; *s/zlj		p/b	lj > p/blj; *pj/bjlj

A serious objection can be raised in connection with (9b): if **I** is prevented from entering the structure in (9b), it should also be precluded from joining [p] or [b] as a complement in the case of the unstable [je]. This is not supported by the data. Difficult as it may seem to suggest a solution, the nature of the two elements **I** may be decisive: in the case of the expelled **I**, one is dealing with a floating **I** which has no inherent affiliation to either a V or a C slot as opposed to an **I** which is inherently present in the melodic structure of [lj]. The expelled **I** which functions as a complement to [l] and is preceded by [s] never causes palatalisation: cf. [s]*ljepoća* 'blindness' ∼ *[ʃ]*ljepoća,* [s]*ljez* 'hop' ∼ *[ʃ]*ljez*; this points to a palpable difference in status of the two **I**'s. This supposition, however, excludes the structure in (9a): only [s/zlj] should exist. The only solution available is the notion of branching onsets, a notion which should ideally be deducible from consonantal interaction (this type of interaction is stored in the lexicon) given that the traditional notions of Government Phonology as regards inter- (i.e., coda–onset) and intraconstituent (i.e., branching onset) structures have become an explanatory shorthand notation in CV and VC Phonology, i.e., in frameworks that view consonant clusters as exclusively virtual on the skeleton. It is, nevertheless, necessary to draw a distinction between branching onsets and bogus clusters, for example. In RP, *cemetery* and *symmetry* are nearly homophonous: [ˈsemətri] and [ˈsɪmətri], respectively. Yet, the relationship between [t] and [r] is not identical in dialects that show lenition phenomena: *cemetery* may be pronounced [ˈsemәʔri] but *symmetry* can only be realised as [ˈsɪmətri], not *[ˈsɪməʔri]. The conclusion is that there is a bogus cluster (and accordingly different consonantal interaction between the two parties): this lack of lexically determined interaction allows for lenition in *cemetery* ([t] is debuccalised to [ʔ]). As opposed to this, there is a branching onset (and accordingly consonantal interaction between [t] and [r] which precludes the lenition of [t]) in *symmetry* (see Szigetvári 1999 : 111–125, Scheer 1998a, 1998b for a fuller discussion).

If C-to-C licensing, alias branching onsets, is allowed into the set of possible configurations, a solution is available for the problem above: #[plj] is a branching onset as opposed to #[pje] and #[bje], which are not. It is not clear at the moment, however, how this configuration should prevent **I** from linking to [p] in a cluster of the [plj] type. The answer lies in the distinction between licensing and government: the former supports melodic material, the latter "destroys" it according to Ségéral & Scheer (1999). It can also be claimed that government makes the targeted element lose its inherent characteristics (cf. Szigetvári 1999). It follows from this that licensing coming from [lj] supports the internal structure of [p] (no component is added), whereas government attacks the structure of [s/z] in the [s/zlj] cluster causing the addition of **I** to an already existing melodic make-up. This explanation supports the standard GP observation that #sC clusters are in fact coda–onset clusters.

Recast in VC terminology this means that there exists a case of C-to-C government between [s/z] and [lj]: this means that government changes the internal structure of [s/z] by adding an element **I**, hence [ʃ/ʒ] represent melodic bundles which are influenced by government, i.e., there is addition of an element (as opposed to C-to-C licensing operating in cases such as #[plj], for instance, in which there is no such tapering with melodic material). The C-to-C licensing in branching onsets receives further support when [k/g/h] plus **I** are concatenated: while there are no [k/g/hj] clusters in Croatian, there do exist branching onsets involving [lj]: ***kljun*** 'bill (part of a bird's anatomy)', ***g**ljiva* 'mushroom', ***h**ljebno* 'having to do with bread', etc. It seems plausible to suppose that C-to-C licensing prevents the addition of **I** to the melodic structure of [k/g/h] which should otherwise surface as affricatised/palatalised: ****č**ljun,* ****dž**ljiva,* ****š**ljebno,* etc. In other words, C-to-C licensing supports the melodic structure of these velars (cf. (10)), whereas C-to-C government enables the addition of an external element to a given melodic bundle. Since government has been claimed to be destructive in the Coda Mirror theory (Ségéral & Scheer 1999), it should be asked what its effects are on the consonants in question. One is not dealing with lenition although the elements in question are all followed by a governed (hence dead) v, the prime target for consonantal lenition (cf. *š***v***ljunak* 'pebble', similarly to *cemet***v***ry*). The difference between the two constellations is decisive: in *cemetery* there is a bogus cluster (and, accordingly, no consonantal relationship) and an enclosed empty v, whereas in *šljunak* there is a C-to-C government relationship between the two consonants and an enclosed empty v which is muted by the following full V. Whether this can be called lenition (of some sort) will not be discussed in this analysis. See the possible formal (yet, pre-theoretic and non-CV/VC conformist) representations of these C-to-C licensing relationships below (10) as well as a summary of effects and relationships in (11).

(10)


The representation in (10a) versus (10b) and (10c) shows the importance of C-to-C licensing as applied to melodic structure. This configuration prevents **I** from entering the structure either as a complement (10c) or as an element causing fission/fusion (10b). C-to-C government, however, allows the spreading of melodic material from one bundle to another.

(11)

INPUT	RESULT	POSSIBLE CONSONANTAL RELATIONSHIPS
p + je b + je	pje bje	no relationship: floating **I** associates to available onset pos.
s + l + je z + l + je	slje/*šlje zlje/*žlje	no multiple associations of floating **I**
s + lj z + lj	šlje žlje	C-to-C government: (**I** obligatorily spreads to preceding "coda")
p + lj b + lj	plj/*pjlj blj/*bjlj	C-to-C licensing: (**I** cannot spread to preceding onset)
k + lj g + lj h + lj	klj/*člj glj/*žlj hlj/*šlj	C-to-C licensing: (**I** cannot spread to preceding onset)

There are problems, however, with English and Croatian yod dropping: (i) claiming that **I** cannot link to [l] in *blue,* for instance, on grounds that the the maximally available number of slots in a branching onset is two is untenable in a CV/VC framework, (ii) [j] never creates a new onset position but merely joins the available structure as a complement.[10] If this is so, there is no reason to exclude *bl*[j]*ew* given that, even in GP, there are no three X's in such a branching onset: the first slot is linked to [b], the other to [l]

[10] Whether the dislodged [j] creates a new position (a new slot on the timing tier) is debatable. Kaye (1985 : 301) quotes a convention by Vergnaud according to which the creation of a new position directly follows from a segment's affiliation to a syllabic constituent. This may be reconcilable with the Projection Principle given that this new position will be at the end of the chain of licensing relationships (cf. Harris 1997). A move of this kind is basically reconcilable with the basic tenets of Government Phonology. The line of reasoning in this analysis views the creation of such an additional slot unnecessary. In addition to this, in VC Phonology the creation of a C position onto which the complement **I** attaches automatically involves the creation of (and the additional difficulty of extinguishing) a new V position. The present analysis regards the complement **I** as the addition of **I** to the melodic make-up of an element and not as the setting up of a new VC unit. The fact that [l] + **I** is realised as [lj] in English *lewd* but as [ʎ] in Croatian *ljepo* 'beautiful' is again irrelevant phonologically since both are structure preserving processes (cf Nádasdy 2001).

(to which the expelled yod joins without creating a new position for itself). In addition to this, complementing [l] with [j] is not ruled out in English (cf. *l*[j]*ewd,* for instance). Even if the question of *bl∅ew* is satisfactorily settled by the standard GP stipulation that onsets can be maximally binary, the Croatian data offer further difficulties: the floating **I** can join an already branching onset as in *klješta* 'hammer', for example (a test for claiming that this example contains a [kl + [je] sequence and not a [klj] + [e] sequence is provided by Serbian *klešta,* cf. footnote 8). The solution may lie in the melodic representation of [l] which is still a mystery[11] (cf. Kürti 1997, for example), as well as the question of complexity, i.e., if **I** joined [l], such a segment (i.e., [lj]) may be more complex than the consonant which is supposed to govern it, e.g., [b] in the example above (cf. the question of melodic complexity as regards the governing ability of heads of branching onsets in Harris's (1997) Licensing Inheritance), hence the ungrammaticality of *[blj]*ew* in English.

4 Conclusion

The present article has attempted to shed some light on the floating element **I** in English and Croatian. The elimination of this element can be termed yod dropping and some aspects of this process are in fact part of a more general regularity banning the cooccurrence of chunks of identical melodic material in adjacent melodic bundles (this is usually referred to as the OCP). It has been demonstrated that this unstable **I** can be useful in explaining melodic differences in the two languages (for example, the absence of fission/fusion in some consonant clusters). The dropping and potential spreading of this melodic prime onto adjacent consonants can also be used in analysing different consonantal relations, such as C-to-C government and C-to-C licensing. It seems that consonantal relations can (partially) be captured under the operation of the spreading of melodic material.

[11] In English, according to Harris (1994), [l] is represented as {**ʔ** **R**}. This is problematic since (i) [l] is not continuant given that it contains **ʔ** (cf. the rule of Optional Yod Dropping which applies to coronal continuants) and (ii) the lenition of [l] reveals that it also contains **U** (cf. English *film* [fɪwm], as well as the lenition of [l] to [o] in Croatian in coda position, e.g., *radio* versus *radila* 'work-pp.masc∼pp.fem.', but is not restricted to coda position, cf. Croatian *blažen* 'holy' versus Polish *b*[w]*aźen* 'silly').

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