Nivkh Consonant Alternation

1. Introduction

Nivkh (also called Gilyak) is an isolated language spoken on the island of Sakhalin and in the lower reaches of the Amur River in the Russian Far East. Since the middle of the 19th century, Nivkh has been classified as a Paleosiberian (or Paleoasiatic) language together with languages as Ket, Yukaghir, Itelmen, Chukchi and Koryak, etc. These languages are genetically not related to each other though (except for Chukchi and Koryak which form the Luorawetlan language family). Neither is Nivkh related to its geographically neighboring languages as Ainu or Tungusic languages (Uilta, Nanai etc.). The resemblances with Japanese (word order, heavy inflection of verbs) are all of typological nature (Austerlitz 1974).

The current sociolinguistic situation is disastrous. Of the total population of approximately 4,500 (2,500 in Amur, 2,000 on Sakhalin), the number of speakers is estimated to be less than 200. The speakers are above the age of 60 and they are all bilingual with Russian. Nivkh is still used among this elder generation. The next generation (age 40-60) still has some passive knowledge of the language. The UNESCO Red Book on endangered languages describes the sociolinguistic situation of Nivkh to be “nearly extinct” in the Amur area and “seriously endangered” on Sakhalin.1

Access to speakers was very limited before the Perestroika. Fieldwork was practically impossible for Western researchers. The first fieldtrip to Sakhalin by a group of Western researchers was realized only in 1990 (cf. de Graaf 1992). Most of the available linguistic materials are from Russian linguists (Kreinovich 1934, 1937, Panfilov 1962, 1965, etc.). Some non-russian linguists managed to record data of the Southeastern dialect in South Sakhalin under the Japanese regime (1905-1945) or from Nivkh refugees who settled in Hokkaido (Japan) after WWII (Austerlitz 1956, Hattori 1962, etc.).

Nivkh has two major dialect groups, the Amur dialect group and the Sakhalin dialect group. Unless otherwise mentioned, this paper describes

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1 http://www.helsinki.fi/~tasalmin/nasia_report.html#Nivkh
the phonology of the West Sakhalin dialect, which belongs to the Amur dialect group.

1.1. Basic phonology

The segmental inventory of Nivkh is as illustrated below.

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<td>Voiceless fricatives</td>
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(2) Vowels

| i, u |
| e, ø |
| a, o |

Laryngeal phonation is used contrastively in both plosives and fricatives. This contrast is exercised only in initial positions: $p^h\alpha$ ‘window’ vs. $p\alpha$ ‘stone, rock’, $r\alpha$- ‘bake’ vs. $r\alpha$- ‘drink’. In all other positions, laryngeal contrast is suspended. The nonaspirated plosives have allophonic voiced variants b, d, d̪, g and c which surface in post-sonorantal (notably post-nasal) contexts: $ŋŋ\eta$ daf (< taf) ‘our house’. Voiced fricatives have very weak friction and their spectra are close to those of sonorants (Russshakov 1981). The labial fricatives f and v are pronounced bilabial in the speech of the elder generation and in that case they should be transcribed with the symbols ɸ and β, respectively. In the literature some authors describe these sounds as bilabial (Kreinovich 1937, Hattori 1962, 1988, Austerlitz 1990), others as labio-dental (Panfilov 1962, Savel’eva and Taksami 1970, Gruzdeva 1997). The w is put in brackets since it appears only in the Sakhalin
dialect group. In the Amur dialect it has merged with v: **wat** (Sakhalin), **voc** (Amur) ‘iron, metal’.

The rhotic r is classified above and elsewhere in the literature as a fricative since it patterns as such in the phonology of Nivkh. Like other fricatives, it participates in Consonant Alternation (section 2), and has a voiceless counterpart ṛ. This ṛ is an apical trill containing portions without vocal cord vibration (Ladefoged and Maddison 1996: 236). Impressionistically, it sounds as if it contained palatal articulation (cf or ş). However, this is only impressionistically so; there are phonological evidences which show that ṛ is coronal (apical) and not palatal. In the first place, ṛ alternates with the coronal plosive *t* in Consonant Alternation but not with the palatal plosive *c*. In the second place, in loanword phonology the palatal fricative *f* of Russian is pronounced with *s* by Nivkh speakers; the name of the Russian poet Pushkin [puʃkin] is pronounced as *puskin* and not *puɾkin*. These facts indicate that ṛ has nothing to do with palatal articulation, although it may sound so to the ear of the outsider.

There is inconsistency in the literature as to whether *c*, *c* are (pre-) palatal plosives or affricates (*f*). The Russian phonetician Russhakov observed a strong and long friction noise after the closure of these sounds and concluded that these sounds are phonetically close to affricates (Russhakov 1980: 179-180, 1981: 8). In Consonant Alternation these sounds alternate with the strident fricatives *s* and *z*, respectively.

### 1.2 Syllable structure

(C)(C)V(C)(C)(C)

A typical Nivkh root is monosyllabic: *ma, puc, ays, ḥavγ, ḷlami, ḷvask*. Disyllabic roots are less but do exist: *utku, moɾqac, qoto, caqo*. Trisyllabic roots (or more) appear only in loanwords: *estarik* ‘old man’ (from Russian *starik*). Consonants may cluster up to two in onset and three in coda. A

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2 In the Russian literature ṛ is often transcribed with the palatal fricative Ӧ ¤

3 Russhakov’s observations are based on data from the East Sakhalin dialect.

4 Abbreviations are: 1=1*st* person, 2=2*nd* person, 3=3*rd* person, C=consonant, CAU=causative, CAUS=causee, CV=converb, IND=indefinite person, NP=noun phrase, V=vowel, VP=verb phrase, PL=plural, SG=singular, REF=reflexive. Morpheme boundaries are indicated by hyphens. Final hyphens substitute for verbal morphology (suffixes) omitted throughout this paper.
number of roots end in consonant clusters: hatx, tuks, hilx, liyr. In coda positions h does not appear.

1.3 Stress
Stress is fixed to the first syllable in a polysyllabic root and does not move under affixation or cliticization: óyla ‘child’, óyla-gu ‘child-PL’, nának ‘elder sister’, ni-nának ‘1SG-sister’.

2. Consonant Alternation
Consonant Alternation (henceforth CA) is a cyclic process in which the initial obstruent of a morpho-syntactic constituent either spirantizes or hardens to its homorganic counterpart in certain phonological and morpho-syntactic contexts. Spirantization takes place when the target plosive follows a vowel, glide or a plosive ([ ]) denote morpheme boundaries).

Spirantization

\[
\begin{array}{c|c|c}
\text{Vowel} & \text{Glide} & \text{Plosive} \\
\hline
\text{Plosive} & \rightarrow & \text{Fricative}
\end{array}
\]

Preceding segment:

(4) **Vowel**
\[a. \ tõ\om \ ‘fat’ \quad c^h_0 \om \ ‘fish fat’
\[b. \ c^h_0 \ ‘fish’ \quad lɔ\gi \ so \ ‘salmon’
\[c. \ põ\nx \ ‘soup’ \quad c^h_0 \ əõ\nx \ ‘fish soup’

(5) **Glide**
\[a. \ ti\yr \ ‘tree’ \quad qɔj \ zi\yr \ ‘larch tree’ \quad (SL2: 3)

(6) **Plosive**
\[a. \ tif \ ‘trace’ \quad p^h_0-ø\tk \ zif \ ‘father’s trace’ \quad (SL1: 9)
\[b. \ təf \ ‘house’ \quad Galik \ rəf \ ‘Galik’s house’

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5 Examples without credits are from my fieldnotes. Examples with the credits SL (1, 2, 3) are from Shiraishi and Lok (2002, 2003, 2004), respectively. The latter publications are all downloadable with sound files (WAV) from the following site: http://ext-web.edu.sgu.ac.jp/hidetos/
Spirantization does not occur when the plosive follows a fricative or a nasal.

(7) *Fricative*

a. *tʰom* ‘fat’
   cʰxəf tʰom ‘bear fat’

b. *coŋ* ‘head’
   cʰxəf coŋ ‘bear head’

(8) *Nasal*

a. *qʰal* ‘clan’
   Pilavon qʰal ‘The clan of Pilavon’ (SL1: 11)

b. *kʰiri* ‘urine’
   qan kʰiri ‘urine of a dog’ (SL1: 21)

c. *coŋ* ‘head’
   qan dʒoŋ ‘dog head’ (SL1: 22)

d. *paŋ* ‘only’
   aŋ bəŋ ‘who else?’ (SL3: 26)

e. *təf* ‘house’
   nəŋ daf ‘our house’ (SL3: 49)

f. жалан daf ‘my elder brother’s house’

Following nasals, nonaspirated plosives undergo voicing in some degree, as the transcription indicates. The voicing of aspirated plosives is incomplete (Zinder and Matusevich 1937: 109, 111) and is not reflected in the transcription.

Following a lateral, there is fluctuation in the pronunciation. In my data, there are both instances of plosives and fricatives surfacing after a lateral. The examples are few since not many words end in a lateral.

(9) a. *qʰal* bak ‘clan only’ (SL3: 48)

b. *ostol* tʰə ‘on the table’ (SL3: 71)

c. *val-balu-r* ‘roll (reduplication)’ (SL1: 39)

But, d. *vul-vulu-* ‘black (reduplication)’ (SL1: 9)

e. *qal-*ala ‘bright (reduplication)’ (SL1: 9)

f. *kʰul* fi-n-gu ‘those who live on the seashore’ (SL3: 57)
The phonological environment of hardening is complementary to that of spirantization; hardening occurs when a fricative follows either a fricative or a nasal.

Hardening

(10) \( \text{Fricative} \rightarrow \text{Plosive} / \text{Fricative} \)

\[ \text{Preceding segment:} \]

(11) \( \text{Fricative} \)

a. xu- ‘kill’ \( c^h_xa\theta q^h_u- \) ‘kill a bear’ (SL1: 7)
b. fi- ‘live’ \( v^o \eta q\theta p^h_i- \) ‘live in a village’ (SL1: 7)
c. f\( \tilde{a} \eta \) ‘throw’ \( c^h_xa\theta p^h_\eta \) ‘throw ~ to the bear’ (SL1: 8)
d. fu- ‘follow’ \( p^h-\tilde{a}t\theta k t^h_u- \) ‘follow father’s trace’ (SL1: 9)
e. ra- ‘drink’ \( c^h_a x t^a- \) ‘drink water’ (SL2: 15)
f. fi-n-gu ‘residents’ \( t\tilde{u}k p^h_i-n-gu \) ‘people who live here’ (SL3: 56)

There is fluctuation in the post-nasal context as to whether hardening applies. According to Kreinovich there are both instances of application and non-application (Kreinovich 1937: 50). Gruzdeva also reports both cases (Gruzdeva 1997: 90-91). In my data, hardening occurs in the majority of cases, but there are also instances of non-application.\(^6\)

(12) \( \text{Nasal} \)

a. xu- ‘kill’ \( a\tilde{n} k^h_u- \) ‘Who was killed?’ (SL3: 21)
b. \( \tilde{r}x\tilde{a}\tilde{r}p- \) ‘forget’ \( n\tilde{a}\tilde{n} t^h_x\tilde{a}\tilde{r}p- \) ‘forget us’ (SL3: 64)
c. za- ‘beat’ \( q^a n d\tilde{a}- \) ‘beat a dog’ (Gruzdeva 1997: 90)
d. zosq- ‘to break’ \( \tilde{e}n\tilde{v} d\tilde{o}sq- \) ‘break an oar’ (Gruzdeva 1997: 90)

But,
e. vo- ‘take~’ \( m\tilde{e}n v^o- \) ‘take a paddle’ (SL2: 74)

Note that homorganicity is not relevant here. Hardening occurs regardless of whether the nasal is homorganic to the following obstruent (12b). This

\(^6\) It is not clear where this fluctuation comes from. Panfilov raises a group of transitive verbs which never undergo hardening (1962: 16). My informants, however, exhibit hardening for some of these verbs.
holds also for spirantization, in which post-nasal plosives are exempt from spirantization regardless of whether they are homorganic with the preceding nasal (8).

Hardening does not occur when the fricative follows a vowel, glide or a plosive.

(13) **Vowel**
- a. xu- ‘kill’  ηα xu- ‘kill an animal’ (SL1: 11)
- b. ɣyz- ‘take’  pʰ-saqo ɣyz- ‘take one’s own knife’ (SL2: 14)
- c. xau- ‘dry’  ma xau-te- ‘dry dried fish’ (SL3: 45)

(14) **Glide**
- a. seu- ‘dry’  kəj seu- ‘dry a sail’

(15) **Plosive**
- a. xavu- ‘warm’  tɔm k xavu- ‘warm one’s hands’ (SL1: 12)
- b. ɪnə- ‘see’  pʰ-atik ɪnə- ‘saw one’s own younger sister’ (SL2: 42)
- c. ɣe- ‘take, marry’  cʰ-ɔtɔk nanak ɣe- ‘marry your father’s sister’ (SL3: 53)

The inputs and outputs of CA are summarized below. As one may notice, spirantization and hardening conspire to achieve the same segmental sequences: vowel-fricative, glide-fricative, plosive-fricative on the one hand, and fricative-plosive, nasal-plosive on the other. These sequences are the structural goals of CA (17). Whether these structural goals are achieved by spirantization or hardening is a matter of input; spirantization activates when the input is plosive, hardening activates when fricative is the input.

<table>
<thead>
<tr>
<th>Preceding segment</th>
<th>Plosive</th>
<th>Fricative</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Vowel</strong></td>
<td>Fricative</td>
<td>Fricative</td>
</tr>
<tr>
<td><strong>Glide</strong></td>
<td>Fricative</td>
<td>Fricative</td>
</tr>
<tr>
<td><strong>Fricative</strong></td>
<td>Plosive</td>
<td>Plosive</td>
</tr>
<tr>
<td><strong>Nasal</strong></td>
<td>Plosive</td>
<td>Both</td>
</tr>
<tr>
<td><strong>Lateral</strong></td>
<td>Both</td>
<td>Not enough data</td>
</tr>
<tr>
<td><strong>Plosive</strong></td>
<td>Fricative</td>
<td>Fricative</td>
</tr>
</tbody>
</table>
(17) Structural goals of CA
Final seg. of the preceding constituent (trigger) Initial seg. of the following constituent (target)

a. Vowel Glide Fricative
   Plosive

b. Fricative Plosive Nasal

2.1 Morpho-syntactic context
Being a cyclic process, CA applies in tandem with morphological or syntactic operations. Every domain-initial obstruent in a derived environment is a potential target of CA.

(18) Cliticization
a. tʰu ‘sledge’ pʰ-ṛu ‘one’s own sledge’
b. caqo ‘knife’ pʰ-saqo ‘one’s own knife’ (SL2: 14)

(19) Suffixation
a. pxi-rox ‘taiga-allative’ (SL2: 6)
b. ʰtʰut-rox ‘fireplace-allative’ (SL2: 31)
c. cax-tox ‘water-allative’ (SL2: 58)
d. cʰŋ-doq ‘you-allative’ (SL2: 39)

(20) Reduplication
a. pulk-vulk-u- ‘round’ (base pulk) (SL2: 8)
b. cʰaf-cava ‘wet’ (SL2: 21)
c. yur-kurd- ‘to stick~’ (SL1: 26)
d. cʰerk-serkt- ‘break’ (SL1: 39)

Compounds and NP formation: See examples (4, 5, 6) above.
VP formation: See examples (11,12) above.

Not all suffixes undergo CA. While most postnominal suffixes undergo CA, most postverbal suffixes do not (Jakobson: 1957: 96-97). Postverbal suffixes which undergo CA are very limited (the examples below do not exhaust the whole list).
(21)  Alternating suffixes  
     a.  -yat/-gat-  Completive  
     b.  -vara/-bara  Counter assertive focus  

(22)  Non-alternating suffixes  
     a.  -ku-  Causative  
     b.  -f  Deverbative locative  
     c.  -s  Deverbative instrumental/modal  

2.2 Non-derived environment blocking  
CA does not apply in non-derived environments. In the examples below,  
the phonological conditions of CA are met and yet CA does not apply.  
This is because the word is not in a derived environment (monomorphemic).  

(23)  a.  utku  *utɣu  ‘man’  
     b.  nرأس  *nɣc  ‘teeth’  

2.3 Maximal domain of application  
The maximal domain of application of CA is the maximal projection (XP). In order for CA to apply, the trigger and the target should belong to the same XP, i.e. they should be structurally adjacent. When the trigger and the target belong to different XPs, CA does not occur. Subjects, adverbs,  
converbs all block CA, indicating that they create strong boundaries which cannot be overriden by CA.  

(24)  Subject-predicate  
     ḫbasq qoju-  ‘A cat cried.’  
     cat cry  

(25)  Adverb  
     a.  j-ax njanq ḫo-ku-  ‘(She) let her sleep for a while.’  
       3SG-CAUS a bit sleep-CAU  
     b.  pъt ḫo-  ‘Tomorrow morning’  
       tomorrow morning  
     c.  pi sok caqo-ɣu mulk-ɣu ḫo-  ‘He took all his knives and baskets.’  
       REF all knife-PL basket-PL take  

(26)  Converb (chaining of verbs)
The two sentences below differ minimally from each other with respect to the application of hardening. In (27a), the initial fricative of the predicate does not undergo hardening since the preceding noun is the subject and lies outside of the VP. On the other hand, in (27b) the initial fricative of the predicate undergoes hardening since the noun is the object and forms a VP with the verb.

(27) a.  eyŋ ŋo-    ‘The child holds (something)’
    = [Nŋeyŋ] [vŋo-] (‘child’ is subject)

b.  eŋŋ [tʰ]o-    ‘(Someone) holds the child’
    = [v[pNŋeŋŋ][v[tʰo-]] (‘child’ is object)

(Gruzdeva 1997: 83, East Sakhalin dialect)

2.4 Other properties of CA
2.4.1 Pause sensitivity
CA is reported to be sensitive to pause insertions (Kreinovich 1937: 15). When a pause intervenes between the trigger and target, CA does not apply.\(^7\)

(28) Pause sensitivity
a.  qoj ‘larch’ vac….qoj ‘iron larch’
    (Kreinovich 1937: 15)

b.  tʰom ‘fat’ hajk….tʰom

This fact indicates that in addition to structural adjacency, temporal adjacency is crucial for the application of CA.

\(^7\) Kreinovich criticized his precursor Lev Shternberg on this point. Shternberg recorded Nivkh stories by means of word-by-word dictation, thereby “distructing all regulations of consonant alternation (Kreinovich 1937: 15)”. Accordingly, Shternberg’s text (1908) contains many instances of non-alternating forms (citation forms) in CA contexts.
2.4.2 No hardening of fricative-initial nouns

Initial fricatives of nouns do not undergo hardening. These fricatives remain unchanged in hardening contexts (after fricatives or nasals).

(29) a. vo ‘village’ Vаъркун vo ‘The village of Vygrshkun’ (SL3: 5)
   b. Маър vo ‘The village of Maghr’ (SL3: 34)
   c. ţo ‘door’ тэф ţо ‘entrance door’
   d. vaqi ‘box’ тэң вақи ‘coal box’ (Gruzdeva 1997: 88)

2.4.3 Applicability to loanwords

Old loanwords undergo CA but recent loanwords do not. In Nivkh, old loanwords consist of Chinese and Tungusic vocabulary.

(30) a. taj ‘pipe’ manд'u raj ‘Chinese pipe (Chinese yen tai)’
    (Savel’eva and Taksami 1970)
   b. sиңру- ‘torture~’ cʰaxаf cʰиңру- ‘torture a bear (Nanai сиңгара)’
    (Jakobson 1957: 90)

Recent loanwords are from Russian. In most of the contexts these words do not undergo CA. CA is reported only in cases of cliticization (31c).

(31) a. kommunist partija ‘Communist party’
   b. cʰo konserв ‘fish can (Russian konserвы)’
   c. pʰ-xoooperative ‘one’s own cooperation (Russian kooperativ)’
    (All from Kreinovich 1933)

The last example may be due to syllable phonotactics. Nivkh does not allow plosives as the second member of an onset consonant cluster; kovo-rotk from Russian skovorodka ‘fry pan’ (Pukhta 2002: 58), ostol from Russian stol ‘table’.

Recent loanwords may trigger CA though, as the examples below illustrate.

(32) a. tor ‘law’ sovet ror ‘Soviet law (Russian sovet)’
    (Kreinovich 1933)
b. fi- ‘live~’ Bajdukofo pʰi- ‘lived on Baidukov’ (SL3: 32)

2.4.4 Elided nasals and opacity
In the Amur dialect group, nasals in the final position of some words and suffixes are elided. In the Sakhalin dialect these nasals are retained. Although unpronounced, elided nasals still block spirantization and may trigger hardening, which means that they pattern with overt nasals. Accordingly, elided nasals create a mass of opaque (non-) applications of CA (34).

(33) Amur dialect group Sakhalin dialect group
a. eɣa eɣaŋ ‘cow’
b. pɨtγo pɨtγaŋ ‘book’
c. oɣla eɣlŋ ‘child’
d. ŋu -γun plural suffix

Opaque (non-) applications of CA
(34) a. pʰəx ‘soup’ eɣa bəx ‘beef soup’
b. rəu- ‘learn’ pɨtγo dəu- ‘learn a book (to read)’
c. fo- ‘take’ pʰ-umγu oɣla tʰ-o- ‘take one’s own daughter’

(SL2: 45)

The pronunciation of the younger generation tends to neglect elided nasals in favor of a transparent application of CA, e.g. eɣa zus ‘beef meat’ (cus ‘meat’).

3. The diachronic developmental path of hardening
Roman Jakobson depicted the diachronic developmental path of hardening as follows (Jakobson 1957). In Early Nivkh, there were no roots initiating with a fricative. This phonotactics can be still observed in old loanwords from Tungusic; fricative-initial roots are adapted to Nivkh with initial plosives (Kreinovich 1937: 53-54).

(35) Nivkh Tungusic
a. cʰafq safugu ‘chopsticks’

8 An island nearby the mouth of the Amur River named after the Russian aviator Baidukov, Georgii Filipovich.
b. $c^h$am saman ‘shaman’
c. $c^h$oxc- sokto- ‘to get drunk’
d. $q^h$al xala ‘clan’
e. $q^h$ac-$q^h$ac xasi-xasi ‘different’

Fricative-initial roots in contemporary Nivkh are marginal (recent loanwords, onomatopoeia, taboo-words) or are derived from plosive-initial roots. The latter consists of transitive verb roots. In Nivkh, many intransitive-transitive verbal root pairs differ only in the continuancy of the initial obstruent.

(36) Intransitive verb roots Transitive verb roots
a. $p^h$akz- ‘disappear’ $v^h$akz- ‘throw’
b. $t^h$au- ‘to get accustomed’ $r^h$au- ‘teach’
c. $t^h$a- ‘to be roasted’ $f^h$a- ‘roast’

Likewise, there are a number of nominal roots which differ minimally in the continuancy of the initial obstruents from their transitive verb counterparts.

(37) Nominal roots Verbal roots
a. $p^h$uf ‘saw’ $fuf^h$- ‘to saw’
b. $c^h$afq ‘chopsticks’ $safq^h$- ‘to eat with chopsticks’
c. $k^h$es ‘information’ $xes^h$- ‘to tell’

Regarding these pairs, Jakobson hypothesized that fricative-initial transitive verbs are historically derived from plosive-initial forms through the attachment of the prepositive pronoun $i$- (or $e$), ‘someone/something’. When preposed to verbal roots, this pronoun indicated the transitive voice and the absence of the definite object. In Early Nivkh, absence of the definite object ought to be expressed explicitly by this pronoun; the objectless use of transitive verbs was prohibited.

(38) a. $n^h$a xu- ‘kill an animal’
   animal kill
b. $l_i^h$y$s$ $k^h$u- ‘kill a wolf’
   wolf kill
In the course of the history, the indefinite prepositive pronoun *i*- merged with the following verb. The phonological consequences of this merger were diverse, depending on the phonological shape of the verb. In verbs initiating with a sonorant, the *i*- simply dropped (39a). In roots initiating with a consonant cluster, *h* or a vowel, the *i*- was retained (39b-39e). When merged with roots initiating with a plosive, the *i*- caused spirantization and then dropped (39f).9

(39) a. i-lat-  lat-  ‘do’
    b. i-xr̩  iyɾə-  ‘to be with~’
    c. i-xlu-  iylu-  ‘be afraid of~’
    d. i-hǎjm-  jəjm-  ‘know’
    e. i-əs-  jəs-  ‘call’
    f. i-tu-  zu-  ‘wash’

The diverse outputs of *i*-merger are phonologically explicable. The *i*- was retained in cases in which its loss would otherwise yield phonologically marked structures, such as initial consonant clusters or syllable with an empty onset (incl. *h*). In all other cases, the *i*- simply dropped.

After this merger,

(40) “…there arose the possibility of an objectless use of transitive verbs, as, for instance /lat/. Then /i-/ in such forms as /iyɾə-/ ceased to act as a pronominal object and was reinterpreted as a prothetic vowel (Jakobson 1957: 88-89).”

This hypothesis explains why fricative-initial nouns do not undergo hardening (2.4.2); nominal roots did not follow the diachronic path, which the transitive verbs did follow. Crucially, fricative-initial nouns are not derived from their plosive-initial counterparts, there being no plosive-initial counterparts. Fricative-initial nouns in Nivkh are marginal; they were either not

9 I follow here the amendment to Jakobson’s scenario by Robert Austerlitz (1977). Whereas Jakobson assumed the input of merger to be fricative initial roots (*i-xu-*, cf. 38), Austerlitz assumed plosive-initial roots. Regarding the phonotactics in Early Nivkh that words should begin with plosives (35), Austerlitz’s amendment sounds plausible (spirantization by *i-*, then loss of *i-*).
subject to the phonotactics that roots should begin with a plosive, or were borrowed after this phonotactics has lost power. This made the behavior of fricative-initial nouns in CA a unique one. Alternatively, this is the reason why of the content words only transitive verbs undergo hardening.

4. Problems with synchronic analyses of spirantization
A synchronic analysis of CA should overcome a number of problems. How do we account for the exceptional behavior of fricative-initial nouns? Why do nasals not trigger hardening as much as fricatives do? Why do laterals not trigger consistent patterns of CA? Why do initial plosives undergo spirantization and not the final (or medial) one (as in Danish)? Among all such questions, the hardest one is probably the following one: how come that plosives trigger spirantization? The last part of this paper highlights this problem and reviews some of the analyses proposed previously in the literature.

4.1 The “natural class” problem
As seen previously, vowels, glide and plosives trigger spirantization whereas fricatives and nasals do not. Regarding this division of triggering segments, one may wonder what the driving force behind spirantization is, given the fact that segments of the triggering set do not form a natural class.11 The spreading of [+continuant] from neighboring sounds (mostly vowels), which is the standard autosegmental approach to spirantization (e.g. Padgett 1995), is not applicable to Nivkh since plosives trigger spirantization to the same extent as vowels do.

In general, spirantization (as lenition) occurs more readily the greater the openness of the flanking segments (Kirchner 1998). The fact that plosives (zero openness) trigger spirantization but fricatives do not is not in concordance with this cross-linguistic generalization.

In Nivkh literature there are mainly two approaches to this problem.12 One solution is to give up phonological analysis altogether and put CA in (morpho-) syntax. CA is then the remnant of what had once been a

10 Shiraishi (2004) proposes a synchronic analysis to account for this exceptional behavior of fricative-initial nouns by means of output-to-output constraints.
11 “No formal statement of Gilyak (Nivkh) lenition has succeeded in stating the set of triggering segment as a natural class (Blevins 1993: 1).”
12 Blevins (1993) proposed a third approach which makes use of underspecification. The problem with this approach is discussed in Shiraishi (in preparation).
productive phonological rule that has fossilized in the morpho-syntax of the language, comparable to the consonant mutations of the Celtic languages. Kreinovich (especially his later works), Austerlitz (1990) and Gruzdeva (1997: 94) take such view (or are close to such view).

Other linguists attempted to combine phonological and syntactic approaches and seeked for solutions of the natural class problem. One solution is to analyze CA as a combination of assimilation and dissimilation (Mattissen 1999: 299, 2003: 52-53, Kaneko 1999: 273-274). According to this analysis, plosives and fricatives trigger spirantization and hardening respectively in order to avoid clustering of two plosives or two fricatives. On the other hand, spirantization triggered by vowels and glides, and the voicing after nasals are interpreted as assimilation. Since dissimilation and assimilation are separate processes triggered by different segments, there is no longer need to group plosives with vowels as members of the triggering group and the natural class problem disappears.

Both approaches contain shortcomings, though. The syntax-only approach overlooks the phonological traits of spirantization. As mentioned in 2.4.1, spirantization is sensitive to pause insertions. This is in sharp contrast with consonant mutation of Irish, which is reported to be not sensitive to pause insertions (Rotenberg 1978: 96). In addition, in Nivkh there is practically no restriction on the vocabulary which trigger spirantization (2.4.3), unlike consonant mutation which exhibit severe restriction on the triggering constituents (function words). Likewise, the vocabulary which undergoes spirantization excludes only recent loanwords and thus is much broader than that of morpho-syntactic processes of other languages as, for instance, Rendaku (sequential voicing) of Japanese, which is limited to native vocabulary. The syntax-only approach fails to capture such phonological aspects of spirantization and misplaces spirantization together with consonant mutation or Rendaku which are highly lexical (morpho-syntactic) processes.

The dissimilation – assimilation approach contains problems as well. Notably, it fails to explain why dissimilation and assimilation apply in exactly the same morpho-syntactic environments. Since this approach regards assimilation and dissimilation as separate processes, it happens to be a coincidence that the two processes share their domains of application. In addition, this approach fails to explain why the outputs of dissimilation and assimilation are identical. If the two processes were motivated by different phonological requirements, why do they yield exactly the same outputs (fricatives)? Is this another coincidence? A related question which
this approach cannot answer is the following one: why do assimilation and dissimilation target initial obstruents and not the final ones? The latter option seems more natural, regarding the prosodically non-prominent nature of coda positions cross-linguistically. Without linguistically plausible answers to these questions, the dissimilation - assimilation approach cannot be accepted as a satisfactory alternative to the syntax-only approach.

4.2 A unified account of spirantization

In Shiraishi (in preparation) I propose a phonological analysis which attempts to unify all instances of Nivkh spirantization as motivated by a single requirement. In particular, I argue that Nivkh spirantization is an instance of lenition, characterized as a phonological operation which diminishes the amount of information in a syntagmatic contrast (Harris and Urua 2001, Harris 2005). Recall that spirantization targets every initial obstruent of a non-initial morpho-syntactic unit in XP. By diminishing the amount of information of the segments in these environments, spirantization (=lenition) serves to highlight the initial segment of the XP, which is never the target of spirantization. The citations below illustrate the point.

(41) a. “Lenition potentially diminishes the amount of information a segment projects onto the speech signal (Harris and Urua 2001: 81).”

b. “The flow of phonetic information across speech signals is uneven: linguistically significant modulations are of greater magnitude at certain points in time than at others. (…) segments in strong positions should bear richer feature specifications than segments in weak positions (Harris 2005: 128).”

c. “Positionally sensitive vowel reduction, like consonantal lenition, can be understood as accentuating the syntagmatic contrast between information-heavy prominent syllables and information-light weak syllables (Harris 2005: 132-133).”

In Nivkh, the domain of the syntagmatic contrast is XP. The initial obstruent of XP stands in a prominent position whereas all initial obstruents of a non-initial morphosyntactic unit within this XP are non-prominent and therefore undergo lenition. This analysis explains why only plosives in initial positions undergo spirantization and not the final ones. For the syntagmatic contrast among constituents within XP, it is the initial segment that matters and not the final (or medial) ones.
Moreover, this approach is free from the natural class problem since it sees spirantization not as a strictly local process. Plosives trigger spirantization as much as vowels do when they happen to appear before another plosive which initiates a non-domain-initial morphosyntactic unit. Or to be precise, in this approach there is no triggerering segment; initial plosives undergo spirantization because they are in a non-prominent position which stands in a syntagmatic contrast with a prominent position, and not because they follow a plosive. Spirantization is then a phonological boundary process which is motivated by informational (perceptual) demands.

5. Conclusion

A unified account of spirantization as lenition still has to resolve a number of problems. The non-spirantizing contexts should be explained independently; why do fricatives and nasals not tolerate spirantization? Why do most postverbal suffixes not undergo CA while most postnominal suffixes do? The fluctuations observed deserve explanations as well.

There is also need for more data. Many previous works base their analysis on secondary sources. But in discussing lenition (and any other phonological phenomena), access to sound data is crucial. For instance, the outputs of spirantization should be examined in depth; are they strident or non-strident?

Unfortunately, sound materials are scarce and do not provide sufficient information in order to examine the details of the phenomenon. As far as I
know, there is no published sound material which contains all instances of CA in every context.

There is no much time left, though, regarding the high age of the speakers. Laboratory phonetics, which was still possible until some 30 years ago, is hardly possible with such speakers. Despite all the difficulties, we hope to be able to record enough sound materials in order to get the complete picture of CA in the not far future.
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