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CONSONANTAL BLOCKING CLUSTERS IN WINTER'S LAW

Abstract
Winter's law is one of the important accentual laws of the Balto-Slavic period. Its reality is now established and acknowledged by most scholars, although some still reject its existence or point to its problematicity.[1] The aim of this paper is to show that the behavior of certain blocking consonants which prohibit the operation of Winter's law can be described by Optimality Theory.

Keywords
Winter's law; acute; consonants; clusters; optimality theory

1 Kortlandt's blocking clusters

Kortlandt (1979, 60-70) suggests that clusters **ngn-* and **-ndn-* blocked the operation of Winter's law (nasal and liquid diphthongs) The first cluster can be found in Proto-Slavic **ognь*, Lith. *ugnìs* (AP4), Skt. *agníḥ*, Lat. *ignís*, for which Kortlandt reconstructs **ŋg^{w}nis* >BS **ungnis* (labialization of labiovelar); for explanation **un>*o* see Kortlandt 1979, 61. The cluster *-ndn-* is to be found in Proto-Slavic **voda*, Lith. *vanduõ*, Latv. *ûdens*, OPruss *undw, wundan*. Kortlandt reconstructs BS paradigm: Nsg **vondōr,* Gsg **(v)undnes* > ProtoSlav. **vodnes* Asg **vondenim*, Npl **(v)undā; *un* is the zero grade of **on*, initial v introduced analogically in other case forms, in my opinion due to decomposition of [+labial] feature; **vundā* ~ Lat. *unda*, Prus. *unds*; in Lith. *vanduõ*, Latv. *ûdens* Kortlandt sees the preservation of vocalic alternation up to the end of East Baltic period Nsg **vandō*, Gsg **vundenes*, Asg **vandenin*; ProtoSlavic **voda* is APc which, according to Kortlandt, reflects old consonantal mobile paradigm.

The blocking rule was rejected by Birnbaum (Birnbaum 1985, 48), who sees similar environments but questionable etymologies of the word for BS words "fire" and "water". Birnbaum derives Lat. *ignis* < **egnis* and concerns Lith. ugnìs as a form with zero grade root and he interprets nasal forms of "water" in Lith.

1 See Kortlandt 2007/2011. Some apparent exceptions to Winter's law supported by evidence in Germanic can be explained by the operation of Kluge's law which changed the Germanic consonantism, see Kroonen 2011a, 2011b.

vanduõ and Lat. *unda* as secondary although it is not clear how and why this parallel and independent infixation to the same etymon in separate languages could occur.[2] Therefore, Birnbaum rejects Balto-Slavic nasalized protoform for "fire" **ungnis* as improbable and also doubts that Czech *výheň* should support this reconstruction.[3] The rule is also rejected by Rasmussen, who sees **ūngio-* (Cz. *výheň,* S-Cr *vȉganj*) as a vrddhi derivative from **ugni,* but *ugnìs* should be considered a counterexample.

1.1 Proposed solution

The glottalization in the **ndn-* position has been lost due to the neutralization but we should explain why and how it happened. I would propose that **ungnis* and **vondōr* are in fact **unʔgnis* and **vondʔōr* because voiced obstruents are preglottalized and phonetically they simply form a combination of glottal stop and an obstruent. The syllabic structure *CVʔDNV-* is atypical with respect to sonority. The glottal stop is unvoiced and is in the neighborhood of the voiced segments – the nucleus and a voiced obstruent which can be either a part of the first syllable coda or the second syllable onset. The existence of a voiceless segment among voiced segments is anomalous and the voiceless segment must either be deleted or must undergo voicing assimilation.

As Lombardi (1995, 1999) proposed, such a situation can be controlled by the *Harms' generalization* (HG) constraint, which requires that voiced obstruents are more sonorous.

(1) **Harms' generalization (HG)** – voiced obstruents must be closer than voiceless to the syllable nucleus (Lombardi 1995, 1999)

Obstruent clusters tend to assimilate in voice. The constraint which enforces voicing assimilation is

(2) **AGREE** – Obstruent clusters should agree in voicing (Lombardi 1995, 1999)

The AGREE constraint does not say anything about the direction of assimilation, apart from HG. So if HG is undominated, all the obstruents in a row must be either [+voiced] or [-voiced].

The preglottalized consonant easily disintegrates into the sequence glottal stop-obstruent, which means that a new segment (glottal stop) is inserted into a syllable. In the sequence *-nʔg-* the glottal stop can either remain (which would break

2 Birnbaum takes the nasal infixation in Latin and Baltic as the general tendency (Birnbaum 1985, 48).

3 Birnbaum 1999, 30.

the sonority sequence) or be eliminated. Such deletion violates the correspondence constraint MAX:

(3) **MAX –** Input segments must have output correspondents. No deletion (Kager 1999).

The interaction of HG and MAX constraints is shown in the following table:

unʔgnis	HG	MAX
unʔg.nis	*	
☞ung.nis		*

The input **unʔgnis* gives two candidates, both resyllabified. The first candidate does not satisfy HG because of the combination *VʔG* containing the glottal stop. The second candidate is the winner because the MAX constraint eliminated the voiceless glottal stop.

The glottal stop cannot be assimilated with respect to voice feature – it must either be deleted or transformed into a glottalic intonation.

The existence or non-existence of any laryngeal feature is controlled by *LAR constraint (do not have laryngeal features).

Assimilation is prohibited by the IDENT LAR constraint:

(4) **IDENT LAR –** Consonants should be faithful to underlying laryngeal specification (Lombardi 1999).

IDENT constraint is responsible for the perseverance of any feature from input to output.

Assimilation of voice is required by the AGREE constraint: obstruent clusters should agree in voicing. Presence or absence of the glottal stop is controlled by MAX constraint. Because there is a row of obstruents in a syllable (in the reconstructed form we are not definitely sure with the precise tautosyllabic and heterosyllabic position), the constraint limiting the number of consonants in onset and coda position is controlled by *COMPLEX constraint:

(5) ***COMPLEX –** no complex syllable margins (Kager 1999)

The glottalic intonation is generally avoided and its absence is required by the *V^{ʔ} constraint that I propose

(6) ***V^{ʔ}** – no glottalic feature on a vowel.

As we can see, the table above is missing one more candidate with nucleus glottalization **uˀngnis*. This candidate would not be faithful to **Vˀ* but would satisfy AGREE constraint.

The constraint interaction can be showed on the 'fire' example. I propose that input is **unʔgnis*:

unʔgnis	IDENT	AGREE	HG	MAX	*COMPLEX	*Vˀ
1.unʔg.nis		*	*		**	
☞2.ung.nis				*	*	
3.uˀngnis					!***	*

The first candidate fails to satisfy both AGREE and HG constraints and is eliminated from the output. The third candidate is eliminated due to the failure to meet gradation constrain of *COMPLEX as well as the *Vˀ. Therefore, we do not have the *ungnis with a glottalized vowel (or acute). The second constraint is faithful to both AGREE and HG constraints and is the optimal candidate that does not contain either glottal stop and the glottalized nucleus. The form *ungnis is later simplified to *ugnis due to the highly positioned *COMPLEX cluster but the change is of no significance to our solution here.

2 Dybo's blocking clusters

Dybo (2002, 480-502) proposed other clusters which should prohibit or neutralize the effect of Winter's law. One must say that Dybo's analysis is completely independent of Kortlandt and other authors and that Dybo sticks to classical Neogrammarian approach. Dybo distinguisthes several consonantal combinations:

a) *-sg-, -sd- > *-zg-, -zd-, e.g. Lith. *mazgóti* "wash"
Lith. *mazgóti* "wash, Latv. *mazgât,* other cognates: OInd. *májjati* "sink", Lat. *mergō, mergere* "plunge, immerse", PIE**mesg-* (IEW:745–746, LIV:441).
De Vaan (2008, 375) reconstructs PIt. **mezge/o-*. Kewa (2, 549) and Iew connect also Gr. *mísgein* "mix", Frisk (I, 193) reconstructs **mi-msg-ō* and connects with Lith. *miẽšti* "mix", OCS *měšiti* which requires the root **moik'-*, thus also Derksen (2008, 313) and Chantraine : 677.
Further references: Fraenkel (I, 421), Dell (1951, 710-711), Dybo (2002, 480).

It is obvious that what we deal about is the voicing asimilation. We have two possibilities that reconstruction allows us. If the original cluster is **zʔd-*, the factorial typology is the same as in Kotlandt's **nʔgn-* cluster because of the highly ranked AGREE and HG constraints.

If the original cluster is **sʔg-*, the situation is different because the only voiced segment in the cluster is **d*. So, a glottal stop must be lost due to the highly ranked *COMPLEX constraint, which eliminates glottal stop from the coda position:

mesʔg-	AGREE	*COMPLEX	IDENT-LAR	MAX	*Vʔ
1.mes.g	*			*	
2.meʔsg	*			*	*
☞3.mez.g			*	*	
4. mesʔ.g	*	*			

The first two candidates are also banned by the AGREE constraint because the obstruents in a row do not agree in voicing. The fourth candidate has a first syllable complex coda and must be eliminated by *COMPLEX constraint.

b) the combination of voiced unaspirated and a cluster contaning a fricative, e.g. *D+s, *-Dzd, -Dsk-, -Dst-, e.g. PSl* *lozá* "wine, PSl. **gvězdá* "star", PSL. **ovŏsъ* "oats", PSl. **blěskъ* "brightness".

1) PSl **lozá* "wine" (APb), OCS. *loza,* Rus. *lozá,* Cz. *loza,* Slk. *loza*, S-Cr. *lòza*, Sln. *lóza,* Lith. *lazdà "*stick", Latv. *lágzda* "hazel", OPrus. *laxde* other cognates Alb. *laíthi, ledhi* "hazel", Arm. *last* "boat". PIE **lēgʼʰ-* (IEW 1959, 660), BS form **la(g)zda.*

The connection of Slavic and Baltic forms rejected by ESJS (7:439), which prefers independent origin. The connection with PSl. **lěska* "hazelnut" (APb with pretonic length), Rus. *ljazgá,* Cz. *líska,* Slk. *lieska,* USorb *lěska,* S-Cr. *lijèska,* Sln. *léska,* proposed by Derksen (2008, 274) and Dybo (2002, 486 & 487), the same cluster **-zgd-* which blocks WL aslo reconstructed by Snoj (2003, 352), who reconstructs original **ləs-dh$_3$-áh$_2$* for **lozá* and **u̯loi̯skah$_2$* for **lěska*. The obvious problem in the reconstruction of **lozá* is the aspirate obstruent. So Dybo reconstructs early BS **log'zdā* and **leg'kā*, the later form probably underwent dissimilation. The definite etymology is not clear but if the voiced aspirate is reconstructed, there is no need to postulate WL here.

Further references: Smoczyński 2007, 341; Derksen 2008, 286–287; Matasović 1995, 65.

2) PSL. **ovŏsъ* "oats", Rus. *ovës, ovsá,* Cz. *oves*, S-Cr. *òvas,* Čak. *ovàs,* Sln. *óvəs,* Lit. *avižà* (AP3), OPrus. *wyse*, another cognate Lat. *avēna* "oats, stalk, straw", PIE **au̯ig'-* (IEW 1959, 88).

The reconstruction is problematic. Derksen (2008, 385) posits BS **āviź-* from **h$_2$euigʼʰ(s)eh$_2$* but does not exclude the substratum origin. Also de Vaan (2008, 65) who considers the **-igʼʰ-* suffix strange and points to the different suffix in Slavic and Baltic. Smoczyński (2007, 39) reconstructs Balt. **au̯iž-ā* < **au̯igʼʰā/*h$_2$euigʼʰ-eh$_2$* (referring to Schrijver (1991, 46–47)). He derives Slavic form from **h$_2$euigʼʰ-so* > PBS **au̯iš-a* with **ž-s* assimilation. Dybo (2002, 485–486) suggests BS. **awiź-so* <**au̯ig'-so* where the cluster *-g's-* shoud block WL. The situation is similar to the "hazel" reconstruction. If the voiced aspirate should be here, no WL would be required.

Further references: Vasmer (3, 113), Frisk (I, 31–32).

3) PSl. **gvẽzdá* "star" (APb), OCS *dzvězda*, Rus. *zvězdá*, Cz. *hvězda*, Slk. *hviezda*. Pl. *gwiazda*, USorb *hvězda*, S-Cr. *zvijèzda*, Sln. *zvẹ́zda,* Lith. *žvaigždẽ* (AP4), Latv. *zvàigzne.*
PIE **g'^{h}u̯oig^{w}-* (IEW 1959, 495), BS **g/zwoizde?* (Derksen 2008, 196).

The reconstruction is not quite clear. The reconstruction of IEW is based on the connection with Gr. *foĩbos* "shining". This etymology is accepted by Dybo (2002, 488-489) who refuses Fraenkel's (Fraenkel II, 1324) form **žvaig(e)s, žvaid(e)s* combined with PIE root **dhē-* (**d^{h}eh$_{1}$–*). The IEW approach is, however, rejected by Derksen who proposes the PIE reconstruction **g'^{h}uoig'^{h}-d^{h}eh$_{1}$, *g'^{h}uoid^{h}-d^{h}eh$_{1}$*. Snoj (2003, 861) accepts Fraenkel and reconstructs **g'^{h}uoig^{w}zd(^{h}h$_{1}$)ah$_{2}$*. Smoczyński (2007, 794) derives *žvaigždẽ* <**švaistẽ* and consider the initial fricative voicing due to the related Slavic forms and derives it from the root **k'u̯ei̯t-/k'u̯it-* "lighten". This etymology is improbable.

Gluhak (1993, 702–703) proposes the original **g^{h}u̯oi̯-stā* with the assimilation of voice **st>zd* considering the Lithuanian "g" secondary. Similarly Schuster-Šewc 1978-1996, 368 who considers Lithuanian "g" unclear. Boryś (2008:189) starts from the same **g^{wh}ēi̯-* "clear", if connected with Gr. *phaidrós,* Lith. *gãzdras* "heavenly light" but the etymology is unclear to give Slavic forms.
Further references: Vasmer (2, 85–86).

4) PSl. **blêskъ* "brightness" (APc), Rus. *blesk,* Cz. *blesk* "brightness, lightning", Slk. *blesk,* USorb. *blěsk,* S-Cr. *blìjesak* "glow", Sln. *blẹ̑sk*, Latv. *blaiskums*"spot"
PIE **b^{h}lei̯g'-* (IEW 156–157). BS form **bloisko-* reconstructed by Derksen (2008:43).

The same root with zero grade in OCS *blьštati* "shine, sparkle", Lith. *blyškė́ti* "shine, BS **blisk'eʔ- <*bligske-* (Derksen 2008, 49) where the "g" was lost before WL. Dersken's explanation seems probable as an explanation of the absence of WL.
Further references: Vasmer (1, 173–174), Bezlaj (1, 27), Snoj (2003, 46), Dybo (2002, 490-492; LIV 2001, 89).

5) Lith. *blõkšti* "hurl, fling", cognate with ON *blekkja* "beat", Lat. **flāgō, flāgere, flagrum* "whip", PIE **b^{h}ag'-* "beat" (IEW 1959, 154), **b^{h}leh$_{2}$g-* (LIV 2001, 87, Smoczyński 2007:66).

Latin form derived from the zero grade **b^{h}lHgro-* (de Vaan 2008, 224), also Lithuanian form ?**b^{h}l̥h$_{2}$g-sk'é* (LIV 2001). Smoczyński reconstructs BSl **blā́g-stu >*blókstu* but leaves Lithuanian circumflex unexplained.

Glottal stop here might have been neutralized with th ecombination of laryngeal, if the reconstruction *C(V)RHD-* is right. The neutralisation would have been similar to **Lubotsky's law:** *C(V)RʔʔD- >C(V)RʔD.* The final merger would have then be vocalized.
Further references: Fraenkel (I, 51), Dybo (2002, 491).

As we have seen, the above-mentioned group of "blocking clusters" does not really block clusters. The data can be explained either by an alternative etymology or by the early loss of voiced obstruent. I also doubt that there would have been any phonetic process which would block WL in such combination because the elimination of a glottal stop in the position *VʔDC* must lead to the glottalization. But the data here do not support such an explanation.

c) -st- and -n-st- stems

Here the explanation is provided by Derksen (2008a/2011) who proposes the **ske/o* <**-Hske/o-* due to the reanalysis of presents *CRH-ske/o*. The introduction of the glottal stop causes *métatonie rude*. *Métatonie douce* is in sta-presents is limited to Lithuanian only (in **Ci/uD*) structures and spread to demominative sta-present verbs.

d) clusters *-br-, e.g. PSl. **dobrъ* "good" .

This apparent prohibiting cluster can also be explained by a different etymology:
PSl. **dobrъ* "good" (APb), OCS *dobrъ,* Rus. *dóbryj,* Cz *dobrý*, S-Cr. *dȍbar*, Sln. *dǫ́bər*
PIE * $d^{h}ab^{h}$- Derksen (2008:110)
Further references: Dybo (2002, 496), ESJS, 3.

e) clusters *-g'n-, *-gn-, *-bn-, e.g.*PSl. **dъnó* "bottom", PSl. **ognjь*

*PSl. **dъnó* "bottom" (APb), Rus. *dno,* S-Cr *dnȍ,* Sln. *dnò,* Lith. *dùgnas* (AP4), Latv. *duôbs, duõbjš* "deep", PIE **$d^{h}ub^{h}$-no* Smoczyński (2007:130), Derksen (2008:130) who both reconstruct BS **dubno-*. As remarked by Derksen, Lithuanian acute could be from WL but the problem is Slavic APb. Moreover, the reconstruction shows aspirate in coda.

Another **-gn-* cluster, adduced by Dybo, is the same as the one adduced by Kortlandt.

3 Rasmussen's blocking clusters

Rasmussen (1992/1999:534–536) distinguishes the following blocking clusters:

a) -DR-, before sonorant, e.g. Lith. *anglìs* "coal" OCS *ǫglь* < BS **ang-lí;* Lith. *ugnìs* "fire", OC*S ognь* < PIE **og-nó-/ní*; Lith. *slãbnas* "weak" < **slab-nós.*

PSl. **ǫ̋glь* is APa and the glottal stop is positively reflected here. The word for "fire" is the one belonging to Kortlandt's clusters but Rasmussen reconstructs different etymology. Lith. *slãbnas* is a bit problematic. Proto-Slavic **slắbъ* is APa which is quite logical but it does not correspond Lithuanian circumflex. Derksen (2008, 452–453) considers the Baltic form a borrowing. As Derksen aptly remarks, Rasmussen's counterexample even the counterexample to his own proposal that WL operates in pretonic position. But this does not explain Slavic acute.

b) -RD-, after a sonorant, e.g. Lith. *stulbas* "post, mast", ORus. *stъlbъ* "column", ON *stolpi,* Rassmussen considers the probable Slavic loanword; other Rasmussen's examples poit to the reconstructed aspirate, as he himself points e.g. Lith. *gaũbti* "curve", ON *gaupn* "hollow of the hand", PIE **g^{h}ou̯b^{h}-nó.*

Rasmussen's blocking clusters are not real blocking clusters, they are either postulated without reference to Slavic accentuation or they can be explained by an alternative etymology.

4 Conclusion

In the previous pages I proposed the development of Winter's law as a loss of glottal stop before the voiced unaspirated obstruent. This is the basic idea of Kortlandt which I accept. I claim that the loss of glottal stop has been controlled by the constraints responsible the laryngeal features of obstruents: AGREE, *LAR, IDENT-LAR. Those constraints, developed by Lombardi as a description of the assimilation of voice and voice neutralisation, can be successfully applied to the behavior of glottal stop. Glottalization of the vowel nucleus (acute) is caused by the lower-ranked *$V^{ʔ}$ constraint which prohibits vowel glottalization.

Blocking clusters can also be explained by the above mentioned constraints with the interaction of HG constraint which is responsible for the position of sonorous segments in the neighborhood of the vowel nucleus.

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KONSONANTICKÉ SKUPINY BLOKUJÍCÍ PŮSOBENÍ WINTEROVA ZÁKONA

Výjimky z Winterova zákona způsobené ztrátou rázu před neznělým obstruentem v konsonantických skupinách v baltoslovanštině (ve smyslu Kortlandtovy teorie) je zde popsán jako interakce laryngálních constraintů pomocí teorie optimality. Na ztrátu rázu v konsonantických skupinách je aplikována teorie asimilace znělosti Lindy Lombardi.

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