

László Kristó *Palatality harmony  
in Proto-Slavonic\**

## 0 Introduction

One salient feature of Proto-Slavonic (PSl) linguistic history is a set of “conspirative” changes which led to a harmonic arrangement of adjacent consonants and vowels by the late PSl period. These changes include the palatalization of velar consonants before front vowels and the fronting (umlaut) of back vowels after palatal consonants. This tendency has been called INTRA-SYLLABIC HARMONY; for reasons that will become obvious shortly, I will use the term PALATALITY HARMONY. It may be formulated as in (1):

(1) **Palatality Harmony (PH)**

Within a syllable, the combination of palatal segments with velar (back) ones is forbidden (Schenker 1993:67).

This formulation expresses the following facts:

- a. If the onset consonant is velar, it may not be followed by a front vowel. E.g., a sequence *ko* is well-formed; *\*ke* is not.
- b. If the onset consonant is palatal, it must be followed by a front vowel. E.g., *še* is a well-formed sequence; *\*šo* is ill-formed. (I will provide examples for PH in the next section.)

In this paper, I provide an analysis of how such a system had developed. That is, I will give an account of what constraints had led to this state of affairs. I will attempt to show that the formulation in (1) is incorrect. Instead of referring to the syllable, I formulate PH in terms of Autosegmental Licensing and the Structure Preservation Principle. I adopt

\* I would like to thank László Varga and the anonymous referee of this volume for their helpful comments. Of course, they are not responsible for the remaining mistakes. Also, since this is a “working paper” in the literal sense, far from being a completed analysis, further suggestions are most welcome.

the view of Government Phonology on the internal makeup of segments. Using these (independently motivated) principles, I also account for apparent exceptions to PH.

This paper is structured as follows. Section 1 introduces the phonemic inventory of late PSl as it is reconstructed by most scholars. Section 2 presents some apparent exceptions to PH as well as other problems with the traditional analysis. In section 3, I analyse the internal structure of PSl vowels and consonants, based primarily on comparative evidence. Section 4 is an analysis of PH itself, in terms of the principles mentioned above. In section 5, following Polgárdi & Rebrus (1996), I combine the analysis in section 4 with an Optimality Theoretical (OT) framework. The principles and rankings outlined in sections 4 and 5 will account for why PH failed to operate in certain cases. Finally, in section 6, I will consider the synchronic status of PH in late PSl.

## 1 The phonemic inventory of Late PSl

In this section, I present an inventory of the reconstructed phonemic inventory of Late PSl, based on Schenker 1993:82.

### 1.1. Vowels

In (2), I present the vowel system of Late PSl. I will not consider vowel length, since it is entirely predictable from quality; moreover, its phonological status is quite uncertain. Also, we will not need to refer to length in this analysis. The symbols used here are the traditional ones used in Slavonic linguistics.

#### (2) The Vowels of Late PSl

	FRONT	CENTRAL	B	A	C	K
			UNROUNDED		ROUNDED	
HIGH	i		y		u	
MID-HIGH	ɨ				ʉ	
MID-LOW	e ɛ		ɤ		o	
LOW	ě	a				

Note:  $\varrho$  and  $\epsilon$  are nasal vowels. The back unrounded vowels may have been central, but they line up with back rounded vowels with respect to PH, so they are usually treated as back in the literature.

## 1.2 Consonants

In (3), I provide a consonant inventory; again, the symbols are the traditionally used ones. (Note especially the use of *v* for [w], which is usual in the literature, but may be confusing for the non-specialist.)

### (3) The Consonants of Late PSI

	LABIAL	DENTAL	PALATO-ALVEOLAR	PALATAL	VELAR
STOPS	p b	t d		ʦ ʣ	k g
AFFRICATES			c dz	č	
FRICATIVES		s z	ś ź	š ž	x
NASALS	m	n		ń	
LIQUIDS		r l		ř ľ	
GLIDES	v			j	(v)

From the point of view of PH, both consonants and vowels can be classified into three groups:

- a. “SOFT” or PALATAL: front vowels; palato-alveolar and palatal consonants.<sup>1</sup>
- b. “HARD” or BACK (VELAR): back vowels; velar consonants.
- c. NEUTRAL: the vowel *a*; labial and dental consonants.

This classification enables us to re-define (1) more precisely:

### (4) Palatality Harmony (Revised)

Within a syllable, the combination of soft segments with hard ones is disallowed; neutral segments are free to co-occur with any segment.

In (5) below, I provide examples for PH. The data are taken from Old Church Slavonic (OCS), the oldest attested Slavonic language, but all of

<sup>1</sup> “Soft” and “hard” are traditionally used terms in Slavonic linguistics. In the literature, neutral segments are also referred to as “hard” (i.e., non-soft); I prefer to make a clear distinction between the two. Also, I will use the term “soft” rather than “palatal”, since the latter also refers to a place of articulation (opposed to palato-alveolar).

them are practically identical to the reconstructed PSI forms.<sup>2</sup> The source of data (throughout this paper) is Horálek 1967 and Diels 1932.

(5) **Examples for the operation of PH**

(the hyphen indicates a morpheme boundary)

a. Velars are palatalized before front vowels

re <u>k</u> -o	‘say-IND.PRES.SG1’	cf. reč- <u>e</u> tъ	‘id.-IND.PRES.SG3’
vra <u>g</u> -ъ	‘devil-NOM.SG’	vra <u>ž</u> -e	‘id.-VOC.SG’
grě <u>x</u> -ъ	‘sin-NOM.SG’	grě <u>š</u> -iti	‘to commit sin’

b. Back vowels are fronted after soft consonants<sup>3</sup>

učeni <u>k</u> -omъ	‘pupil-DAT.PL’	cf. učitel’- <u>e</u> mъ	‘teacher-DAT.PL’
dobr- <u>ъ</u>	‘good-NOM.SG.MASC’	ni <u>š</u> t-ъ	‘poor-NOM.SG.MASC’
dobr- <u>y</u> mъ	‘good-DAT.PL’	ni <u>š</u> t- <u>i</u> mъ	‘poor-DAT.PL’

c. Examples for neutral segments

i. For *a*

žen- <u>a</u> ma	‘woman-DAT.DU’	& ulic- <u>a</u> ma	‘street-DAT.DU’
děl- <u>a</u> ti	‘to work’	krič- <u>a</u> ti	‘to shout’

ii. For neutral consonants

<u>d</u> omъ	‘house-NOM.SG’	<u>d</u> ělo	‘work-NOM.SG’
<u>b</u> yti	‘to be’	<u>b</u> iti	‘to beat’

<sup>2</sup> As Meillet (1924: 7) says, “apart from a small number of easily recognizable dialectal features, the language of these texts (=OCS—L.K.) equals to what Common Slavonic would be if it were attested” (my translation).

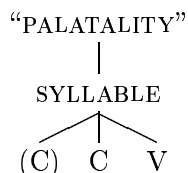
<sup>3</sup> The observant reader will have noticed that two of the back vowels, *u* and *o*, are missing. This is not an accident; we will come back to it in section 2.2.

## 2 Problems and exceptions

### 2.1 The Domain of PH

The traditional formulation in (1) suggests a syllable-based analysis in which the domain of palatality is the syllable.<sup>4</sup> Formally, it means that the prime(s) responsible for palatal articulation are attached directly to the syllable node. This conception would treat PH as a “Firthian syllable prosody” (cf. Lass 1984:238–248). Figure (6) shows a possible representation; “Palatality” refers to the prime(s) that express(es) palatal articulation, be it features or elements.

(6) **A representation of a “palatal” syllable**



A syllable without a “soft” segment would lack “Palatality”. Note that we must posit “Palatality” as the active value, since it is the value which spreads onto the back segment (cf. the data in (5a) and (5b)).

However, consider the following data (where dots indicate syllable boundaries):

- (7) kri.ča.ti ‘to shout’  
kli.ca.ti ‘to call’  
gle.da.ti ‘to look’  
grě.ši.ti ‘to commit sin’

The examples in (7) show that the palatalization of velar consonants is blocked by an intervening consonant. If “Palatality” characterizes the whole syllable, this phenomenon is difficult to explain. Instead, a revision of the definition of PH is needed:

(8) **Palatality Harmony (2nd revised version)**

In a CV sequence, the combination of a soft segment with a hard one is disallowed.

<sup>4</sup> Note: syllables in PSI have been analysed as open (Schenker 1993:67).

In other words, the domain of PH is [CV], rather than the entire syllable. I give a detailed account in section 4.

## 2.2 Exceptions to PH

So far, we have seen that a syllable-based analysis of PH is problematic. I will now present data which show apparent exceptions to PH. Concretely, two of the back vowels, *u* and *o*, are free to occur after soft consonants, and—as opposed to other back vowels—are not fronted in this position, as shown in (9) (cf. the data in (5)).

### (9) Exceptional vowels

- a. Morpheme-internally:                    jugъ ‘South-NOM.SG’  
    čuti ‘to hear’
- b. Straddling a morpheme boundary: ulic-u ‘street-GEN.DU’  
    plač-o ‘cry-IND.PRES.SG1’  
    piš-o ‘write-IND.PRES.SG1’

The words in (9) are in no way exceptional: as stated above, the ability to occur after soft consonants is an “inherent” property of these back vowels.

The question is whether it is possible to explain the behaviour of these vowels without relaxing the constraint of PH. One possibility is to say that they, too, are neutral. Such a solution, however, leaves us with three neutral and three “back” vowels, and the validity of PH itself is questioned: why do we claim that there ever was such a harmony? Is it not just an “accident” that certain back vowels are fronted after soft consonants? Moreover, it is also strange why exactly the most strongly labialized (“most back”) vowels are deviant. I will suggest in section 4 that their strong labialization may be the key to the problem.

There is, however, another peculiar vowel: *ě*. Interestingly, this vowel is forbidden after certain soft consonants. The set of these consonants is what we find under “Palatal” in (3). If preceded by such a consonant, *ě* becomes *a*, as shown in (10).

(10) **Examples for  $\check{e} \rightarrow a$ : Class II and IV verbs with infinitive in  $-ěti$** 

vid-ěti ‘to see’  
 um-ěti ‘to understand’

but: slyš-ati ‘to hear’  
 stoj-ati ‘to stand’  
 lež-ati ‘to lie’

Interestingly,  $\check{e}$  is free to occur after palato-alveolars, as demonstrated by the data of (11).

(11)  **$\check{e}$  after palato-alveolars**

cěsařь ‘emperor-NOM.SG’  
 dzělo ‘very’  
 vьšěxь ‘all-GEN.PL’

The change  $\check{e} \rightarrow a$ , again, is surprising: why should a front vowel be disfavoured after palatal consonants? The exceptional vowels presented in this section seem to suggest that PH, in fact, did not exist as a “law” of PSl.

**3 The internal structure of segments in Late PSl****3.1 Introduction**

In this section, I provide a presentation of the internal structure of PSl segments. More emphasis will be laid on vowels than on consonants, since they are more problematic. I adopt the view of Government Phonology (GP) on the internal representation of segments.

It is beyond the scope of this paper to give a detailed presentation of the GP conception of segmental structure. Readers are referred to Harris & Lindsey (1995) or Szigetvári (1998). Suffice it to say that segments are made up of elements, which are independently realisable. If a segment consists of several elements, one element will act as the head, whilst the others are operators. For example, the elements **I** and **A**, when alone, are pronounced [i] and [ɛ], respectively. They may be fused (combined): an **I**-headed combination (**A.I**) is high-mid [e], whereas an **A**-headed one (**I.A**) is open [æ]. (I follow the convention of separating the head from the operators with a dot before it.) Segments can be empty-headed, too: in this case, their head is the neutral element @.

### 3.2 Consonants

Most of the consonants can easily be represented. I assume the following, providing place elements only:

(12) **Place elements for PSl consonants**

PLACE	ELEMENT
labial	<b>U</b>
dental	<b>R</b>
palatal	<b>I</b>
velar	<b>@</b>

So far, this is the same as what is assumed in the literature. In palatals and velars, the place elements act as heads; in labials and dentals, they are operators. One place of articulation, palato-alveolar, must still be defined. I propose that they, too, contain **I**, but as an operator rather than the head. This is supported by evidence from the dialects, which generally have anterior, rather than palatal, reflexes.<sup>5</sup> Furthermore, such a representation will prove useful when accounting for why *ě* is not lowered to *a* after them. The empty-headedness of velars, assumed by GP on independent grounds, provides an excellent account of why it is velars that are palatalized before front vowels and not labials or dentals. (I will return to these points in section 4.)

### 3.3 Vowels

The vowel system (not surprisingly) is more difficult to reconstruct: vowels sometimes have an extremely wide range of reflexes in the dialects. Nevertheless, some of the vowels present little problem. In general, one can rely on the following sources in doing reconstruction:

- a. the behaviour of the vowel in the phonological system;
- b. the reflexes in the dialects;
- c. certain orthographic features of OCS, which, as we have said, is extremely close to PSl. Of course, this type of evidence must be handled carefully, since OCS is a Bulgaro-Macedonian dialect, showing dialectal features. This will be, however, of special importance in my analysis (see section 4).

<sup>5</sup> For the reflexes of PSl phonemes in the modern languages, see Horálek 1967: 354–393.



First, I present the vowels one by one, starting with the “easier” ones. Of the three types of sources, I rely on (b)—that is, the reflexes.

1. *i*: Practically unproblematic: the dialects have [i] (exc. Ukrainian, see below). So it is reconstructable as **.I**, IPA [i].
2. *u*: This, too, is simple. The dialects have [u], so it must have been **.U**, IPA [u].
3. *a*: Its reflex is almost exclusively [ɐ], and we may safely assume the same value (i.e., low central) for PSI (= **.A**).
4. *e*: The modern languages have [ɛ] in most cases; close [e] appears as well, but normally in specific environments. I assume, therefore, [ɛ]. The elemental representation is **IA.@**, i.e., it is empty-headed (Szigetvári 1998:172f).
5. *o*: Phonetically, the back “equivalent” of *e*: the dialects have mid-low reflexes in most cases. Accordingly, it was probably **UA.@** (=empty-headed), i.e., IPA [ɔ].
6. *y*: In most dialects, it merged with /i/, yielding [i] (the only exception is Ukrainian, where the two merge in high central [i̯]). Polish, Byelorussian and Russian have kept the two phonemes distinct: in Polish, it is high-central [i̯], whereas in Russian and Byelorussian, it is high back [ɯ]. Both values are possible for PSI; from our point of view, the difference is not relevant, since both vowels can be represented by the neutral element, i.e., **.@**.
7. *ɔ*: This vowel has different reflexes: West Slavonic (exc. Slovak) [ɛ], Slovene and Bulgarian [ɔ], Serbo-Croat [ɐ], Macedonian, Slovak and East Slavonic [ɔ]/[o]. These are all non-high vowels. The most probable value is a schwa-like sound in PSI, i.e., **@**, the neutral element. The difference between *y* and *ɔ* can be stated in terms of headedness: the former is **.@**, the latter simple **@**—i.e., an empty nucleus.<sup>6</sup> This stance is supported by the fact that empty nuclei in the dialects derive historically from *ɔ* (as well as *ɔ̆*).<sup>7</sup>

<sup>6</sup> Cf. Harris 1994:181f, where the difference between a word-final empty nucleus (**@**) (e.g., in *dine*) and a word-final schwa (**.@**) (as in *Dinah*) is treated in the same manner.

<sup>7</sup> Empty nuclei in PSI are always realized, i.e., the language did not apply Proper Government, and word-final empty nuclei were not licensed either. Indeed, one crucial step marking the end of the PSI period is the introduction of Proper Government and the licensing of domain-final empty nuclei in the early dialects.

8. *ɨ*: The reflexes are almost the same as for *ɪ*, except that Bulgarian, Macedonian, Slovak and East Slavonic have a front mid vowel ([ɛ] or [e]). In West Slavonic (exc. Slovak), Slovene and Serbo-Croat *ɨ* and *ɪ* merged. This suggests a non-high, fronted vowel, i.e., **I.@** (i.e., a “palatalized” *ɪ*). This vowel, too, is a historical source of empty nuclei in the dialects, which supports the internal structure assumed above.
9. *ɛ̃*: The reflexes are front, non-high oral vowels, ranging from [e] to [a]; in Polish, we have mid nasals as reflexes, front or back.<sup>8</sup> It is difficult to state its exact quality, and it is likely that there was some dialectal variation. (Since there were no other front nasal vowels, its phonetic realization could vary significantly.) However, the non-high reflexes dominate, so I opt for a mid-low vowel, i.e., [ɛ̃], which can be represented as **NIA.@** (=empty-headed).
10. *ɔ̃*: This vowel, too, has several reflexes, but here, the non-low ones dominate. East Slavonic, Serbo-Croat, Czech and Slovak have [u]; Slovene has [o]. Only Bulgarian and Macedonian have low reflexes (Macedonian [ɐ], Bulgarian [ə]). This latter fact will be useful for our analysis. As for Polish, see *ɛ̃*. Since the reflexes are generally high, I reconstruct it as [ɔ̃], i.e., **NA.U** (**U**-headed).
11. *ɛ̃*: Maybe the most problematic of all vowels, which is traditionally reconstructed as low open [æ]. Its reflexes include virtually all possible front vowels from [i] to [a], as well as front diphthongs. There is some indication, however, that the high reflexes are the results of later developments. I accept [æ], i.e., the traditional reconstruction, partly because it will fit nicely into my PH analysis. This vowel can be represented as **IA** — an **A**-headed expression.

The overall picture is, therefore, as follows:

<sup>8</sup> In Polish, the two nasals merged; later, the resulting vowel split, yielding [ɛ̃] and [ɔ̃], depending on length. The quality of the vowels in Modern Polish, therefore, does not indicate the original quality.

(13) **Vowels**

	FRONT	CENTRAL	B	A	C	K
			UNROUNDED		ROUNDED	
HIGH	<b>.I</b>		<b>.@</b>		<b>.U</b>	
MID-HIGH	<b>I.@</b>				<b>NA.U</b>	
MID-LOW	<b>IA.@</b> <b>NIA.@</b>		<b>@</b>		<b>UA.@</b>	
LOW	<b>I.A</b>	<b>.A</b>				

**4 An analysis of Palatality Harmony**

We are now in a position to proceed with an analysis which, I hope to show, accounts for the irregularities as well. First, I repeat the formulation of PH in (8) as (14) for convenience:

(14) **Palatality Harmony (2nd revised version)**

In a CV sequence, the combination of a soft segment with a hard one is disallowed.

Now we can add that

- a. *u* and *ɔ* are free to combine with any preceding consonant;
- b. *ě* is prohibited after palatal consonants.

My analysis is based on two crucial principles. The first of these is licensing, formulated in (15).

(15) **Phonological Licensing**

- a. “Within a domain, all phonological units save one must be licensed. The unlicensed unit is the head of the domain” (Harris 1994:156). This aspect of licensing is generally referred to as PROSODIC LICENSING.
- b. “Melodic material must be licensed by the skeletal position with which it is associated. Unlicensed melodic expressions may not receive phonetic interpretation” (Harris 1994:155). This aspect is called AUTOSEGMENTAL LICENSING.

The second principle is Phonological Structure Preservation (Harris 1994:190):

(16) **Structure Preservation**

Licensing relations defined at the level of lexical representation remain constant throughout the derivation.

With these two principles at our disposal, I now provide a new formulation of Palatality Harmony. In terms of licensing, PH can be formulated as two principles, given in (17).

(17) **Palatality Harmony (3rd revised version)**

- a. Spread **I** into licensed positions.
- b. The element **I** in a licensed position must be licensed by an **I** in the licensing position.

The constraint in (17a) accounts for the palatalization of velars before front vowels: from the licensing position (=the nucleus) with an **I**-containing melodic expression **I** spreads into the licensed position, which is the onset. Since spreading does not take place if the back consonant is the first member of a branching onset (see (7)), an extension of (17a) is necessary. Note that branching onsets are licensing domains: the left-hand member is the head, i.e., it licenses the right-hand one. (In *kr*, for example, the skeletal position associated with *k* licenses the one to which *r* is linked.) We may then add the following constraint:

## (18) Spreading does not operate across a licensing domain.

We will also have to account for the fact that labials and dentals (=neutral consonants) are not palatalized before front vowels. We might re-formulate (17a) to exclude them from the operation of **I**-spreading, but that would mean another extension of the constraint, which is unnecessary: the fact that neutral consonants are not affected will fall out nicely as a result of Structure Preservation. I will return to this point shortly, but let us first see (17b) in detail.

The constraint in (17b) accounts for the fronting of back vowels after palatal consonants: they are fronted because back vowels do not contain **I**, so they may not license an element **I** in the onset. In other words, spreading takes place to provide for an appropriate licenser. For instance, in the sequence *šo*, the element **I** spreads from the onset into the nucleus. The element **U** is delinked from the nuclear position, so the resulting vowel will be front *e*. Structurally, this vowel change may be represented as follows: **AU.@** → **AI.@**.

Now, two questions must be answered. First, why is the ill-formed sequence eliminated by the fronting of the vowel? After all, de-palatalizing the consonant would yield a well-formed sequence, too; e.g.,  $\check{s}o \rightarrow xo$  seems to be a plausible change, especially if we consider the fact that  $x$  does alternate with  $\check{s}$  before front vowels (cf. (5a)). The answer is provided by a special subcase of Structure Preservation, which I present shortly. The second question is why **U** is delinked. The answer lies in the fact that PSI has no front rounded vowels. In autosegmental terms, we can say that the elements **I** and **U** reside on the same tier, so they are not allowed to combine (Szigetvári 1998:171). This can be formulated as in (19):

(19) The combination of **I** and **U** within a segment is prohibited.

One further note is in order in connection with (17b): the formulation seems to be too strong, since it predicts that **.A**, too, is unable to license **I** in the onset, although this is not the case. We can modify (17b) as below:

(20) (= (17b) revised)

The element **I** in a licensed position must be licensed by an element **I** or a lone **A** in the licensing position.

This, however, is not really elegant. Alternatively, we may derive the neutrality of **.A** from its charm properties. I will leave the question open in this paper, and use (17b) in its original form.

We still have to account for the exceptions. Recall that the non-low rounded (**U**-headed) back vowels, i.e.,  $u$  and  $\varrho$ , are not fronted after palatal consonants. This behaviour, I claim, is explicable with reference to Structure Preservation. In their treatment of Hungarian labial harmony, Polgárdi & Rebrus (1996:13) introduce the following constraint:

(21) **\*Switching**

Elements preserve their position within the structure of the segment.

That is, an element which is lexically a head must remain so throughout the derivation. This constraint, in fact, is a strict subcase of Structure Preservation: headedness must be preserved.

The constraint in (21) accounts for the non-fronting of these two vowels: they are **U**-headed. Due to (19), the head **U** should be delinked, which would result in head switching. The change from  $u$  to  $i$  would involve the

change  $.\mathbf{U} \rightarrow .\mathbf{I}$ ;  $\varrho$  would change into a mid-high front nasal vowel:  $\mathbf{NA.U} \rightarrow \mathbf{NA.I}$ . In both cases, a lexically  $\mathbf{U}$ -headed expression would become an  $\mathbf{I}$ -headed one. Since the other back vowels are empty-headed (and  $\varepsilon$  is headless), their fronting does not violate \*Switching.

The same principle can be applied to explain why it is velars, but not labials and dentals, that are palatalized before front vowels. Labials and dentals are headed; velars have @ as a head, i.e., they are empty-headed. The palatalization of neutral consonants would, therefore, violate \*Switching; that of velars does not do so.<sup>9</sup>

Finally, the question why illegal sequences of the \**šo* type are rendered well-formed by the fronting of the vowel, rather than the de-palatalization of the consonant, is also adequately answered with reference to \*Switching: the latter change would involve head switching, which is forbidden.

Now, some OCS texts show an interesting orthographic phenomenon. After soft consonants, the letter for  $\varepsilon$  is sometimes used where one would expect  $\varrho$ ; e.g., we find  $\langle \text{plač}\varepsilon\text{š}\text{t}\text{i}\text{i} \rangle$  for expected  $\langle \text{plač}\varrho\text{š}\text{t}\text{i}\text{i} \rangle$  ‘cry-PRES.PART. NOM.PL.MASC’ (Diels 1932:107). This “confusion”, rare though it is, deserves some attention, since the most reasonable explanation is that  $\varrho$  was actually fronted to  $\varepsilon$  in the dialect of the scribes.<sup>10</sup> Interestingly, but not surprisingly, it is precisely the Bulgaro-Macedonian dialects which have low reflexes for PS1  $\varrho$  (cf. section 3.3) — and OCS is such a dialect. It is reasonable to suggest, therefore, that the back nasal was mid-low, rather than mid-high, in these dialects; in other words, it was  $\mathbf{NAU.@}$ . Since this expression is empty-headed, it can be fronted without violating \*Switching.

One problem remains to be solved: why does  $\check{e}$  become  $a$  after palatal consonants? Recall that this vowel has been analysed as  $\mathbf{A}$ -headed. I propose the following constraint as a stricter subcase of (17b):

- (22) A head  $\mathbf{I}$  in a licensed position must be licensed by a non-dependent element  $\mathbf{I}$  in the licenser.

<sup>9</sup> Interestingly, this is not peculiar to Slavonic: velars seem to be universally more prone to palatalization by front vowels than other consonants (cf. Romance languages, Old English or Icelandic).

<sup>10</sup> The relative rarity of the phenomenon may reflect the optionality of fronting; it is more likely, however, that non-fronted forms occur because the scribes, brought up in the tradition, followed the conventional orthographical rules. This is not surprising: orthographies tend to be conservative.

Remember that palatal consonants are **I**-headed, whereas palato-alveolars are not: they contain **I** as an operator. Also, *ě* only becomes *a* after palatals, but remains intact after palato-alveolars. We can say, in other words, that a dependent **I** in the nucleus is “too weak” to license a head **I** in the onset. Recall that the element **I** is non-dependent in other vowels, which are either **I**-headed or empty-headed.

The question now arises why *ě* becomes *a*, instead of being raised. The answer is provided by \*Switching: the raising of *ě* would involve head switching, since an **A**-headed segment would become either headless or **I**-headed. The only possible solution is to delink the dependent **I**, which results in *a*, i.e., **.A**; since **A** is neutral, it may license any expression.

The analysis presented above is not entirely satisfactory: we have introduced constraints which contradict each other, and in case of conflict, the stronger one wins. Since Optimality Theory (Prince & Smolensky 1993) was devised to account for precisely such phenomena, this analysis seems to call for an OT framework. Polgárdi & Rebrus (1996), meeting quite similar problems, provide an analysis combining GP representations with an OT framework. I will follow them here in the next section, providing the outline of an OT analysis.

## 5 The analysis in an OT framework: an outline

In section 4, I introduced the following constraints:

- i. \*SWITCH: Elements preserve their position within the structure of the segment.
- ii. \*(**I,U**): The combination of **I** and **U** within a segment is prohibited.
- iii. \*SPREAD: PH is blocked by an intervening licensing domain.
- iv. PAL: Spread **I** into licensed positions.
- v. LIC\_I: The element **I** in a licensed position must be licensed by an **I** in the licensing position.
- vi. LIC\_HEAD-I: A head **I** in a licensed position must be licensed by a non-dependent element **I** in the licensor.

Since (i), (ii) and (iii) are never violated, they must be higher ranked than the other constraints; it is not clear how they should be ranked with respect to each other. Because (iv) and (v) apply in complementary environments, it is irrelevant which one dominates the other; as they may be violated, they are ranked lower than (i)–(iii). As for (vi), it must be lower ranked than (i)–(iii), but nothing else can be said about it on the basis of the data. Since I have defined (vi) as a strict subcase of (v), it may be ranked

either immediately below or above (v). Altogether, we have the following rankings (where a slant indicates that the constraints are not ranked between themselves):

(23) **Constraint rankings in PSI**

\*SWITCH/\*(I,U)/\*SPREAD  $\gg$  PAL/LIC\_I/LIC\_HEAD-I

With these constraints and rankings, we can now account for the following phenomena:

- a. velar consonants are palatalized before front vowels, (24), but palatalization does not take place if the velar is the first member of a branching onset, (25);
- b. non-U-headed back vowels are fronted after soft consonants, whereas the elimination of such illegal sequences is impossible by the de-palatalization of the soft consonant, (26);
- c. U-headed vowels fail to be fronted after soft consonants, (27);
- d. neutral consonants are not palatalized by front vowels, (28);
- e. the low front vowel *ě* becomes *a* after palatal (=I-headed) consonants, (29).

(24) *rečeto* ‘say-IND.PRES.SG3’ (cf. *reko* ‘id.-IND.PRES.SG1’)

	*SWITCH	*(I,U)	*SPREAD	PAL	LIC_I	LIC_HEAD-I
rečeto						
reket				*!		

(25) *kričati* ‘to shout’

	*SWITCH	*(I,U)	*SPREAD	PAL	LIC_I	LIC_HEAD-I
kričati				*		
čričati			*!			

(26) *koň* ‘horse-NOM.SG’ (cf. *stol* ‘table-NOM.SG’)

	*SWITCH	*(I,U)	*SPREAD	PAL	LIC_I	LIC_HEAD-I
koň						
koň					*!	
kon	*!					



(27) *ulicu* ‘street-GEN.DU’

	*SWITCH	*(I,U)	*SPREAD	PAL	LIC_I	LIC_HEAD-I
☞ ulicu					*	
ulici	*!					
ulicü		*!				

Note: the *ü* of the last form is not used in Slavonic philology, because the sound is nonexistent. It, of course, stands for a high, front, rounded vowel, IPA [y].

(28) *ti* ‘PERS.PRON-DAT.SG2’

	*SWITCH	*(I,U)	*SPREAD	PAL	LIC_I	LIC_HEAD-I
☞ ti				*		
či/ci/ĭi	*!					

(29) *slyšati* ‘to hear’

	*SWITCH	*(I,U)	*SPREAD	PAL	LIC_I	LIC_HEAD-I
☞ slyšati						
slyšeti						*!
slyšeti/ slyšiti	*!					

## 6 The synchronic status of PH in Late Proto-Slavonic

In this essay, I have attempted to provide an analysis of Proto-Slavonic Palatal Harmony in terms of licensing and optimality, using an elemental view on the internal makeup of segments. I hope to have shown that PH, in spite of the apparent exceptions, is a “well-behaved” constraint: the exceptions follow from the fact that the PH constraints (viz., PAL, LIC\_I and LIC\_HEAD-I) is ranked lower than other constraints, most importantly \*SWITCH and \*(I,U). There is, however, one problem left, to which I now turn.

So far, the picture seems to suggest that PH acts as an active, dynamic process in late PSI. In fact, its status as a synchronic process is not unambiguous, as shown by the data below:

- (30) a. rek-ϕ ‘say-IND.PRES.SG1’  
       reč-etъ ‘id.-IND.PRES.SG3’  
       ръс-ěte ‘id.-IMP.PL2’
- b. kъńig-a ‘book-NOM.SG’  
       kъńidz-ě ‘id.-DAT.SG’  
       kъńiž-ьнъ ‘related to books-NOM.SG.MASC’
- c. učeník-ъ ‘pupil-NOM.SG’  
       učenič-e ‘id.-VOC.SG’  
       učenic-i ‘id.-NOM.PL’
- d. slug-a ‘servant-NOM.SG’  
       služ-iti ‘to serve’
- e. grěx-ъ ‘sin-NOM.SG’  
       grěš-iti ‘to commit sin’  
       grěš-i ‘sin-NOM.PL’

The forms in (30) obey Palatality Harmony: the constraint PAL applies before front vowels. The problem is that the outcome of palatalization is not always predictable. (31) presents the possible alternations:

- (31) Alternations: k ~ č ~ c  
                     g ~ ž ~ dz  
                     x ~ š ~ ś<sup>11</sup>

The reason why the issue is problematic is that we can only say that velars are palatalized before front vowels, but it is unpredictable whether a palatal or a palato-alveolar will result. To be sure, some generalizations can be made: for example, *e* and *ь* always produce *č/ž/š* (and so does *ę*); but *i* is perfectly ambiguous (as shown in (30c–e)), and so is *ě* (though it yields palato-alveolars in most cases). Interestingly, LIC\_I, i.e., the fronting of back vowels, is perfectly predictable.

The problem is easily explicable historically: the two “kinds” of *i* and *ě* have different historical sources, and cause two different, chronologically ordered palatalizations with different outcomes. Synchronically, however, the alternation is a morpho-phonemic one: one has to refer to the particular morpheme. For instance, *i* and *ě* occurring in imperative inflexions always produce palato-alveolars; but as thematic vowels of certain verb classes,

<sup>11</sup> In West Slavonic, *ś* > *š*, so here, the alternation is simply *x* ~ *š*.

they yield palatals. In the framework adopted here, reference to morphology is not permitted, so an analysis of palatalization as a dynamic process is excluded.<sup>12</sup> As a result, all we can say is that PH is a constraint on representations, i.e., a distributional constraint. The question is how it applies in derived (morphologically complex) forms. This is, however, another story.

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<sup>12</sup> It is, of course, perfectly possible to treat palatalization as a dynamic process in an SPE-type rule-based analysis (where the ordered rules would coincide with the chronologically ordered historical processes).