

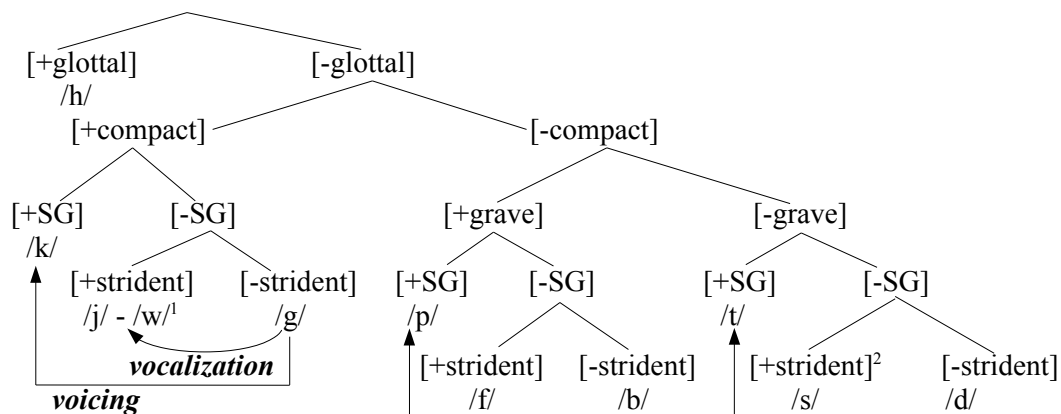
**Geminates: from Old Norse to Scandinavian Languages.**  
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Consonants in scandinavian languages (Icelandic, Faroese, Danish, Swedish and one variety of Norwegian, Bokmål) have very similar behaviors: they undergo the same changes. Some examples showing this proximity are given below in (1):

- (1). (a) semi-vocalization Icelandic /lagi/ [laji] *lie* past. part. ; /segja/ [sejja] *say* inf.  
 Faroese /stutligur/ [stotlijur] *pleasant* ; /drøgu/ [drøwɯ] *drag* past. part.  
 Danish /lægə/ [læjə] *play* inf. ; /søɔ/ [sɔ<sup>ɰ</sup>ɰ] *sorrow* ; /bɔɔ/ [bɔ<sup>ɰ</sup>ɰ] *book*
- (b) voicing Icelandic /ljeku/ [ljɛɣu] *play* pret. ; /tapa/ [taba] *lose* inf. ; /matur/ [madur] *meal*  
 Faroese /teaka/ [teaga] *take* inf. ; /drepa/ [dre:ba] *kill* inf. ; /sita/ [si:ða] *sit* inf.  
 Danish /ly:pə/ [ly:bə] *lagopus*; /pawkə/ [pawɔ] *kettledrum* ; /ru:tə/ [ru:də] *route*

This similarity finds its source in the diachrony of these languages: they all are from the same language continuum, Old Norse (henceforth ON). In order to explain their behavior and to test if this genetic proximity still holds in the synchrony, we used the contrastive hierarchy method (Hall : 2007, Dresher : 2009), which allows us to identify the phonologically active material in the segments. We obtained the same hierarchy for the five nordic languages. It is given in (2):

- (2). [glottal] >> [compact] >> [grave] >> [Spread Glottis] >> [strident] >> [voice]



The contrastivist approach allows us to explain most of the consonantal changes in nordic languages: segments that interact share most of their features and hence they appear under same node. In the vocalization process, /g/ gains stridency, i.e. become [+strident]. In the voicing process, stops lose their aspiration (hence positive specification for [SG]) and gain voicing in the same time, since there is no phonological voiceless non aspirated in nordic.

There is however one specific process the contrastive hierarchy fails to explain: gemination. Examples in (3) show the treatment of voiceless stops geminates across nordic languages. As we can see datas exhibit variation from a language to another:

- (3).                    V /pp/ V                    V /tt/ V                    V /kk/ V
- |           |  |  |  |
|-----------|--|--|--|
| Icelandic | /lappa/ [lahpa] <i>patch</i> inf.                    | /fatta/ [fahta] <i>catch</i> inf.              | /θakka/ [θahka] <i>thank</i> inf.                |
| Faroese   | /leappi/ [leah <sup>h</sup> pi] <i>patch, rag</i>    | /kettai/ [tʃɛ <sup>h</sup> tai] <i>cat</i> pl. | /teakka/ [tea <sup>h</sup> ka] <i>thank</i> inf. |
| Danish    | (lappe) <sup>3</sup> /lapə/ [labə] <i>patch</i> inf. | (fatte) /fatə/ [fadə] <i>catch</i> inf.        | (takke) /takə/ [togə] <i>thank</i> inf.          |
| Swedish   | /lappa/ [lap:pa] <i>patch</i> inf.                   | /fatta/ [fata] <i>catch</i> inf.               | /takka/ [taka] <i>thank</i> inf.                 |
| Bokmål    | /lappe/ [lap:pə] <i>patch</i> inf.                   | /fatte/ [fata] <i>catch</i> inf.               | /takke/ [taka] <i>thank</i> inf.                 |

1 We put the labial velar /w/ under the same specifications as /j/ : they are both [+compact] and their behaviors across nordic languages are very similar.  
 2 After [+strident] Icelandic needs an extra contrast, namely [±voice], in order to distinguish between coronal fricatives /s/ and /ð/. The former is common to every nordic languages but the latter is present only in Icelandic.  
 3 We give for Danish orthographic forms. This will be relevant later.

Underlying (derived from ON) /pp, tt, kk/ should surface respectively [p:, t:, k:]. That's indeed what we can observe in Swedish and Bokmål, in (3). In Danish however, we can see that voiced stops, [b, d, g] are produced. We posit simple consonants in underlying representations and not geminates. Otherwise we can't justify why a consonant in a *protected* environment (Lass 1984 : 182) undergoes lenition and why it's phonetically short.

During a previous field study we recorded native speakers of Danish, Swedish and Norwegian (Bokmål) for reading and conversation tasks. Some unexpected data showed up with the Danish speaker, they are presented in (4):

- (4). Danish
- |                                  |                                  |                                  |
|----------------------------------|----------------------------------|----------------------------------|
| (ikke) /ikə/ [ikə] not           | (lappe) /lapə/ [lapə] patch inf. | (fatte) /fætə/ [fætə] catch inf. |
| (klokken) /klogən/ [klokɳ] clock |                                  |                                  |

Where Danish speaker was expected to produce voiced segments (intervocally), she produced [p, t, k] instead. This backs our proposal of underlying single voiceless stop: voicing would then not be obligatory and the underlying segment surfaces without any change.

Following Lass (1984) and his proposal explaining sound change, we assume that the synchronic treatment of geminates in nordic languages allows us to reconstruct a sequence of a developmental type from ON to today. We already mentioned that the jump from /pp/ to [b] without intermediate stage would be hard to justify. According to this and to Lass' hierarchy of segments in terms of phonological strength (1984 : 178) we assume the following sequence (we illustrate it with labial voiceless stops):

- (5). pp > p > b

In (5) [p] would be what Lass calls a *missing link* (1984 : 337), i.e. a stage we can reasonably posit but for which we don't have diachronic data. If the literature never mentions [p] as the production of /pp/ for any nordic languages, we showed in (3) that it is however a possible stage. Lass (1984) proposed that checking in the outputs of speakers could be a way to borne out assumptions about *missing links*, since the movement across the hierarchy a speaker can control may be taken as a "possible sound change" (Lass 1984 : 333).

Assuming that [p] is indeed the *missing link* leads to two implications: either speakers have access to the diachronic sequence, or the change is still in progress. Another, maybe more convincing, solution would be the one proposed in Nevins & Vaux (2006): speakers underlying representations may be influenced by their knowledges of alternations and orthography. The datas in (4) are extracted from our reading task: the speaker had the words in front of her and she may have produced [p,t,k] because of the orthographic (double) *p, t, k*.

We explore here the possibility of reconstructing the diachrony with the help of the synchrony, considering the expected forms but also the particular or unexpected productions made by the speakers. In this way we should be able to find out the *missing links* between two observable stages, like we did in (5). We will also show how preaspiration fits in this scenario. In return, diachrony, and more particularly *missing links*, allows us to explain and to justify the underlying representations we posit (here for Danish former "geminates").

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