Topics in Nivkh Phonology

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Лидия Демьяновна Кимова (1939-2003) рох

I dedicate this dissertation to Lidiia Dem'ianovna Kimova, who many times was our hostess in Nogliki and whose great hospitality and extensive knowledge of the Nivkh culture and language we have to miss since 2003.

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When I returned to Japan with my parents in 1982 after 3 years of tremendous time in the Dutch countryside, there was only the sad feeling that I had to say good-bye to my friends of 'De Goede Herder School' in Ermelo. As a nine-year-old boy, I could not imagine that I would ever spend another 3 years in the Netherlands as a Ph.D. student of the University of Groningen. Later in Japan, I became interested in linguistics but this interest did not directly encourage my connection with the Netherlands since I was mainly interested in the languages of East Asia, such as Ainu and Nivkh. It all changed when I came to know Tjeerd, who was interested in these languages and therefore often visited Japan. He encouraged me to apply for the Ph.D. position in Groningen and to write a dissertation on one of these languages. This thesis is thus indebted to Tjeerd de Graaf in the first place. I could not start and complete my Ph.D. project without his continued support and encouragement.

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I would like to thank a final group of people, my parents, Hideki and Etsuko Shiraishi, and Tomoko and Sayana for their unconditional support.

Contents

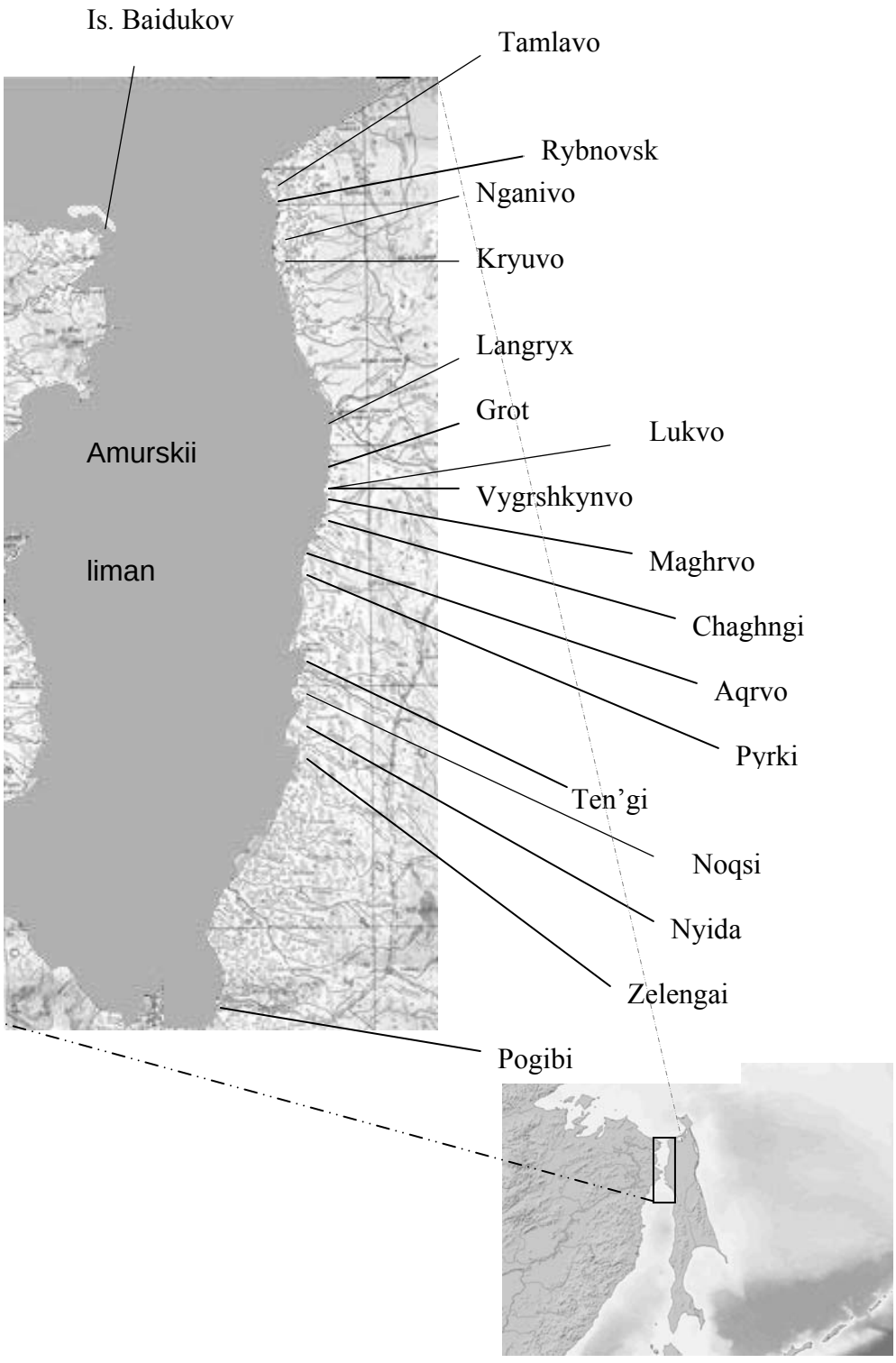
Abbreviations

1: 1st person
2: 2nd person
3: 3rd person
ADVP: adverbial phrase
ALL: allative
C: consonant
CAU: causative
CAUS: causee
CM: Consonant Mutation
COMP: completive
CV: converb
FFV: Final Fricative Voicing
HILI: highlighting focus
I: intonational phrase
IND: indicative
INDF: indefinite person
INS: instrumental
INT: intentional
LOC: locative
NP: noun phrase
OCP: Obligatory Contour Principle
PL: plural
PP: postpositional phrase
REF: reflexive
SG: singular
V: vowel
VOC: vocative
VOT: voice onset time
VP: verb phrase

Maps

Map 1: The Russian Federation and Sakhalin

Map 2: Sakhalin



Map 3: The West coast of North Sakhalin

Table 1: The Nivkh alphabet (Taksami, Pukhta and Vingun 1982)

Chapter 1

Introduction

This thesis has two aims. One is to show how the latest findings of current phonological theories facilitate the statement of generalizations underlying the phonological structure of Nivkh, a relatively unknown language of Northeast Asia. The other aim is to describe the phonology of a hitherto undocumented dialect of Nivkh (West-Sakhalin dialect, henceforth WSN), using data which I collected in a number of fieldwork trips. At the same time, I will demonstrate in the discussions how such newly collected data contribute to a better understanding of various phonological phenomena in Nivkh.

Nivkh (also called Gilyak) is a language isolate (or microfamily) spoken on the island of Sakhalin and on the lower reaches of the Amur River in the Russian Far East (map 1, 2). From the middle of the 19th century on, Nivkh was classified as a Paleosiberian (or Paleoasiatic) language together with languages such as Ket, Yukaghir, Itelmen, Chukchi and Koryak. However, these languages are not genetically related to each other (except for Chukchi, Koryak and Itelmen, which form the Chukchi-Kamchatkan language family). Neither is Nivkh related to geographically neighboring languages such as Ainu or any of the Tungusic languages (Uilta, Nanai etc.). The resemblances with Japanese (word order, heavy inflection of verbs) are all of a typological nature (Austerlitz 1974).

The thesis consists of descriptive and theoretical parts. The descriptive parts are Chapter 2 and the introductory sections of Chapter 3 and 4. These parts aim to familiarize the reader with the basic phonology of Nivkh, and to provide background information in order to discuss the phonological issues in Chapter 3 and 4. In these descriptive sections, special emphasis is put on i) those aspects of Nivkh phonology which have been hitherto unknown, and ii) those characteristics in which WSN deviates from other dialects of Nivkh.

Chapters 3 and 4 discuss two phonological topics: Chapter 3 deals with laryngeal phonology and Chapter 4 with Consonant Mutation.[1] In these chapters I will first give a descriptive sketch of the issues and review the way previous works dealt with them. For both issues, I propose alternative approaches and show how the proposed analyses succeed in describing complicated phonology on the surface from a restricted number of phonological principles and generalizations.

The two topics, laryngeal phonology and lenition, have received a lot of attention in current theories of phonology. The discussions in the last decade have led to substantial progress in understanding these phenomena. Unfortunately, however, little of the fruits of these discussions has been brought to bear on the description and analysis of Nivkh phonology. Many previous works have described the phonology involved in these topics as being unique and complicated, and give the impression that they are isolated instances which are language-specific to Nivkh. In contrast, this thesis attempts to show how the latest findings on these topics in the current theoretical framework lead us to a better understanding of Nivkh phonology.

In this introductory chapter I will first outline the phonological assumptions which are defended in this thesis. Next, I sketch the sociolinguistic situation of this endangered language (with special emphasis on the West-Sakhalin dialect) and the linguists' efforts in language documentation.

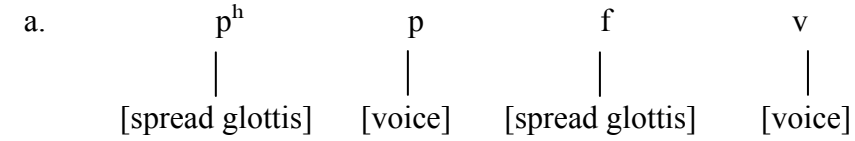
1.1 Phonological Assumptions

1.1.1 Laryngeal Contrast and Laryngeal Phonology

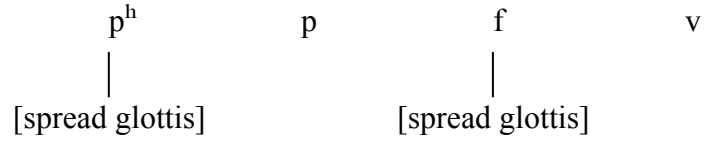
Chapter 3 focuses on the nature of laryngeal contrast and the laryngeal phonology of WSN. In word-initial position, WSN contrasts aspirated plosives with non-aspirated plosives, and voiced fricatives with voiceless fricatives. While most previous works assume that this contrast is symmetric in the sense that the members of the contrast are opposed with equal strength (X/Y. See (1) below), I argue that the contrast is asymmetric; one member of the contrast is phonologically stronger than the other (X/zero). To be specific, I propose that the aspirated plosives and the voiceless fricatives are the marked members of the contrast, and that the non-aspirated plosives and the voiced fricatives are the unmarked members (2).

[1] In this thesis, I capitalize the names of specific phonological rules when I am not referring to the process as a general phonological phenomenon. Thus by *Consonant Mutation* I refer to consonant mutation process which is specific to Nivkh.

(1) Symmetric contrast



(2) Asymmetric laryngeal contrast



There is evidence which argues against the equipollent view (X/Y) but supports the idea that the laryngeal contrast is asymmetric (X/zero) in WSN. The laryngeal phonology of aspirated plosives and voiceless fricatives is only minimally influenced by the surrounding segments and remains invariable across a great number of contexts. This is in contrast with the surface laryngeal phonology of non-aspirated plosives and voiced fricatives which are susceptible to effects of surrounding segments and position. The stability of one member in a phonological contrast is called 'dimensional invariance' (Avery and Idsardi 2001) and is the hallmark of asymmetric contrast.

One way to represent the asymmetric contrast is to use unary features. In such a system, features do not represent contrast by binary specification (+/-), but do so by being either present or absent in a given segment. In this thesis, I defend the position that phonological features are unary and that when features express a phonological contrast, they do so by being either present or absent from the underlying representation. This is the basic tenet of phonological contrast of Modified Contrastive Specification, a version of Underspecification theory which is pursued by phonologists of the Toronto School of Contrast (Dresher, Piggott and Rice 1994, Avery 1996, 1997, Avery and Idsardi 2001, etc.). This theory asserts that there is a strong connection between i) phonologically active features which are responsible for the underlying contrast in the segmental inventory and ii) the visibility of such features in lexical phonology. The prediction is that the marked members of the contrast are actively involved in the phonological events of the lexical phonology and vice versa.

On the other hand, the unmarked member of the contrast may be implemented by phonetic cues in order to over-differentiate the contrast on the surface. Such an implementation changes the mode of contrast from an asymmetric to a symmetric one, and is called 'enhancement' (Stevens and Keyser 1989, Avery and Idsardi 2001, etc.). In this chapter, I will present arguments in support of the view that voicing plays such a role in WSN. It will be shown that processes which involve voicing contain

characteristics which deviate from those predicted by lexical phonology. One such example is Final Fricative Voicing (FFV). This is a process in which final fricatives undergo voicing when followed by voiced fricatives, vowels or sonorants. In citation forms or when followed by voiceless segments, final fricatives surface as voiceless.

(3)	a.	tʰulf	'winter'	tʰulv vo	'winter village'
	b	cʰxɨf	'bear'	cʰxɨv lɨj-	'kill a bear'
	c.	als	'berry'	alz ŋa-	'gather berry'
	d.	kins	'devil'	kinz it-	'go insane'
	e.	cus	'meat'	cus pɨŋx	'meat soup'
	f.	tɨf	'house'	tɨf r̥ɨ	'main door'

At first glance, this process seems to contradict the proposed asymmetric specification, since it makes reference to the voicing of the triggering fricatives, which should be absent according to the proposed asymmetric contrast with [spread glottis] as the only underlying feature. A closer look reveals, however, that this process has characteristics which are not typical of processes of lexical phonology. First, final fricatives undergo voicing when followed by vowels and sonorants as well. This shows that voice assimilation actually makes reference to non-contrastive voicing, and suggests that it is not a lexical process.

Second, FFV exhibits characteristics of a 'fast speech' process. In the recordings of conversations and recitations of folktales, there are occasional instances of FFV applying between relatively large syntactic constituents. For instance, it applies between a subject and a predicate.[2]

(4) a. haŋrmaz ŋarma- (< haŋrmas)
gimlet wait
'The gimlet (anthropomorphized) waited for (someone).'
(Shiraishi and Lok 2002: 21)

b. vulvulu cʰxɨv jiv-ra (< cʰxɨf)
black bear be-HILI
'There was a black bear.' (Shiraishi and Lok 2002: 9)

[2] Nivkh is a head-final language and the canonical word order is SOV.

c. iv j-ama-ŋan (< if)
3SG INDEF-look-when
'When he looked.' (Shiraishi and Lok 2003: 26)

This is in sharp contrast to a process such as Consonant Mutation, which does not apply between such large syntactic constituents even in fast speech (Chapter 4). As we will see in Chapter 4, Consonant Mutation strictly applies within its maximal domain of application (which is syntactically defined) and never exceeds it.

These characteristics indicate that voicing, which is associated with the non-lexical process such as FFV, is implemented on the surface. Accordingly, we maintain the hypothesis that laryngeal specification of Nivkh obstruents is asymmetric.

1.1.2 Consonant Mutation

Consonant Mutation (henceforth CM) is the best-known linguistic phenomenon of Nivkh and is also discussed in textbooks (e.g. Kenstowicz and Kisseberth 1979: 436-437). A closer examination, however, reveals that this process has many peculiar characteristics which go beyond textbook discussion.

CM targets morpheme-initial obstruents and changes their continuancy under specific phonological and morpho-syntactic conditions. Descriptively, there are two processes involved: Spirantization changes a plosive to a fricative, and Hardening changes a fricative to a plosive.

CM exhibits characteristics which challenge the existing theoretical understandings of the relevant processes. For instance, Spirantization may apply after a plosive. Cross-linguistically, however, it is known that spirantization is very unlikely to occur after an obstruent (Kirchner 1998, 2004, Ségéral and Scheer to appear). In Nivkh, however, Spirantization applies after a plosive to the same extent as after a continuant, i.e. a vowel or a glide.

(5) Spirantization after a continuant

a.	tʰom	'fat'	cʰo r̥om	'fish fat'
b.	cʰo	'fish'	liɣi so	'salmon'
c.	piŋx	'soup'	cʰo viŋx	'fish soup'
d.	ciɣr	'tree'	qoj ziɣr	'larch tree'

(6) Spirantization after a plosive

a.	pɨɲx	'soup'	p^{h}eq vɨɲx	'chicken soup'
b.	p^{h}oqi	'air bladder'	mɨkɨk foqi	'air bladder of dace (fish)'
c.	c^{h}ŋɨr	'grass'	k^{h}e̥rq sŋɨr	'seaweed (*lit*. sea grass)'
d.	cus	'meat'	p^{h}eq zus	'chicken meat'

Another problem is that Spirantization targets morpheme-initial plosives to the exclusion of medial and final plosives. The examples in (5-6) above show that Spirantization targets segments in a specific position namely, morpheme-initial plosives which follow a morpheme juncture. In contrast, medial and final positions are excluded from Spirantization targets. Again, this is not a typical context of spirantization cross-linguistically. In many languages, spirantization is a process of weakening (lenition), and weakening typically targets prosodically weak positions.

There are several approaches in the literature to describe CM and to account for the problems mentioned above. One approach is to give up phonological analysis altogether and regard CM as a morpho-syntactic phenomenon, comparable to consonant mutation in the Celtic languages. Alternatively, one may postulate a language-specific phonological rule of CM and regard it as an isolated process with no analogues in the world's languages. However, both approaches are explanatorily unsatisfying. I will refute the first approach by presenting new data from fieldwork which supports the view that CM is a synchronic phonological process. I will argue that the above-mentioned problems disappear, and that CM is not an isolated phenomenon, if we regard Spirantization as an instance of perceptually motivated process of lenition (Harris and Urua 2001, Harris 2005). A perceptually motivated lenition is a phonological operation that diminishes perceptual information from the speech signal in order to accentuate the syntagmatic contrast between information-heavy prominent positions and information-light (weak) non-initial positions within a specific domain (Harris and Urua 2001: 86). In particular, I will argue i) that Spirantization is a non-local process which has no specific segments as a trigger, ii) that the syntagmatic contrast is realized among morphemes which are in the syntactically defined domain of CM, and iii) that in certain contexts, Spirantization and Hardening conspire to achieve the same sequences of segments in order to satisfy local perceptual demands. i) accounts for the above-mentioned problem that Spirantization applies even after plosives. This problem disappears if Spirantization had no specific segments as triggers, but applied in a non-local fashion to a specific domain in order to satisfy perceptual demands of creating informational asymmetry. ii) accounts for the fact CM is sensitive to domain-internal morpheme junctures, as illustrated above. I

propose that in Nivkh, Spirantization creates informational asymmetry (=syntagmatic contrast) between the domain-initial morpheme and the remaining non-initial morphemes in the designated informational domain. This explains why morpheme-initial positions are targets to the exclusion of medial and final positions. The latter positions are exempt from targets since they do not contribute to realize syntagmatic contrast among morphemes.

Finally, I consider contexts where Spirantization is blocked. These are the positions after a fricative and a nasal. Since these are also the contexts where Hardening applies, there is an apparent conspiracy of the two processes to achieve the same sequences of segments. I propose that these sequences surface in order to satisfy local phonological demands, which disfavor specific sequences of segments for perceptual reasons. This contrasts with Spirantization, which I claim to be a non-local process (i.e. it has no local triggers).

The overall picture of CM which the current thesis depicts is the following: CM is an interaction of a non-local process of Spirantization and a local process of Hardening (and the blocking of Spirantization in the same context) which are both perceptually motivated. This analysis is not a surprising one. It demonstrates how the complicated phonological patterns which CM exhibits on the surface can be deduced from a restricted number of phonological generalizations. In this sense, CM is by no means a language-specific isolated phenomenon.

1.2 Sociolinguistic Introduction

1.2.1 The West-Sakhalin Dialect

An important task of the current thesis was to conduct fieldwork and collect data from the contemporary speakers of a specific dialect of Nivkh, namely the West-Sakhalin dialect (WSN). There are several reasons why I chose this dialect as the target of my project. One reason is that a description of this dialect in the literature is sorely missing. WSN has hitherto hardly been described, mostly due to the relative inaccessibility of the area. The speakers had lived primarily in settlements on the West coast of North Sakhalin, and were later relocated to larger villages due to the resettling and concentration policy, which took place in the 1950-70's.[3] Before this resettlement, access to WSN speakers was very limited because of geographic and, for Western researchers, political reasons. The faint roads on the sandy soil easily change to mud

[3] Grant (1995) gives an overview of how collectivization proceeded on Sakhalin.

baths after summer rains, and in the winter heavy snowfall isolates the area from the outside world almost completely.

In addition, since Sakhalin borders on Japan, USSR foreign policy closed off the whole island from Western researchers until the late eighties. The first fieldtrip to Sakhalin by a group of Western researchers did not take place until 1990 (cf. de Graaf 1992). At that time, the resettling and concentration of the aboriginal population had already been completed. The speakers of WSN lived in villages such as Nekrasovka, Moskal'vo, Ekhabi and the city of Okha (map 2), which are located in the north and northeast of Sakhalin. These places are relatively easy to reach the whole year round with public transportation such as train and bus. This improvement in accessibility is the other reason why I decided to do fieldwork on this dialect.

Currently, there are hardly any people living on the West coast, the homeland of many WSN speakers. In the summer, some people go there and spend a couple of months to catch fish and gather berries. Many of my recordings were therefore made in the winter, when these people are back in their apartments in Okha.

From a linguistic point of view, the geographic isolation of the West coast had an advantage, though. Thanks to inaccessibility, the compact settlements in this area benefited from a relatively dense concentration of Nivkhs. As a consequence, the speakers in the West preserved their language well compared to speakers in other areas. Most WSN speakers now live in the northernmost administrative district of Sakhalin, the *Okhinskii raion*,[4] and this district is known for the high number of Nivkh population on Sakhalin.[5] Although the exact total number is unknown, the number of WSN speakers was estimated to be about 180 in the 1980's (Eremin, Taksami and Zolototrubov 1988: 197).

As a consequence of the high number of WSN speakers, many publications in Nivkh are nowadays written in this dialect. The monthly Nivkh newspaper *Nivkh Dif* ('the Nivkh Language') has its headquarters in the village of Nekrasovka and is led by WSN speakers. Description and documentation of this dominant dialect thus meets the growing demand and interest of the local Nivkh community as well.

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[4] The transliteration of the Russian words in this thesis follows the Library of Congress system. Soft signs and hard signs from the Russian language are spelled with one and two apostrophes, respectively. I make an exception for accepted Western spellings of names such as *Gilyak*, rather than *Giliak*.

[5] According to Vysokov (2006), the percentage of the Nivkh population in this district is 2.9%. The percentage of Nivkh on the total population of Sakhalin is 0.48%.

1.2.2 The Current Sociolinguistic Situation

The current sociolinguistic situation of Nivkh is catastrophic. According to the latest census of the Russian Federation held in 2002, there are 4,902 Nivkh people living in the Amur region on the continent and on the island of Sakhalin, of which 2,452 live in Amur and 2,450 on Sakhalin (Federal State Statistics Service 2004). In these regions, there are 477 people who regarded themselves as speakers of Nivkh. The speakers I met during fieldwork to these areas were all above the age of 60, and they were all bilingual in Nivkh and Russian. In some places, Nivkh is still occasionally used among the older generation. During fieldwork, I often saw these people speaking Nivkh when they visited each other, at cultural events, meetings, parties, or even at home when all the participants of the conversation understood Nivkh. However, it was also often the case that they had to switch to Russian when someone who did not understand Nivkh, often a younger member of the family, was present. Nowadays, the use of the Nivkh language among family members is rare.

The generation between the ages of 40 to 60 still has some passive knowledge of the language. Some of them are still able to follow a fluent conversation in Nivkh. But when they want to participate in conversation, they do so in Russian. The generation under 40 does not understand Nivkh. Russian is the only language which they understand and use everyday. Except for some words and phrases, Nivkh therefore no longer exists in this youngest generation.

The UNESCO Red Book on Endangered Languages (Janhunen 1993) describes the sociolinguistic situation of Nivkh as 'nearly extinct' in the Amur area and 'seriously endangered' on Sakhalin. The diagnosis 'nearly extinct' applies to languages "with maximally tens of speakers, all elderly", and 'seriously endangered' to those languages "with a more substantial number of speakers but practically without children among them" (*ibid.*). The situation is negatively influenced by the fact that most Nivkh live among other Russian speaking population and that they form tiny minority in the region. The census in 2002 shows that the Nivkh population is approximately 0.48% of the total population of Sakhalin.

Language shift from Nivkh to Russian began in regions where contact with Russian speaking population was dense. One Nivkh woman remembers,

> "In the 1950's to the beginning of 1960's, there were still children who spoke fluent Nivkh and some or sufficient Russian, entering the elementary school of Rybnovsk [a village in the Northwest coast. H.S.]. At the same time, children who entered from the village of Nekrasovka spoke only Russian. The close distance to the city [Okha. H.S.], in which contact with Russian speaking

> population was inevitable, had negatively influenced the maintenance of the Nivkh language and tradition. Even the parents spoke Russian to their children." (Bessonova 2003: 216. My own translation)

Many of the speakers whom I met and worked with come from the Northwest coast of Sakhalin. As mentioned in section 1.2.1, this is not an accident. The Northwest coast is one of the areas in which the language was relatively well preserved. There are several reasons for this. First, this area is remote from big cities and is geographically isolated. Second, people lived in small communities which consisted primarily of Nivkh population. Therefore, these people could keep their traditional lifestyle until they had to move to large kolkhozes. Third, the Nivkh in this area are in close contact with Nivkh on the continent, who live in villages across the Tatar Strait. Some of my language consultants were born in the Amur region and later moved to Sakhalin. Even today, some Nivkh risk their lives to cross the Strait (approximately 40km) on modest old fishing boats.

1.2.3 Dialects

Nivkh has two dialect groups, the Amur dialect group and the Sakhalin dialect group. The classification of these two dialect groups corresponds roughly to the *amurskii dialekt* and the *sakhalinskii dialekt* in the current conventional terminology in Russia. Within each group, there are numerous sub-dialects, some of which have not been described or documented to date. The best-described dialects are the dialects spoken on the lower reaches of the Amur River (Kreinovich 1934, 1937, Panfilov 1962, 1965, 1968, etc.) and the dialects on Sakhalin spoken in Nogliki (Gruzdeva 1998, etc.) and Poronaisk (Hattori 1955, 1962a,b, Austerlitz 1956, etc.). The first Nivkh-Russian and Russian-Nivkh dictionaries by Savel'eva and Taksami (1965, 1970) are based on the dialects spoken in the Amur area.

Overview of the dialects

Dialect group	Dialect	Location
Amur dialect group	Continental Amur	Aleevka, Nizhnyi Pronge, Kal'ma, etc.
	West-Sakhalin (WSN)	Ten'gi, Chingai, Rybnoe, Rybnovsk, etc.
	North-Sakhalin (Shmidt)	Shmidt Peninsula
Sakhalin dialect group	East-Sakhalin	Nogliki,Venskoe, Katangli, Nyivo, Chaivo etc.
	Southeastern (Poronaisk)	Poronaisk

The description of this thesis is based on data which I recorded from speakers of WSN. WSN is closely related to the dialects spoken in the Amur area, rather than to those dialects spoken in the eastern part of Sakhalin. This is also the impression of the speakers themselves.

In this thesis, I will refer to the dialects spoken in the Amur district on the continent (*Khabarovskii krai*) collectively as the 'Continental Amur dialect' to contrast them with the dialect of my language consultants. The name 'West-Sakhalin dialect' dates back to the oldest taxonomy of Nivkh dialects by Shternberg (1905/1999) and has been subsequently used by other authors as well (e.g. Eremin, Taksami and Zolototrubov 1988). I use 'Amur dialect' and 'Sakhalin dialect' as shortenings for the Amur dialect group and Sakhalin dialect group, respectively.

WSN was spoken in villages such as Tamlavo, Nganivo, Kryuvo, Ten'gi, Chaghngi (Chingai) and Rybnovsk (map 3). Many of these villages no longer exist. Most of my consultants were born in these villages and were later moved to other areas of the island.

Little is known about the differences among the sub-dialects of WSN. During fieldwork, I got the impression that the speakers regarded those differences to be subtle. WSN borders on another sub-dialect of the Amur dialect, the North-Sakhalin dialect (the Shmidt dialect) spoken in the Shmidt Peninsula. Not much information is available about this dialect, except a short description by Kreinovich (1979). My

consultants are conscious of the differences between this dialect and their dialect and they often mimic the way the speakers of Shmidt spoke. Currently, all speakers of the Shmidt dialect live in areas outside the Shmidt Peninsula. The southern border of the WSN lies in Pogibi (map 3), according to Shternberg (Shternberg 1905/1999: 17).

Like the Amur dialect group, the Sakhalin dialect group consists of a number of sub-dialects. As mentioned above, the best-described dialects are those dialects spoken in and around the town of Nogliki and those spoken in the Poronaisk district (map 2). In the literature the former dialect is called the 'East-Sakhalin dialect' and the latter the 'Southeastern dialect', or the 'Poronaisk dialect'. The Southeastern dialect is described mainly by non-Russian linguists, such as Akira Nakanome (1917), Moritaka Takahashi (1942), Takeshi Hattori (1955, 1962a,b, 1988, etc.), and Robert Austerlitz (1956, 1959, etc.). The Japanese linguists did fieldwork in the southern half of Sakhalin in the period of the Japanese regime (1905-1945). After the end of the Second World War, a few Nivkh families from the Poronaisk region immigrated to Hokkaido, Japan. Austerlitz investigated the language of one of these immigrants, namely that of Mrs. Chiyo Nakamura, who settled in the city of Abashiri, in Northeast Hokkaido.

In contrast to the Amur dialect, no dictionary of the Sakhalin dialect was available for a long time. Recently, a Nivkh-Russian dictionary based on this dialect was published by Vladimir Sangi, a national writer and poet from Nogliki, and Liudmila Gashilova, the Nivkh teacher at the Gertzens Institute in Saint Petersburg (Sangi and Gashilova 2003).

There is no comprehensive study on the distances among dialects of Nivkh, nor is there a dialect atlas. The major differences are undoubtedly between the Amur dialect and the Sakhalin dialect, which is also the view of the Nivkh themselves. Some differences in phonology and morphology among dialects are sketched in Kreinovich (1934, 1979), Novikova and Savel'eva (1953) and Panfilov (1962). Nakagawa, Sato and Saito (1993) report a word list of 220 items of eight speakers from different villages on Sakhalin. Many of these dialects still have some speakers of excellent quality and it is up to the international linguistic community to document the speech of these people.

1.2.4 Language Maintenance and Revival

Currently, Nivkh is taught in three schools on Sakhalin. These are the elementary schools in the villages of Nekrasovka, Nogliki and Chir-Unvd (map 2). According to Laigun (2003: 239), there were 202 pupils learning the Nivkh language at these

schools in the school year of 1999-2000. 180 of them learned the language from the 1st to the 4th grade (age 7-10) as a compulsory subject, and 22 as an elective subject. In the upper grades Nivkh is not taught. The current curriculum started in 1981, after that the Russian Ministry of Education gave permission to teach Nivkh at the lower grades of elementary schools (Polet'eva 2003: 209). The teachers are trained at pedagogic institutes in Saint Petersburg and Yuzhno-Sakhalinsk. In these institutes, linguists and pedagogues organize lectures about theory and teaching methods of the language (Polet'eva 2003: 209). All teachers are Nivkh, but not all of them have learned Nivkh as their first language.

Nivkh is also taught in two kindergartens, in Nekrasovka and Nogliki. In the kindergarten in Nekrasovka, Nivkh is taught to children from the age of three (Bessonova 2003). The teaching program in this kindergarten is organized with special emphasis on the life and the culture of Nivkh. Culturally important notions such as shamanism, the bear festival, clan, flora and fauna of the region are the topics which are incorporated in this program (Bessonova 2003). A number of teaching materials such as textbooks, picture books and dictionaries have been published with the collaboration of teachers, scholars, artists and local administration.

Despite such efforts, people who are engaged in the educational activities take a grim view of the prospects of language maintenance and revival for understandable reasons. The biggest problem is the limited social context in which Nivkh can be used, as Svetlana Polet'eva, the Nivkh schoolteacher in Nekrasovka, points out (Polet'eva 2003: 211). Nivkh is taught only in the first grades of the elementary school and for most pupils there is no way to further develop or practice their knowledge of Nivkh in the rest of their lives.

In addition, Nivkh is not an easy language to learn for children whose first language is Russian. Polet'eva points out that many children regard Nivkh as a tough subject, especially so when they have to learn other (usually some European) languages at the same time (Polet'eva 2003: 212). Language contact with Russian brought further complications into the phonological system of the language. For instance, the massive introduction of loan words from Russian gave phonemic status to voiced plosives (at least in textbooks), which only had an allophonic status in Nivkh (cf. Chapter 3). As a consequence, children have to acquire a three-way laryngeal contrast of plosives (aspirated, non-aspirated, voiced) from the pronunciation and the spelling. This is not an easy task, as pointed out by the Nivkh ethnologist Chuner Taksami (1997).

More than a few parents want to see their children become fluent in English rather than in Nivkh. On Sakhalin, international oil and gas companies are investing billions

of dollars (the Sakhalin Projects) and the key to a successful economic life is undoubtedly a good knowledge of English.

The only way to improve this unfortunate situation for the Nivkh language is, as Polet'eva points out, to broaden the social context in which Nivkh can be used (Polet'eva 2003). In order to achieve this, she proposes to strengthen the infrastructure which supports the Nivkh-Russian bilingual community. These are,

1. Academic institutions in which linguistic and pedagogic issues can be studied.
2. A social network of local intellectuals, teachers, parents, academics, etc.
3. An institution which organizes language courses, and propagates the role of language and culture in the community.
4. Organizations which provide material support, such as, textbooks, teaching aids, newspapers, journals and literature.

Some of these have already been realized, albeit on a limited scale. Since 1990, there has been a monthly Nivkh-Russian newspaper 'Nivkh Dif'. The Sakhalin Museum of Regional Studies[6] (in Yuzhno-Sakhalinsk) has a rich collection of Nivkh materials, and occasionally organizes workshops and fieldtrips, as described in sections 1.3.2 below.

However, these measures are not sufficient to stimulate the local people and stabilize the movement for language maintenance. Teachers complain about the lack of sufficient modern teaching material (Polet'eva 2003: 212). Unless some measures are taken, Nivkh will remain an endangered language in spite of the effort of those local schoolteachers.

1.3 Linguists' Efforts on Language Documentation

1.3.1 Fieldwork

Since access to speakers was restricted before Perestroika, most of the available descriptions and data of Nivkh are from linguists and ethnographers of (Soviet) Russia (Shternberg, Kreinovich, Panfilov, Savel'eva, Otaina, Taksami, etc.), or from non-Russian linguists who managed to record data of the Southeastern dialect, either under the Japanese regime (1905-1945) or from Nivkh immigrants who settled in Hokkaido (Japan) after the Second World War (Austerlitz 1956, 1959, etc., Hattori 1955, 1962, 1988, etc.). After Sakhalin opened up to Western researchers, a number of institutions

[6] http://museum.sakh.com/eng/17.shtml

and individuals organized fieldtrips to collect linguistic material. However, the amount of available linguistic material is still modest and awaits further endeavors of field linguists.

Contact with such foreign researchers opened a way for some local researchers (both Russian and Nivkh) to publish their own work. Pukhta (2002) is one such example. This Nivkh schoolteacher in Nikolaevsk-na-Amure (Amur region. Cf. Map 2) worked on a Nivkh-Russian conversation textbook and thesaurus for a long time. When she was looking for possibilities to publish these works, she met the Japanese linguist Tohru Kaneko who was visiting the region for fieldwork. Kaneko proposed to publish her work in Japan in a series which specializes on the documentation of endangered languages (the ELPR project. See section 1.3.2 below). A monograph on Nivkh musicology has been published recently by the ethnomusicologist Natalia Mamcheva with the aid of a Dutch grant (Mamcheva 2003).

From 2000 to 2001, I spent a year on Sakhalin as a visiting researcher at the Sakhalin Museum of Regional Studies. With the aid of the museum staff and my Nivkh colleague Galina Lok, I conducted fieldwork in places such as Okha, Nekrasovka and Nogliki (map 2). Most of the examples in this thesis were recorded in this period. The recordings have already been published in part, as the following section describes.

1.3.2 Language Documentation and Feedback to Local Community

Prior to the completion of this thesis, I published three books with Galina Lok from the Dutch and the Japanese projects, 'Voices from Tundra and Taiga' (coordinated by Tjeerd de Graaf) and 'The Endangered Languages of the Pacific Rim'[7] (ELPR. Coordinated by Osahito Miyaoka). These are the series 'Sound Materials of the Nivkh Language' (Shiraishi and Lok 2002, 2003, 2004). This series of publications consists of Nivkh texts and the sound recordings corresponding to the texts. Each publication contains an audio CD of recitations of folktales, songs and conversation performed by WSN speakers. The transcription is in the Cyrillic-based alphabet (table 1), as conventionally used by the local people. In addition, a word-by-word translation is given in Russian. Although these publications are written in Russian, English and Japanese, the primary language is Russian. Choosing Russian as the primary language has the aim of facilitating and stimulating the study of the Nivkh language by the local people. This is because the current Ph.D. project has the additional aim of benefiting

[7] http://www.elpr.bun.kyoto-u.ac.jp/

the local people and making them aware of their invaluable linguistic heritage. During the whole Ph.D. project period, we distributed about 250 copies of this series among the members of the local community in Sakhalin. We hope that these books will interest not only the older generation who still speak Nivkh, but also the younger generation who speak only Russian.

Another sort of feedback to the local community was instantiated in October 2003. We participated in a workshop for the local teachers of the indigenous people of Sakhalin, organized by the project 'Voices from Tundra and Taiga'. This one-week workshop was held at the Sakhalin Museum of Regional Studies and had the aim of familiarizing the local schoolteachers with the latest findings of linguistics. Linguists from the Netherlands and Saint Petersburg prepared lectures on phonetics, phonology and field linguistics, and showed how teaching methods can be improved by using modern linguistic equipment (such as speech-analyzing computer programs). About 40 participants from all places of Sakhalin joined the courses.

Another fruitful result of this workshop was that it offered an opportunity for academic researchers to come into contact with the local community members. Such organized events are useful since in order to make the local contact effective and meaningful, the academics have to know what the community's needs are. For instance, during this workshop the representatives of the North-Sakhalin dialect requested that we document their dialect. These speakers were aware that their dialect had hitherto hardly been described. At this moment, we are preparing projects which aim to describe these undocumented dialects of Nivkh.

1.3.3 Sound Archives

The oldest sound recordings of Nivkh date back to the beginning of the 20th century. These are the recordings made by the Russian ethnologist Lev Shternberg, and contain materials which are recorded on wax cylinders. Shternberg's material is archived in the Pushkinskii Dom, the sound archive of the Russian Academy of Sciences in Saint Petersburg. His recordings contain folktales of the Amur dialect (Burykin et al. 2005).

Since then, numerous recordings have been made by different individuals. The total quantity (and quality) of these sound recordings is unknown. The following list provides some information on the sound archives that we know to exist at this moment.

Researcher	Recorded period	Archived place
L. Shternberg	1910	Saint Petersburg (Pushkinskii Dom)
E. Kreinovich	1920's	Yuzhno-Sakhalinsk[8]
E. Gippius and Z. Eval'd	1927-1929	Saint Petersburg (Pushkinskii Dom)
S. Kozin	1931	Saint Petersburg (Pushkinskii Dom)
T. Hattori	1930's to 40's	Abashiri[9]
R. Austerlitz	1950's to 60's	London[10]
G. Otaina	unknown	Vladivostok[11]
V. Sangi	1960-	Sakhalin[12]
I. Bogdanov	1982	Saint Petersburg (Pushkinskii Dom)
K. Murasaki	1990	Tokyo
H. Nakagawa	2000	Chiba
I. Tangiku	2000-	Tokyo[13]

In addition to these materials, there are presumably a number of recordings by individuals and institutions,[14] including those recorded by the Nivkh themselves. Unfortunately, many of these recordings are stored under conditions which are far from optimal. During fieldwork, we often saw such audio tapes (often open-reel ones) stored carelessly in the dark corners of a bedroom. From such observations, we conclude that not only the language is endangered but many such recordings as well (de Graaf 2004, de Graaf and Shiraishi 2004). These recordings contain valuable information about the language and culture of Nivkh, especially since many of the speakers who have been recorded are no longer alive. In order to save such recordings,

[8] Sakhalin Museum of Regional Studies.

[9] Hokkaido Museum of Northern Peoples.

[10] These recordings contain folktales, riddles, songs, passages of shamanistic epic and a minimal pair list (Daniel Abondolo, p.c.).

[11] Far East Branch of the Russian Academy of Science.

[12] Partially available on Internet (http://www.ling-atlas.jp/nivkh.html). See footnote 15 below.

[13] Partially available on Internet (http://www.ling-atlas.jp/nivkh.html).

[14] E.g., the phonetic department of the University of Saint Petersburg made recordings of the Nivkh students who studied in Saint Petersburg (Bondarko and Zinder 1962).

preservation measures should be taken before they are all gone. We hope that different institutions and individuals will cooperate to accomplish this task.[15]

1.3.4 The Use of Sound Materials in This Thesis

A unique characteristic of this thesis is that most of the cited examples can be listened on either audio medium (CD) or Internet. These are the examples from the series 'Sound Materials of the Nivkh Language' (Shiraishi and Lok 2002, 2003, 2004), which are available either as a publication (book with audio CD) or on the Internet (see References for URL). In this way, many of the examples in this thesis can be listened to and checked. This guarantees another important characteristic of the current thesis: accessibility to sound recordings.

There are several reasons why we regard accessibility to sound data as important. First of all, sound recordings give the readers an opportunity to check the data. The importance of verifiability should not be underestimated, especially when one works on a language which is relatively unknown, like Nivkh. Second, for those who know the language, the sound recordings make it possible to find and correct errors which exist in the transcriptions. In case of suspicion, the reader may listen to the recordings and judge the adequacy of our transcription. Third, sound materials can be used as a linguistic corpus which provides useful information, not only on phonology but also on other disciplines of linguistics. For example, one can retrieve lexicographic information from the recordings for the purpose of compiling a dictionary. Fourth, sound materials are useful tools for the learning of the language. It can be used for self-study or in classes as teaching material. Part of our publication is already used for this purpose at the Faculty of the Northern Peoples in the Gertzens State University in Saint Petersburg. Fifth, and perhaps most importantly, like many indigenous people of Siberia, the traditional Nivkh transmitted important information (such as history and legends) from generation to generation by oral performance. The introduction of a writing system for Nivkh was realized only in 1932 (Eremin, Taksami and Zolototrubov 1988: 197). However, this writing system did not survive long because

[15] Recently, the Research Institute for Languages and Cultures of Asia and Africa (Tokyo University of Foreign Studies) started a project to digitalize the sound archive of the Nivkh writer and poet Vladimir Sangi (coordinated by Itsuji Tangiku). These recordings contain folktales (available from the following website: http://www.ling-atlas.jp/nivkh.html).

the written language soon became Russian instead of Nivkh.[16] Accordingly, even fluent speakers often have problems in reading and writing in Nivkh. Therefore, we hope that sound recordings will facilitate the accessibility of those fluent speakers as well. Moreover, the simultaneous publication of text and sound makes the way of transmitting information closer to the traditional style.

1.4 Organization of the Thesis

This thesis is organized as follows. In Chapter 2, I sketch the basic phonology of WSN. Crucially, this chapter is not intended to be a re-introduction and summary of previous descriptions of Nivkh phonology. Thanks to information from my language consultants, I could find new regularities in the phonology of Nivkh and shed light on those aspects which were hitherto unknown. Although the details of such new findings need to be further examined, I chose to add such information as much as possible as a preliminary attempt towards an elaborated description of Nivkh phonology.

Chapter 3 discusses laryngeal contrast and phonology. Chapter 4 discusses Consonant Mutation. Chapter 5 concludes.

[16] Kreinovich introduced the first Nivkh alphabet (for the Amur dialect), which was based on the Latin alphabet. In 1937, this Latin alphabet was abolished. In 1953, the Cyrillic-based alphabet was introduced and became conventional as it has remained until today.

Chapter 2

The Basic Phonology of the West-Sakhalin Dialect

2.1 The Vowels

Like other dialects of Nivkh, WSN has the following six vowels.

(1)

i	ɨ	u
e		o
	a	

2.1.1 Vowel Length

Vowel length is not phonologically contrastive. Phonetically, long vowels arise due to i) sentence prosody, ii) compensatory lengthening, and iii) in songs. Sentence prosody lengthens the vowel when emphasis is put on a constituent (2a-d), in exclamations (2e), or in vocatives (2f). Vowel lengthening targets vowels independently of stress, which usually falls on the first syllable (section 2.2.3).[1, 2]

(2) a. ˈtoːlkar ha-r (SL2: 5)
fat do-CV
'(it became) very fat'

[1] Examples with the credits FN are from my unpublished field notes. Examples with the credits SL (1, 2, 3) are from Shiraishi and Lok (2002, 2003, 2004). The latter publications are downloadable with sound files (WAV) from the following website: http://ext-web.edu.sgu.ac.jp/hidetos/. Examples with the credit S&T are from the Nivkh-Russian dictionary of Savel'eva and Taksami (1970).

[2] With zero tense marker, Nivkh verbs are aorist (= non-future) forms and can be used to denote either present or past tense.

b. ˈɨkɨkɨː p^h-rɨw-ɣɨt-ɣa (SL3: 64)
almost REF-teach-COMP-when
'When he had almost finished his study,'

c. ˈtilɨː ha-t (SL3: 66)
swing do-CV
'(I) swung'

d. ˈpatiːkur (SL1: 13)
'slowly'

e. ˈajkaː, ˈajkaː, haɽ̥ qoju-c (SL2: 19)
ai ai COMP scream-IND
'She screamed "ai, ai!"'

f. ˈɨtɨk-aː (SL1: 7)
father-VOC
'father!'

Compensatory lengthening occurs when postvocalic fricatives are deleted. In such a case the preceding vowel is lengthened. The deletion of the fricative is a fast speech rule. In careful speech the fricative is pronounced.

(3) a. oʁla > oːla 'child'
b. maɣr vo > maːr vo 'the place name Magr' (SL3: 10)
c. urla > uːla 'good'

2.1.2 /a/-Raising

When sentence prosody lengthens /a/, it raises to /i/ in some cases.[3]

[3] This process is also reported in Panfilov (1962: 22) for the speech of the Continental Amur dialect speakers.

(4)	a.	ŋala-	>	ŋaliː-	‘like’	(SL1: 33)
	b.	namakur̥	>	namiːkur̥	‘well (adverb)’	(SL1: 39, 42)
	c.	erʁala	>	erʁaliː	‘many’	(SL2: 2, 3)
	d.	par̥k	>	piːr̥k[4]	‘only’	(SL2: 69) (SL3: 62)
	e.	oɣra	>	oɣriː	‘back of the head’	(SL2: 66)

2.1.3 Palatalization of Consonants by /i/, /e/

Some of the relatively young speakers (VI, GY) tend to palatalize consonants which are followed by /i, e/, especially when the vowel is stressed.

(5)	a.	p^{hj}i-	‘dwell’	(SL1: 7)
	b.	m^{j}evsq	‘two half pieces of dried fish’	(SL3: 70)
	c.	p^{hj}er-	‘to be tired’	(SL1: 16)
	d.	k^{hj}eq	‘fox’	(SL2: 14)
	e.	t^{hj}es-t^{hj}es-t^{hj}es	‘jumping and hopping (onomatopoeic)’	(SL1: 42)
	f.	$ŋ^{j}$ex-$ŋ^{j}$ex-$ŋ^{j}$ex-	‘oink, oink (onomatopoeic)’	(SL2: 51)

The palatalization is weak or not audible when the consonant is followed by an unstressed vowel.

(6)	a.	nane	‘soon’	(SL2: 25)
	b.	laʁe	‘nearby’	
	c.	vin-te	‘let’s go’	(SL2: 59)

The oldest speaker ON does not palatalize in contexts where the younger speakers do, e.g. [p^{h}-eftaŋr-] ‘REF-quick’ (SL3: 52).[5] The difference among speakers with respect to palatalization is clearly contrasted in conversation when speaker VI repeated the word /ves/ ‘crow’ after ON (SL2: 23). While ON did not palatalize at all, VI did.[6]

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[4] This form is occasionally contracted to [piːk] (SL1: 15, SL2: 36).

[5] Tangiku (2006: 136, p.c.) reports that such a variation is observed among the speakers of the East-Sakhalin dialect as well.

[6] The influence of Russian is conceivable, but the correlation with stress remains to be explained.

(6) VI: (Asking in Russian) *Voroni, voroni, kak kak*?
‘How do you say crows (in Nivkh)?’
ON: ves, ves. ‘*Ves, ves*.’
VI: vʲes-ku la? ‘*Ves*, right?’

Unless necessary, I omit palatalization from the transcription in this thesis.

2.2 The Consonants

WSN has the following consonants.

(8)							
	Aspirated plosives	p^h	t^h	c^h	k^h	q^h	
	Non-aspirated plosives	p	t	c	k	q	
	Voiceless fricatives	f	r̥	s	x	χ	
	Voiced fricatives	v	r	z	ɣ	ʁ	
	Nasals	m	n	ɲ	ŋ		
	Lateral		l				
	Glides	w		j			h

2.2.1 Obstruents

There is inconsistency in the literature as to whether /c^h, c/ are described as (pre-) palatal plosives or affricates ([t$ʃ^h$, tʃ]). The Russian phonetician Rushchakov observed a strong and long frication noise after the closure of these sounds and concluded that these sounds are phonetically close to affricates (Rushchakov 1980: 179-180, 1981: 8).[7] In Consonant Mutation (Chapter 4) these sounds will be seen to undergo Spirantization and become strident fricatives /s/ and /z/, respectively.

A laryngeal contrast exists in both plosives and fricatives, but only in initial positions.

[7] Rushchakov’s observation is based on data from the East-Sakhalin dialect.

(9) a. pʰaχ ‘window’ vs. paχ ‘stone, rock’
b. r̥a- ‘bake’ vs. ra- ‘drink’

In all other positions, the laryngeal contrast is suspended and obstruents surface as voiced or voiceless (or somewhere in between) depending on the neighboring sounds and position (see Chapter 3 for details). The non-aspirated plosives have the allophonic variants [b], [d], [dʒ], [g] and [ɢ] which surface in post-sonorant (notably post-nasal) context: /anci/ [anci]~[andʒi] ‘again’ (SL1: 41), /ɲiŋ tɨf/ [ɲiŋ dɨf] ‘our house’ (Chapter 3, section 3.2, section 3.3.1).

The frication of fricatives is weak, especially so in voiced fricatives. Rushchakov (1981) reports that the spectra of Nivkh voiced fricatives resemble those of sonorants. The labial fricatives /f/ and /v/ are pronounced bilabial ([ɸ], [β]) in the speech of the older WSN speakers (cf. Chapter 4, section 4.8.5). 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 distribution of the velar (/kʰ, k, x, ɣ/) and the uvular (/qʰ, q, χ, ʁ/) obstruents is nearly allophonic. The distribution of the uvular obstruents is restricted to syllables which are headed by the vowels /a, o/.

(10) a. raq ‘rice’ (SL2: 23)
b. qʰa ‘name’
c. pʰaχ ‘window’
d. oq ‘coat’
e. qʰotr ‘bear’

The co-occurrence of uvular obstruents and low vowels can also be observed in the process which I will call ‘/e/ lowering’. In this process, some speakers (VI, GY) lower /e/ to /a/ when the former precedes a uvular plosive.

(11) a. peq ~ pe̯q ~ paq ‘chicken’
b. kʰeq ~ kʰe̯q ~ kʰaq ‘fox’
c. nineq ~ nine̯q ~ ninaq ‘a little’

A phonemic contrast between velar and uvular obstruents is marginally found by those lexical items which have velar obstruents adjacent to /a, o/.[8]

(12)	a.	nanak	'older sister'	(SL2: 40)
	b.	ɲr̥ak	'always'	(SL2: 2, SL3: 50)
	c.	popok	'accessory'	(SL2: 37)

2.2.2 Rhotics

A unique segment in the Nivkh consonantal inventory is /r̥/, the voiceless counterpart of the rhotic /r/. Ladefoged and Maddieson describe this sound as "an apical trill which contains portions without vocal cord vibration." (1996: 236). Impressionistically, it sounds as if it contained a palatal articulation, and sounds similar to [rʃ] or [ʃ].[9] However, this is only impressionistically so. There is phonological evidence which shows that /r̥/ is dental and not palatal. Firstly, /r̥/ alternates with /t^{h}/ in Consonant Mutation but crucially, not with the palatal /c^{h}/ (Chapter 4). Another bit of evidence comes from loanword phonology. The palatal fricative /ʃ/ of Russian is pronounced with /s/ but not with /r̥/ by Nivkh speakers. For instance, the name of the Russian poet Pushkin [puʃkin] is pronounced as [puskin] and not as *[pur̥kin].

(13)	a.	c^{h}astuska	(from Russian [tʃastuʃka])	'two- or four-line rhymed poem'	(SL2: 68)
	b.	kriska	(from Russian [krɨʃka])	'lid'	(FN)

These facts indicate that /r̥/ has no palatal articulation of any kind, although it may sound so to the ear of the outsider.

Another remarkable characteristic of the Nivkh rhotics is that they pattern with fricatives and not with sonorants (Trubetzkoy 1939). Characteristics which indicate that rhotics are not sonorants are: 1) like fricatives, Nivkh rhotics include a voiced and a voiceless segment, while no Nivkh sonorant has a voiceless counterpart; 2) rhotics participate in Consonant Mutation (Chapter 4) while no sonorant does so; 3) rhotics

[8] Austerlitz (1956: 262) points out that many of such items are loanwords or special terms for ceremonies, as in /kaskazi-/ 'to be plain' (from Nanai /kas/ 'straight').

[9] In the Russian transcriptions the symbol for /r̥/ is often the palatal fricative 'ш'.

exhibit laryngeal phonology similar to fricatives (Chapter 3); 4) rhotics drop and cause compensatory lengthening of the preceding vowel in contexts where fricatives do so, too (section 2.1.1); 5) in different dialectal forms rhotics often correspond to [s]: [liɣr̥]~[liɣs] ‘wolf’. These facts strongly indicate that in Nivkh rhotics should be classified as fricatives and not as sonorants.

2.2.3 Nasals

Nasals contrast four places of articulation which can be contrasted in all positions. Notably, nasals do not place-assimilate to the following consonant (16).

(14)	a.	ma	‘dried fish’	
	b.	naχ	‘bed’	(SL1: 27)
	c.	ɲo	‘storehouse’	
	d.	ŋa	‘animal/game’	(SL1: 29)

(15)	a.	cʰam	‘shaman’	(SL2: 28)
	b.	men	‘two (people)’	(SL2: 40)
	c.	ɲiɲ	‘one (dog)’	(SL3: 61)
	d.	aŋ	‘who’	(SL1: 27)

(16)	a.	ŋiɲk	‘face’	(SL1: 13)
	b.	timk	‘hand’	
	c.	ŋiɲf	‘bone’	(SL1: 17)
	d.	pilavon qʰal	‘the clan of Pilavon’	(SL1: 11)
	e.	nonk	‘cub, puppy’	

As mentioned in section 2.1.4, some speakers palatalize consonants before the front vowels /i, e/. For nasals, this has the consequence that the contrast between /n/ and /ɲ/ is neutralized in this context.

(17)	a.	nʲevar	‘look like’	(SL1: 20)
	b.	nʲen	‘one (person)’	(SL3: 61)

2.2.4 Lateral

In consonant clusters, /l/ has an allophonic variant which sounds similar to [r] (rhotacism). I could not figure out the conditions of this variation, and will leave it for future research.

(18) a. kʰlɨz- (SL1: 27, SL2: 6) ~ kʰrɨz-‘eat one’s fill’ (S&T 1970)
b. elɣala (SL1: 33, SL2: 2, 38) ~ erɣala ‘many’ (SL1: 34, 39, SL2: 2, 72)

2.2.5 Glides

Of the three glides in the Amur dialect, only /j/ appears in all positions. /w/ appears only in non-initial positions, while /h/ appears only initially.

(19)

a.	jeski-	‘sell’	
b.	jaqo	‘which’	
c.	lɨj-	‘kill (a bear)’	
d.	ɨjf	‘always’	(SL3: 5)
e.	cʰiŋgaj	‘the place name Chingai’	(SL3: 5)
f.	rɨw-	‘teach’	
g.	vow-	‘chew’	
h.	qʰawk	‘no’	
i.	haɣs	‘clothes’	
j.	hum-	‘live’	

The Sakhalin dialect still has initial /w/. In the Amur dialect, this has historically merged with /v/, as in /vɨc/ (Amur) from /wat/ (Sakhalin) ‘iron, metal’. After this merger, /v/ and /w/ are no longer contrastive in initial position in Amur. In non-initial position, the two sounds are contrastive: /ʁav-/ ‘push’ (SL3: 66), /ʁaw-/ ‘gulp’ (SL3: 66). /h/ drops when preceded by a tautosyllabic consonant.

(20) a. pʰ-haɣs-ku [pʰaɣsku] (SL2: 23)
REF-clothe-PL
‘one’s own clothes’

b.	if-he̯rq-ux	[ive̯rqux]	(SL2: 52)
	3SG-side-LOC		
	‘as to him/her’		

2.3 The Phonological Structure of Words

2.3.1 Syllable Structure

A typical Nivkh root is monosyllabic. Disyllabic roots are fewer but do exist. Trisyllabic roots (or more) appear only in loanwords, as in /estarik/ from Russian /starik/ ‘old man’.

(21)	a.	e	‘comb’	(SL1: 32)
	b.	ma	‘dried fish’	
	c.	nos	‘ear’	
	d.	puc	‘seaweed’	
	e.	haɣs	‘clothes’	
	f.	utku	‘man’	
	g.	mo̯rqa-	‘to live’	
	h.	caqo	‘knife’	

Consonants may cluster up to two in word-initial position and up to three in word-final position.

(22)	a.	cʰŋi̯r	‘grass’	(SL2:36)
	b.	ɲlami	‘half’	(SL3: 70)
	c.	tʰfisk	‘fir’	(SL2: 47)
	d.	cʰxevrŋaj	‘worm’	(SL1: 28)
	f.	hontq	‘sack’	(FN)
	g.	antχ	‘guest’	(FN)

2.3.2 Syllable Phonotactics

In an initial cluster plosives may not occupy the second position. No native word has an initial cluster with a plosive as the second member. In loanword phonology such clusters are adjusted by either the deletion of the consonant or vowel epenthesis (epenthetic vowels are transcribed with outlined fonts as in ◌).

		Nivkh	Russian		
(23)	a.	kovorotk	skovorodka	'frying-pan'	(Pukhta 2002: 58)
	b.	◌stol	stol	'table'	(SL3: 71)
	c.	◌starik	starik	'old man'	(SL3: 23)

These epenthetic vowels bear stress, unlike the epenthetic vowels which appear in clitics (section 2.6).

2.3.3 Stress

In WSN, stress is fixed on the first syllable in a polysyllabic stem.[10] Phonetic correlates of stress are the assignment of high pitch in the citation form and for some speakers palatalization of the consonant before front vowels /i, e/ (see section 2.1.4).

(24)	a.	ˈmoo̯rqa-	'to live'
	b.	ˈcaqo	'knife'
	c.	ˈoɣla	'child'
	d.	ˈoɣla-gu	'children'

There are no special stress patterns which distinguish compounds (25a) from phrases (25b-e). In both structures it is the first constituent which receives primary stress in WSN.[11]

[10] Panfilov states that in the Amur dialect stress may fall on a non-initial syllable in some words and cite examples as [umˈgu] 'woman' and [utˈku] 'man' (Panfilov 1962: 22). In the speech of my informants, these forms are always initially stressed.

[11] Kreinovich reports that in the Sakhalin dialect the last constituent receives stress in compounds and noun phrases: [cʰo ˈzoŋqr] 'head of fish' (Kreinovich 1979: 298).

(25) a. ˈɲaʁ ajs (FN)
eye gold
‘glasses’

b. ˈkins ŋi̯ɲk (SL1: 13)
devil face
‘devil’s face’

c. ˈpilkar ŋi̯ɲk (SL1: 13)
big face
‘a big face’

d. ˈral umgu (SL1: 31)
frog woman
‘frog woman (an evil woman in a story)’

e. ˈcacr ŋojχ-xu (SL2: 17)
tern egg-PL
‘eggs of a tern’

2.4 Word Phonology

2.4.1 Geminate Spirantization of Coronal Plosives

/t/ and /c/ spirantize when followed by a homorganic plosive.

(26) /it-/ ‘say’

a.	it-ra	highlighting marker	(SL2: 35)
b.	i̯r̥-c	indicative marker	(SL3: 6)
c.	i̯r̥-t	converb marker	(SL2: 11)

(27) /jocjoc-/ ‘ask’

a.	jocjoc-ɣar	subjunctive marker	(SL2: 29)
b.	jocjoc-ja	imperative marker	(SL3: 12)
c.	jocjos-c	indicative marker	(SL1: 33)

(28) /lɨt-/ ‘make’

	lɨr̥-ti	‘even (focal)’	(SL2: 9)

(29) /q^{h}at-/ ‘bald’

a.	q^{h}at ŋivx	‘bald man’	(SL2: 67)
b.	oɣra χar̥-t	‘back of the head became bald’	(SL2: 67)

(30) /-ɣɨt-/ completive marker

-ɣɨr̥-t	converb marker	(SL3: 25)

Geminate spirantization applies in a very restricted morpho-syntactic context, namely in the morphological extensions of verbal roots. Across larger boundaries, Consonant Mutation (Spirantization), a separate process from the one exemplified above (for further, extensive discussion see Chapter 4), applies in preference to Geminate spirantization: /vɨc cif/ [vɨc zif], *[vɨs cif], ‘iron road’ (Kreinovich 1937: 40).

2.4.2 Elided Nasals

In the Amur dialect, final nasals of some words and suffixes were elided historically. Although these nasals never surface, they affect Consonant Mutation and induce voicing of the following non-aspirated plosive: /eɣa^{N} cus/ [eɣa^{N} dʒus] ‘cow meat’ (see Chapter 4, section 4.4.4 for details). When followed by other segments (vowels, aspirated plosives, sonorants), the elided nasal does not leave any significant phonological trace /j^{N}-acik/ [j-acik] ‘his/her younger sister’ (SL2: 40).

Elided nasals can be reconstructed by comparing the forms of the Amur dialect with those of the Sakhalin dialect.

(31)		Amur	Sakhalin	
	a.	eɣa	eɣaŋ	‘cow’
	b.	pitɣɨ	pitɣaŋ	‘book’
	c.	oɣla	eɣlŋ	‘child’
	d.	-gu/-ɣu	-gun/-ɣun	plural suffix

Not all speakers exhibit the effects of elided nasals. In the speech of the younger speakers, elided nasals no longer play any role. The effect of the elided nasal is visible only in the speech of the older speakers, in which it creates an instance of phonological opacity (Kiparsky 1973). This difference among generations is described in detail in Chapter 4. Unless necessary, elided nasals are omitted from the transcription in this thesis. When necessary, they are transcribed with /^{N}/.

2.5 Phrase-Level Phonology

2.5.1 Velar/Uvular Spirantization

Final velar and uvular plosives spirantize when followed by velar or uvular obstruents. This process was already described in one of the earliest descriptions of Kreinovich (1937: 40).

While in the literature it is often described that spirantization of /k/, /q/ occurs when they are followed by the fricatives /x/, /χ/ (Savel’eva and Taksami 1970: 511, Mattissen 2003: 52), speakers of WSN exhibit spirantization before a plosive as well (see example (34d) below).

(32)	a.	ɨtɨx-xu	(< ɨtɨk)	‘parents (lit. father-PL)’	(SL3: 5)
	b.	q^{h}oχtolox-xu	(< q^{h}oχtolok)	‘the family of Qokhtolok’	(SL3: 10)
	c.	estarix-xu	(< Rus. *starik*)	‘old people’	(SL3: 23)
	d.	bambux-xu	(< Rus. *bambuk*)	‘bamboos’	(SL1: 36)
	e.	burundux-xu	(< Rus. *burunduk*)	‘chipmunks’	(SL2: 14)
	f.	mecaχ-xun	(< mecaq)	‘ashberries’	(SL3: 35)
	g.	k^{h}eχ-xu	(< k^{h}eq)	‘foxes’	(SL3: 48)
	h.	nonoχ-xu	(< nonoq)	‘puppies’	(SL1:11)
	i.	zosχ-xɨt-	(< zosq)	‘broke’	(SL2: 22)

j.	tʰvɨsx-xir	(< tʰvɨsk)	'with fir'	(SL2: 30)
k.	ma haqaχ-xɨt-	(< haqaq-)	'cut dried fish'	(SL2: 34)
l.	laŋr ŋoχ moqmoχ-xɨt-	(< moqmoq-)	'cut seal fat'	(SL2: 34)
m.	caχ-xiṛ	(< caq)	'with a cradle'	(SL2: 51)

While Velar/vular spirantization is obligatory between the stem and suffixes, there is variation in other domains. Across larger boundaries (i.e. between words), spirantization does not apply consistently. While the examples below are all pronounced without an intervening pause, Velar/uvular spirantization does not apply in the examples in (35-36).

Application of Velar/uvular spirantization

(33) Object-predicate

a. cʰelmix xu- (< cʰelmik)
name kill
'Killed Chelmik.' (SL3: 22)

b. pʰ-ɨtɨx xrɨ-t (< ɨtɨk)
REF-father be_together-CV
'Together with our father.' (SL3: 30)

c. tɨmx χavu- (< tɨmk)
hand warm
'(He) warmed (his) hands.' (SL1: 12)

d. hɨ kʰɨsx ɣe- (< kʰɨsk)
that cat catch
'Caught that cat.' (SL2: 4)

e. kʰɨsx ʁaw - (< kʰɨsk)
cat gulp
'Gulped the cat.' (SL2: 5)

f. tʰfɨsx xu- (< tʰfɨsk)
fir cut
'Cut fir.' (SL2: 27)

g. hɨ ŋif lɨtɨnix ɣe- (< lɨtɨnɨk)
that heart thing_which_was_made take
'Took that thing which was made as one's heart.'[12] (SL2: 28)

h. j-acix ɣe- (< acik)
3SG-younger_sister take
'Kidnapped her younger sister.' (SL2: 40)

i. hɨ ŋajχ xez- (< ŋajq)
that puppy talk
'Talked to that puppy.' (SL2: 55, 60)

j. mɨcix ʁav- (< mɨcik)
breast squeeze
'(She) squeezed her breast.' (SL2: 57)

k. mulx ɣe- (< mulk)
basket take
'Took the basket.' (SL2: 60)

(34) Subject-predicate

a. c^helmix ɣe-jnɨ umgu (< c^helmik)
name marry-INT woman
'The woman whom Chelmik is to marry.' (SL3: 21)

b. aŋakiɾ̥x ʁavr- (< aŋakiɾ̥k)
somebody not_existent
'There was nobody.' (SL1: 12, 45) (SL2: 41)

c. sidʒakiɾ̥x ʁavr- (< sidʒakiɾ̥k)
something not_existent
'There was nothing.' (SL2: 32)

[12] In shamanism one cuts parts of a fir in order to cure diseases.

d. kʰɨsx qoju- (< kʰɨsk)
cat cry
'A cat cried.' (SL2: 3)

Non-application of Velar/uvular spirantization

(35) Subject-predicate
sidʒakiɾ̥k ʁavr-
somebody not_existent
'There was nobody.' (SL1: 41)

(36) Object-predicate

a. verek χaw- ~ verex χaw-
name was_called
'She was called Verek.' (SL3: 10, 11)

b. nenhakiɾ̥k ɣe-
nobody take
'Took nobody.' (SL1: 32)

c. qʰoχtolok χaw-
name was_called
'He was called Qokhtolok.' (SL3: 9)

d. ena kʰɨsk ɣe-
different cat catch
'Caught a different cat.' (SL2: 5)

e. pʰi-oq ɣe-
REF-coat take
'Took his own coat.' (SL2: 5)

f. ŋajq ɣe-
puppy take
'Took the puppy.' (SL2: 60)

(37) Subject-object

a. pilkar tɨmk k^{h}uti rulku-
big hand hole come_into
'A big hand came inside from the hole.' (SL2: 26)

b. k^{h}eq k^{h}e uɣ-
fox net get_into
'The fox got into the net.' (SL2: 16)

(38) Adverb-predicate

a. jaŋgu̥rpak q^{h}o-
how sleep
'How (she) fell asleep' (SL2: 22)

b. ɨ̥rk qal-ʁal-
already becomes_bright (reduplication)
'(It) became already bright.' (SL2: 5)

It is still not clear to me what the decisive factor for the application of Velar/uvular spirantization in such larger domains is. It might be the case that it is a fast speech rule and that in such larger domains speech rate plays a decisive role. I will leave this issue for future research.

The interaction of Velar/uvular spirantization with the Spirantization of Consonant Mutation (Chapter 4) is interesting. When velar or uvular plosives are adjacent across morpheme boundaries, both Velar/uvular spirantization and Spirantization of Consonant Mutation may potentially apply. In fact, Kreinovich (1937: 40) cites examples in which both have applied.

(39)	a.	p^{h}roχ xuŋs	(< p^{h}roq k^{h}uŋs)	'the stomach of a mallard'
	b.	k^{h}eχ ʁarqŋɨlx[13]	(< k^{h}eq qarqŋɨlx)	'the kidney of a fox'
	c.	k^{h}eχ χos	(< k^{h}eq q^{h}os)	'the neck of a fox'

[13] An alternative pronunciation of this form in Kreinovich's description is [k^{h}eχ χarqŋɨlx], in which the initial fricative of the second word is devoiced.

In my data, there is a single instance of Velar/uvular spirantization in a Spirantization context between words: [k^{h}ɨsx kins-ku] 'cat devils' (SL2: 8). In this example, Spirantization does not apply. I leave it for the future to work out whether the differences with Kreinovich's data are accidental or an indication of some fundamental difference in the phonology among speakers. It should be pointed out, however, that the domain of application of the Velar/uvular spirantization is larger than that of Spirantization. While the latter is strictly restricted to specifier-head domain in NP and complement-head domain in VP (Chapter 4), the former may also apply between the subject and predicate, as is demonstrated in the examples in (34). As we will see in Chapter 4 (section 4.3.4), Spirantization never applies between a subject and predicate, even in fast speech. This is a crucial difference which should be noted in considering the nature of the two processes.

2.6 Cliticization

2.6.1 Characteristics

Singular pronouns have phonologically weak forms which need a host to attach to. Most of them are contracted forms of the full forms and meet the criteria of being identified as '(pro)clitics', as we will see below. Clitics of the 1st, 2nd and the reflexive form are formed by the deletion of the vowel from the full form. The 3rd person singular clitic consists of a single vowel which is augmented by the elided nasal /$^{N-}$/ (section 2.4.2, Chapter 4, section 4.4.4).

(40)

	Full form	Clitic
1st person	ɲi	ɲ-
2nd person	c^{h}i	c^{h}-
3rd person	if	i^{N-}
Reflexive	p^{h}i	p^{h}-

These pronominal clitics cliticize at the phrasal level and function either as i) complements (undergoer) of the verb, or ii) attributes (possessor) of the noun. When cliticized, clitics trigger Consonant Mutation of the following consonant. In addition,

/cʰ-/ and /pʰ-/ devoice the following fricative and neutralize the laryngeal contrast in this position.

(41)	a.	pʰ-qʰal	[pʰ-χal]	‘one’s own clan’	(SL1: 11)
	b.	pʰ-qan	[pʰ-χan-gu]	‘one’s own dogs’	(SL2: 6)
	c.	pʰ-vo	[pʰ-fo]	‘one’s own village’	(SL2: 8)
	d.	pʰ-ro-	[pʰ-r̥o-]	‘help oneself’	(SL1: 29)
Cf.	e.	pʰ-r̥o-	[pʰ-r̥o-]	‘betake oneself’	(SL3: 44)

The 3rd person clitic becomes a non-syllabic glide [j] when it cliticizes to a vowel-initial host (see 42d-e, 43l, 44d).

(42) NP

a.	ɲ-ɨmɨk	‘my mother’	(SL3: 17)
b.	cʰ-ɨtɨk	‘your father’	(SL3: 19)
c.	iᴺ-qʰa [i-qʰa]	‘his/her name’	(SL3: 9)
d.	iᴺ-acik [j-acik]	‘his/her younger sister’	(SL2: 40)
e.	iᴺ-ɨmɨk [j-ɨmɨk]	‘his/her mother’	(SL2: 49)
f.	pʰ-χal	‘one’s own clan’	(SL1: 11)

(43) VP

a.	ɲ-ŋarma	‘wait for me’	(FN)
b.	ɲ-ʁaw-	‘gulped me down’	(SL3: 67)
c.	ɲ-r̥o-	‘took myself’	(SL3: 30)
d.	ɲ-ɣoc-	‘pushed me’	(SL3: 49)
e.	ɲ-iɣrɨ-	‘together with me’	(SL1: 7)
f.	cʰ-ŋalagur	‘like you’	(SL3: 38)
g.	cʰ-r̥o-	‘took you’	(SL3: 42)
h.	cʰ-iṛ-	‘talk about you’	(SL3: 63)
i.	cʰ-iɣrɨ-	‘together with you’	(SL1: 7)
j.	iᴺ-ŋarma- [i-ŋarma-]	‘wait for him/her’	(FN)
k.	iᴺ-ŋaliku- [i-ŋaliku-]	‘like him/her’	(SL1: 14)
l.	iᴺ-ar- [j-ar-]	‘feed him/her’	

m.	p^{h}-amxta-	'praise oneself'	(FN)
n.	p^{h}-saŋru-	'train oneself'	(SL3: 51)
o.	p^{h}-iɣ-	'commit suicide (*lit.* kill oneself) (SL1: 34)	

(44) PP

a.	p^{h}-erx	'to oneself'	(SL2: 14)
b.	ɲ-erx	'to me'	(SL3: 66)
c.	c^{h}-ux	'from you'	(SL3: 18)
d.	i^{N}-ax [j-ax]	'causes him/her to~'	(SL3: 23)

(45) Adverbial phrase

p^{h}-sitr̥ (< citr̥) 'by one's own language' (SL3: 64)

The use of the clitic, instead of the full form, is obligatory in the contexts above. A pronominal complement should always be realized as a clitic.[14] A sentence in which the pronominal complement appears in the full form is ill-formed and is rejected by most of my informants (Shiraishi 2004b).[15] Note that in Nivkh there are no morphological case markers which provide case information for complements.

(46) * ɨtɨk if amxta-
father 3SG praise
'Father praised him.' (Shiraishi 2004b: 182)

The consonantal clitics /ɲ-/, /c^{h}-/, /p^{h}-/ are augmented with an epenthetic vowel when the host begins with a consonant cluster. While some of the previous literature regards the pronominal element in such a context as being a full pronoun (e.g. Panfilov 1968: 411), there is phonological evidence to reject this view (Shiraishi 2001). In the first place, these vowels are not stressed, unlike the vowels of the full pronoun.

[14] Unless the pronominal complement is augmented with an emphatic particle, as in
Galik c^{h}i park ŋarma- 'Galik waits only for you.' (FN)
2SG only wait

[15] Full pronouns and clitics are thus complementarily distributed and do not alternate by a phonological rule. These are 'special clitics' according to the classification of clitics by Zwicky (1977).

(47) a. ɲi̥-ˈzŋaj ‘my picture’ (FN)
b. cʰi̥-ˈzŋaj ‘your picture’ (FN)

Second, when the host contains a non-high vowel, the augmented vowel may exhibit vowel harmony and may lower to /e/.

(48) a. ɲi̥-zŋaj ~ ɲɵ-zŋaj ‘my picture’ (FN)
b. ɲɵ-zrovs ‘my nail’ (Kreinovich 1937: 94)
c. pʰɵ-sʁa ‘one’s own money’ (*ibid*.)

Vowels which undergo vowel harmony indicate recessive nuclei (Harris 1997). As is expected, vowels of the full pronominal forms do not exhibit vowel harmony.

(49) cʰi ɾ̥atx vi- (SL1: 21)
2SG where go
‘Where do you go?’

2.6.2 Inalienable/Alienable Possession

With some clitic-host combinations, speaker VI inserts an epenthetic vowel even when the host does not begin with a consonant cluster. Since this vowel is never stressed and often also devoiced, I assume that it is an epenthetic vowel and not the vowel of the full pronominal form.

(50) a. pʰi̥-ˈmur-puks ‘one’s own reins (*lit.* horse belt)’ (SL1: 34)
b. pʰi̥-ˈnaχ ‘one’s own bed’ (SL1: 35)
c. pʰi̥̥-ˈsaqo ‘one’s own knife’ (SL1: 13)
d. pʰi̥̥-ˈcaqo ‘one’s own knife’ (SL2: 4)
e. pʰi̥̥-ˈeɲ ‘one’s own skis’ (SL1: 19, SL2: 6)
f. pʰi̥̥-ˈoq ‘one’s own coat’ (SL2: 4)
g. pʰi̥̥-ˈɲo ‘one’s own storehouse’ (SL2: 8)
h. pʰi̥̥-ˈɾ̥o-jni̥-x-xu ‘one’s own equipments’ (SL2: 40)
i. cʰi̥-ˈolɣoŋ oɣla-gu ‘your pig children’ (SL2: 51)

j. p^{h}i̥-ˈpilkar caqo ‘one’s own big knife’ (SL1: 13)

Interestingly, there is no report of such forms of clitic-host combinations in the literature as far as I know. According to descriptions in previous literature (e.g. Austerlitz 1959), forms such as [p^{h}j̥-ˈeɲ] should surface as [p^{h}-eɲ], especially since the clitic attaches to a vowel-initial host.

On the other hand, there are also combinations in which speaker VI does not insert an epenthetic vowel.

(51) a. ɲ-ɨmɨk ‘my mother’ (SL2: 78)

b. ɲ-ɨtɨk ‘my father’ (SL2: 78)

c. ɲ-oɣla-gu ‘my children’ (SL 2: 35, 54)

d. p^{h}-umgu ‘one’s own wife (*lit.*woman)’ (SL1: 35) (SL2: 62)

e. c^{h}-emar ‘your husband’ (SL2: 35)

f. p^{h}-acik ‘one’s own younger sister’ (SL2: 40)

g. p^{h}-nanak ‘one’s own elder sister’ (SL2: 40)

h. p^{h}-umgu oɣla ‘one’s own daughter’ (SL2: 45)

i. p^{h}-emaɲaχ (< hemaɲaχ) ‘one’s own wife’ (SL2: 62)

j. c^{h}-oɣla-gu ‘your children’ (SL2: 51, 61)

k. p^{h}-oɣla-gu ‘one’s own children’ (SL2: 50, 52, 53, 60, 62)

l. p^{h}-ɲaχ ‘her own eyes’ (SL2: 50)

m. p^{h}-r̥ot (< tot) ‘one’s arms’ (SL2: 59)

n. p^{h}-χan-gu (< qan) ‘one’s own dogs’ (SL2: 6)

o. p^{h}-ŋajχ-xu ‘one’s own puppies’ (SL2: 13, 32)

p. p^{h}-r̥ar̥paklu ‘to oneself’ (SL2: 13)

q. ɲ-laʁa ‘nearby myself’ (SL1: 18)

r. p^{h}-laʁa ‘nearby oneself’ (SL1: 34)

s. p^{h}-fo (< vo) ‘one’s own village’ (SL2: 8, 69)

t. p^{h}-aʁs-ku (< haʁs) ‘one’s own clothes’ (SL2: 23)

u. p^{h}-naχ-tox ‘to her own bed’ (SL2: 34)

v. c^{h}-ux ‘at yours’ (SL2: 51)

x.	pʰ-χal (< qʰal)	‘one’s own clan’	(SL1: 11)
y.	pʰ-fivus (< vivus)	‘one’s own belt (dog)’	(SL2: 60)
z.	pʰ-ɾ̥if (< t̥if)	‘one’s own house’	(SL2: 69)

Whether a given clitic-host combination requires an epenthetic vowel does not seem to be an arbitrary choice. Those hosts which do not require such a vowel consist of kinship terms, body parts and culturally important items such as dogs and houses. In languages which distinguish alienable and inalienable possession by different possession strategies, these are typically items which are inalienably possessed (Nichols 1989). On the other hand, the hosts which require an epenthetic vowel manifest a type of possession which can be terminated and can therefore be regarded as alienable possession.[16]

Additional support for this hypothesis is the fact that the choice of the strategy of possession which this speaker exhibits is in agreement with the cross-linguistic tendency that alienable possession requires more morpho-syntactic material than inalienable possession (‘iconicity’. Cf. Payne 1997: 105). Crucially, speaker VI has epenthesis with alienable possession and no epenthesis with inalienable possession.[17]

The observation above is based on the data of speaker VI alone and this has possibly to do with the large quantity of her data in my sound archive. In the future I would like to check this hypothesis with other informants.

[16] In my data, there is one item which undergoes both strategies: /to-ɾif/ ‘winter house’
[pʰ-ɾ̥o-ɾif] ‘one’s own winter house (*lit*. earth house)’ (inalienable possession. SL2: 46)
[pʰi̥-to-ɾif] ‘one’s own winter house’ (alienable possession. SL2: 6, 11, 32)
[cʰi-to-ɾif] ‘your winter house’ (alienable possession. SL2: 29)

[17] When the clitic and the initial segment of the host are (nearly) homorganic, an epenthetic vowel is inserted even with items which are usually inalienably possessed:
ɲɻ̊-nanak ‘my elder sister’ (compare with [pʰ-nanak] ‘one’s own sister’)

Chapter 3

Nivkh as an Aspiration Language

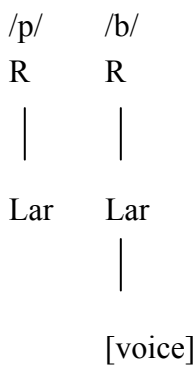
3.1 Introduction

Recent understandings of the laryngeal systems in the world's languages suggest that what has traditionally been regarded as a voiceless/voiced opposition may in fact be expressed by different contrastive features in underlying representations (Harris 1994, Iverson and Salmons 1995, 1999, 2003, Avery 1996, 1997, Jessen 1998, Avery and Idsardi 2001, van Rooy and Wissing 2001, Jessen and Ringen 2002, Iverson and Ahn to appear, etc.). Avery (1996, 1997), for instance, argues that there are three types of laryngeal contrast with respect to the specification of segments involved in the contrast. In his framework, 'voiced obstruents' are manifestations of the following three underlying representations: a) the feature [voice], b) Sonorant Voice (SV) or c) the absence of any laryngeal specification. In the laryngeal contrast which contains segments of the type a), voiced obstruents are the specified (marked) members of the contrast. The feature [voice] is active in the phonology and triggers assimilation of the neighboring sounds. This type of laryngeal contrast is typical of the Slavic and many of the Romance languages. In type b), voiced obstruents pattern with sonorants, the SV node in the hierarchical specification of segment features typically being associated with sonorants. In languages which have this type of segments in the laryngeal contrast, the voicing of obstruents and sonorants are treated alike in phonological processes and constraints. Finally, in type c) voiced obstruents are the unmarked members of the contrast and are unspecified for any laryngeal feature. It is therefore expected that voicing does not play any role in the phonology. There should be no voice assimilations nor constraints which refer to the voicing of obstruents. On the other hand, the opposite member of the contrast is the specified (marked) member and is often enhanced with the feature [spread glottis]. Many of the Germanic languages have this type of laryngeal contrast (e.g. English, Danish, German).

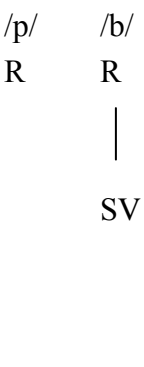
The three laryngeal systems are called Laryngeal Voice (LV), Sonorant Voice (SV) and Contextual Voice (CV), respectively. These are represented below (Avery 1996,

1997).[1]

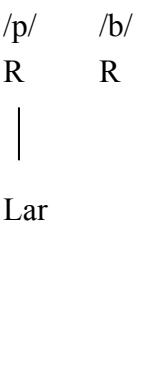
(1) a) LV languages



b) SV languages



c) CV languages



In the literature, LV languages and CV languages are often called 'voice languages' and 'aspiration languages', respectively (Iverson and Salmons 2003, Jansen 2004, etc.).

This chapter examines the laryngeal phonology of WSN and discusses which type of laryngeal system it has. I will discuss various processes which involve laryngeal phonology and propose the most suitable feature specifications for the laryngeal contrast of WSN.

This chapter is organized as follows. Section 3.1.1 gives an overview of the descriptions of laryngeal contrast in Nivkh in previous works. From section 3.1.2 to 3.1.5, I introduce the theoretical framework of this chapter and present candidate representations of laryngeal specifications which account for the laryngeal contrasts of WSN. Section 3.2 describes how laryngeal phonology is realized on the surface within morphemes and section 3.3 deals with cross-morphemes phonology. Section 3.4 discusses the voicing in Nivkh, and begins with an examination of a process of Final Fricative Voicing. This process constitutes a possible counterexample to the hypothesis that laryngeal contrast in WSN is asymmetric. In section 3.4.2, however, I will present data which supports the view that it is not a phonological process. Section 3.5 focuses on the nature of voicing in WSN. I will identify Final Fricative Voicing (FFV) with 'contextual voicing', which is characterized as a phonetic interpolation by the surrounding voiced segments to segments which lack any laryngeal specification. Section 3.5.2 discusses another source of voicing in Nivkh: enhancement. Section 3.5.3 reviews the analysis of Final fricative devoicing of Mattissen (2003), and tests it on data from WSN. Section 3.5.4 compares the restriction that final fricatives should be

[1] 'Lar' stands for 'Laryngeal node' and functions as a docking site for laryngeal features like [voice] and [spread glottis].

voiceless in WSN with final devoicing in other languages. Section 3.5.5 discusses the voicing of fricatives in clusters. Section 3.6 concludes.

3.1.1 The Dual Mechanism Hypothesis vs. Single Mechanism Hypothesis

As seen in Chapter 2, Nivkh obstruents bear a laryngeal contrast which is based on aspiration (plosives) and voicing (fricatives). In the literature, there are two ways to describe this contrast. One way is to describe it as realized on the surface: aspirated plosives vs. non-aspirated plosives and voiceless fricatives vs. voiced fricatives. This is the way which many of the descriptive works practice: Shternberg (1908), Kreinovich (1934, 1937), Panfilov (1962), and Gruzdeva (1999), etc. Such a description is surface-oriented, in the sense that it describes the laryngeal contrast as it is realized on the surface. These authors assume that plosives and fricatives have a different laryngeal contrast: aspiration in plosives and voicing in fricatives. Naturally, there is little or no indication that the two might be connected underlyingly.

The other option is to abstract away from surface realizations and to postulate a single phonological feature that underlies the contrast. Aspiration and voicing are then seen as surface realizations of such an underlying feature. Austerlitz (1956), Jakobson (1957), Hattori (1962ab, 1988) and Blevins (1993) pursue this way. These authors assume that plosives and fricatives have a common feature which expresses the laryngeal contrast at the underlying level. In such a description, it is assumed (often tacitly) that there is a connection between the ways in which laryngeal contrast is realized in plosives and fricatives, in contrast to the surface-oriented descriptions.

The first task of this chapter is to evaluate these two assumptions by testing them on data from WSN. Following Rice (1994), who discusses a similar topic in the Athapaskan languages, I will call the two hypotheses ‘the Dual mechanism hypothesis’ and ‘the Single mechanism hypothesis’, respectively. Using traditional binary features, feature specifications of the segments in both hypotheses are illustrated below.

(2) Dual Mechanism Hypothesis

	p^h	p	f	v
[spread glottis]	+	-		
[voice]			-	+

(3) Single Mechanism Hypothesis

a.	p^h	p	f	v
[spread glottis]	+	-	+	-

or,

b.	p^h	p	f	v
[voice]	-	+	-	+

As illustrated above, the Single mechanism hypothesis may have either [spread glottis] or [voice] as the contrastive feature. The former feature is adopted as the contrastive feature in Blevins (1993). Such a view classifies Nivkh as an aspiration language. On the other hand, authors such as Austerlitz (1956: 262) and Hattori (1962a: 68) use the terms 'fortis' and 'lenis' to describe the laryngeal contrast of obstruents. These authors assume that the aspirated plosives and the voiceless fricatives are the fortis obstruents and the non-aspirated plosives and the voiced fricatives the lenis obstruents. This classification of the obstruents is also present in Jakobson's description of Nivkh phonology (Jakobson 1957). Jakobson postulates the features [strong] and [weak] and assigns aspirated plosives and voiceless fricatives the feature [strong], and non-aspirated plosives and voiced fricatives the features [weak]. Fortis obstruents are also called 'tense' and are characterized by the length of sounding period, greater strength of the explosion or stronger air flow (Jakobson, Fant and Halle 1965: 36, Jakobson and Waugh 1987: 140). On the other hand, lenis obstruents are 'lax' and lack the characteristics of the fortis obstruents.

The Single mechanism hypothesis and the Dual mechanism hypothesis make different predictions with respect to laryngeal phonology. The Single mechanism hypothesis groups aspirated plosives with voiceless fricatives (fortes), and non-aspirated plosives with voiced fricatives (lenes). Therefore, it is expected that obstruents of each group pattern together. On the other hand, the Dual mechanism hypothesis does not make such groupings. Accordingly, it allows plosives and fricatives to pattern independently of each other. We note that the Dual mechanism hypothesis is weaker in its predictions.

In what follows, I will test these hypotheses on data from WSN. From the discussions, it will become clear that it is the Single mechanism hypothesis that should

be adopted. The data of WSN reveal that obstruents behave in the way predicted by this hypothesis: aspirated plosives pattern with voiceless fricatives and non-aspirated plosives with voiced plosives.

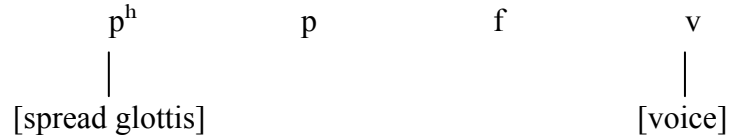
The next question is which of the two candidate features, [spread glottis] and [voice], underlies the laryngeal contrast. I discuss various phenomena in the laryngeal phonology and conclude that [spread glottis] is the contrasting feature. This leads us to the conclusion that Nivkh is an aspiration language.

3.1.2 Symmetric vs. Asymmetric Contrast

A related topic which I will discuss in this chapter concerns the type of contrast. In the previous section, laryngeal contrast is represented with binary features which are fully specified for both members of the contrast (+/-). An alternative way to represent contrast is to use unary features. Using unary features, one member of the contrast is selected as the specified (marked) member of the contrast. On the other hand, the opposite member is not specified at all and comprises the unmarked member of the contrast. With unary features, contrast is always asymmetric. The members in the contrast are either specified or unspecified for that feature. The idea behind this use of unary features in contrast is that phonological contrast is inherently asymmetric (Dresher, Piggott and Rice 1994, Avery 1996, 1997, Avery and Idsardi 2001 etc.). This idea is practiced in Avery's representation of laryngeal systems in (1) above in which all features are unary.

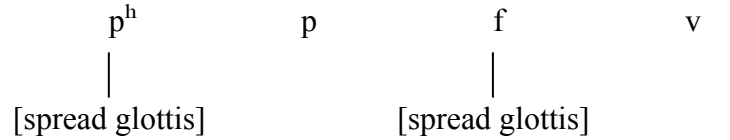
Using unary features, the laryngeal contrast of the Single and Dual mechanism hypotheses are represented below.

(4) Dual mechanism hypothesis



(5) Single mechanism hypothesis

a.



or,

b. p^h p f v

[voice] [voice]

As for Nivkh, there is no discussion of asymmetry in the laryngeal contrast in previous works, with the exception of Jakobson (1957) and Blevins (1993). Many authors take it for granted that the members of the contrast enter into the contrast with equal phonological strength (X/Y). Whether the contrast is symmetric or asymmetric will be discussed in the subsequent sections.

3.1.3 Symmetric vs. Asymmetric Contrast: Diagnostics

I adopt two diagnostics in discussing the mode of laryngeal contrast in WSN. These are 'phonological inertness' and 'dimensional invariance'.

Diagnostic 1: Phonological inertness

If a feature specification (+/-) in a contrast is never referred to by any phonological rule or constraint, that feature is said to be inert in the phonology of that language. This implies that the feature value is invisible to phonology and provides strong evidence that the segment is unspecified for that feature. Put differently, for a feature to be specified in underlying representations, there should be evidence in the phonology that it is present (active). In particular, there should be phonological processes or constraints which refer to it.

Diagnostic 2: Dimensional invariance

Segments which are in a phonological contrast often exhibit asymmetric behavior as regards the surface realization of phonetic cues. For instance, one member of a contrast may exhibit stable acoustic/auditory cues in a large number of contexts, while the opposite member lacks such stable phonetic cues and varies in surface realization depending on the context. When there is such an asymmetry, the stable member is said to exhibit 'dimensional invariance' (Avery and Idsardi 2001: 50).

The contrast between sounds such as /p/ and /b/ in English provides an example. In onset position before a stressed syllable, the cues for /p/ are consistent, marked by the presence of aspiration. On the other hand, /b/ is sometimes fully voiced, sometimes

partially voiced, and sometimes completely voiceless (Docherty 1992, Avery and Idsardi 2001). Using unary features, such an asymmetry can be represented by appointing the stable segment as the specified member, and the unstable segment as the unspecified member. Without any specification, the surface realization of the unspecified member largely depends on the surrounding segments. Returning to the example of English, /p/ is the specified member of the contrast and /b/ its unspecified counterpart.

3.1.4 Modified Contrastive Specification

The asymmetric specification of contrastive features and the diagnostics introduced above are the theoretical assumptions of a version of underspecification theory, Modified Contrastive Specification (henceforth MCS), which is advocated by phonologists of the Toronto School of Contrast (Dresher, Piggott and Rice 1994, Avery 1996, 1997).

MCS asserts that there is a strong connection between i) phonologically specified features which are responsible for the underlying contrast in the segmental inventory of the language, and ii) the visibility of such features in the phonological phenomena. The unmarked member of a contrast is unspecified for that feature and is therefore expected to be inert in the phonology. Continuing with the example of /p/ and /b/ in English, MCS predicts that there should be no phonological rules or constraints which refers to the laryngeal specification of /b/, since it is the unmarked (unspecified) member of the contrast.

MCS differs from other underspecification theories in some crucial ways. With respect to Contrastive Underspecification (Steriade 1987 etc.), MCS differs on the point that all features are strictly unary, at least in the lexical phonology. In contrast, in Contrastive Underspecification the contrastive features are binary, i.e. both values can be specified at the underlying level.

From Radical Underspecification (Kiparsky 1982, Pulleyblank 1983, Archangeli 1984, 1989 etc.), which also assumes unary features at the underlying level, MCS differs in the availability of the unspecified feature value in the phonology. Like MCS, Radical Underspecification leaves the opposite value of the marked member in a contrast unspecified in underlying representations. Nonetheless, the unmarked member can be introduced in the course of derivation by so-called ‘complement rules’. This latter option is not available in MCS.

In this chapter, I will pursue the assumptions of MCS introduced above throughout the discussions.

3.1.5 Summary

To sum up, the following questions are pertinent to the discussions in this chapter.

1. Single vs. Dual mechanism hypothesis?
   Do plosives and fricatives pattern together in the laryngeal phonology, or do they pattern independently?

2. Aspiration or voice?
   Is it [spread glottis] which is contrastively used in the laryngeal system, or is it [voice]?

3. Symmetric or asymmetric contrast?
   Is the laryngeal contrast symmetric or asymmetric? Is one member in a contrast inert in the phonology of WSN, and/or does it lack stable phonetic cues throughout a large number of contexts?

3.2 Laryngeal Phonology within Morphemes

In this section I examine the way laryngeal phonology is realized on the surface in WSN. I begin with laryngeal phonology in monomorphemic words.

In WSN, obstruents show a laryngeal contrast in word-initial position.[2] The surface realization of laryngeal phonology is unpredictable in this position. In non-initial positions, laryngeal contrast is suspended; the surface realization of laryngeal phonology is predictable from the context.

The examples below are minimal pairs which differ in the laryngeal settings of the initial obstruent.

(6)	a.	pʰaχ	‘window’	paχ	‘stone’
	b.	tʰu	‘sledge’	tu	‘lake’
	c.	kʰeŋ	‘sun’	keŋ	‘whale’
	d.	fi-	‘dwell’	vi-	‘go’
	e.	r̥a-	‘bake’	ra-	‘drink’

[2] This is also the case with other dialects of the Continental Amur group (Kreinovich 1934: 297, Jakobson 1957: 83, Panfilov 1962: 9, etc.).

	f.	xe-	‘put on clothes’	ɣe-	‘get, buy’

In medial positions, plosives are voiceless and non-aspirated unless preceded by sonorants.

(7)	a.	atak	‘grandfather’	(SL3: 50)
	b.	ɨkɨn	‘brother’	(SL3: 56)
	c.	kikun	‘eagle-owl’	(FN)
	d.	ŋɨki	‘tail’	(FN)
	e.	caqo	‘knife’	(SL2: 4)
	f.	utku	‘man’	(SL1: 33)
	g.	t^{h}ɨtŋɨs	‘roof’	(SL2: 24)
	h.	kutli-x	‘from outside’	(SL3: 23)

When preceded by sonorants, plosives are voiced to some degree. This voicing is strongest after nasals (section 3.3.1).

(8)	a.	umgu	‘woman’	(many examples throughout SL1-3)
	b.	andʒi	‘again’	(many examples throughout SL1-3)
	c.	p^{h}ɨŋgaj-	‘prepare food’	(SL2: 50)
	d.	cɨŋgi	‘the place name Ten’gi’	(SL3: 3)
	e.	tɨlgu-	‘tell a story’	(SL2: 64)
	f.	nɨjda	‘the place name Nyida’	(SL3: 12)
	g.	ojdom	‘baby’	(SL1: 40)

Fricatives are voiced in medial positions (9), unless adjacent to plosives (10). When adjacent to plosives, fricatives are voiceless.

(9)	a.	ŋɨzit	‘folktale’	(SL3: 50)
	b.	k^{h}uɣi	‘Ainu’	(SL3: 15)
	c.	lɨɣi	‘salmon’	(FN)
	d.	χaza	‘scissors’	(FN)
	e.	hava-	‘open the mouth’	(SL3: 66)
	f.	c^{h}ari	‘bog bilberry’	(SL3: 34)
	g.	olɣoŋ	‘pig’	(SL2: 51)

	h.	fulvul-	‘creep’	(SL2: 59)
	i.	eŋvak	‘flower’	(FN)
	j.	ojra	‘juniper’	(SL3: 30)
	k.	e-zmu-	‘to like’	(FN)
	l.	urla	‘good’	(SL2: 37)
	m.	paʁla	‘red’	(SL3: 38)
	n.	e-rʁap-	‘touch’	(SL2: 78)
	o.	azri-	‘carefully’	(SL2: 25)
	p.	ɨɣrɨki	‘once upon a time’	(SL3: 3)

(10)	a.	muɽ̥ki	‘horn’	(FN)
	b.	uski	‘corridor’	(SL3: 23)
	c.	oχcol	‘hand’	(Pukhta 2002: 68)
	d.	noqsi	‘the place name Noksi’	(SL3: 9)

The voicing of medial fricatives is observed in loanwords as well. Intervocalic voiceless fricatives are replaced in Nivkh by voiced ones.

(11)			Original language[3]	Nivkh		
	a.	ixa	(Nanai)	eɣa	‘cow’	(FN)
	b.	joxa	(Nanai)	joɣa	‘cotton’	(SL2: 62)
	c.	sisam	(Ainu)	sezam	‘Japanese’	(Pukhta 2002: 74)

In final position, plosives are voiceless. Aspiration may or may not be heard, but it is not as significant as in initial position.

(12)	a.	ɨtɨk	‘father’	(SL3: 4)
	b.	tot	‘arm’	(FN)
	c.	nonoq	‘puppy, cub’	(SL3: 58)
	d.	tʰɨt	‘morning’	(SL1: 7)

[3] The source of the original forms is Hattori (1955).

Fricatives are voiceless in final position.

(13)	a.	c^hxɨf	'bear'	(SL1: 7)
	b.	lɨx	'sky/weather'	(SL1: 20)
	c.	als	'berry'	(SL3: 71)
	d.	kins	'devil'	(SL1: 11)
	e.	tolf	'summer'	(SL3: 45)
	f.	aŋχ	'female bear'	(SL3: 46)

Like fricatives in medial clusters (10), fricatives in final clusters are voiceless when adjacent to a plosive.

(14)	a.	hisk	'nettle'	(SL2: 54)
	b.	huxt	'dressing-gown'	(SL2: 11)
	c.	c^hesq	'net'	(SL2: 15)
	d.	otx	'excrement'	(SL1: 22)
	e.	c^hacf	'swamp'	(FN)

When fricatives precede a sonorant or a fricative in clusters, they are voiced.

(15)	a.	k^harŋ	'ice'	(SL2: 3)
	b.	ɨvɲ	'oar'	(SL2: 74)
	c.	sizm	'Japanese'	(SL3: 13)
	d.	lavs	'mat'	(SL2: 33)
	e.	haɣs	'clothes'	(SL2: 23)
	f.	ŋazf	'bowel'	(FN)

To sum up, both plosives and fricatives show a laryngeal contrast word-initially, but in non-initial position the contrast is suspended. In this respect, they pattern together and thus provide support for the Single mechanism hypothesis. In contrast, this does not immediately follow from the feature specifications assumed in the Dual mechanism hypothesis, in which it is a coincidence that plosives and fricatives pattern together with respect to the position of contrast. The surface realization of laryngeal contrast seen above therefore provides an argument in favor of the Single mechanism hypothesis.

3.3 Laryngeal Phonology across Morpheme Boundaries

This section describes the laryngeal status of obstruents under the influence of surrounding segments in morphological concatenations.

When morphemes are concatenated, laryngeal features are often affected by laryngeal settings of the surrounding segments. A closer look reveals, however, that not all obstruents are equally affected. The most vulnerable ones are non-aspirated plosives and voiced fricatives. On the other hand, aspirated plosives and voiceless fricatives are hardly affected, and remain unchanged in most of the contexts. I will illustrate this difference below with examples from two processes, post-nasal voicing and the devoicing of word-initial voiced fricatives.

3.3.1 Post-Nasal Voicing

Nasals induce voicing of the following plosive. This voicing, however, targets only non-aspirated plosives (16). Aspirated plosives and voiceless fricatives do not undergo voicing (17).

(16)	a.	tɨf	'house'	qan dɨf	'doghouse'	(SL2: 33)
	b.	pɨɲx	'soup'	ɲiŋ bɨɲx	'our soup'	(FN)
	c.	tɨf	'house'	ɲiŋ dɨf	'our house'	(SL3: 49)
	d.	coŋ̥	'head'	qan dʒoŋ̥	'head of dog'	(SL1: 22)
	e.	paɾ̥k	'only'	aŋ baɾ̥k	'who?'	(SL3: 26)
(17)	a.	q^hal	'clan'	pal-ŋ q^hal	'clan of mountains'	(SL2: 38)
	b.	q^hal	'clan'	pila von q^hal	'the clan of Pilavon'	(SL1: 11)
	c.	k^hiri	'urine'	qan k^hiri	'urine of dog'	(SL1: 21)
	d.	p^huf	'saw'	ɲiŋ p^huf	'our saw'	(FN)
	e.	t^hi	'ray'	keŋ t^hi	'sun ray'	(S&T 1970: 381)
	f.	t^hxɨrp-	'forget'	ɲiŋ t^hxɨrp	'forget us'	(SL3: 64)
	g.	q^haχ	'spear'	ɲiŋ q^haχ	'our spear'	(FN)
	h.	fitis	'blanket'	ɲiŋ fitis	'our blanket'	(FN)
	i.	ɾ̥ɨ	'door'	ɲiŋ ɾ̥ɨ	'our door'	(FN)

In fact, aspirated plosives and voiceless fricatives do not undergo voicing even in the most 'voicing-friendly' contexts, i.e. when surrounded by vowels and sonorants

(18)	a.	smo-	'like'	muvi smo-	'like porridge'	(SL3: 19)
	b.	t^hni-[4]	'see'	imɣu t^hni-	'see them'	(SL2: 3)

3.3.2 Devoicing of Word-Initial Voiced Fricatives

While there is no process of laryngeal phonology which affects voiceless fricatives (e.g. voicing) in WSN, there is a process which affects the voicing of voiced fricatives. The pronominal clitics /p^h-/ and /c^h-/ trigger devoicing of the following voiced fricative (Chapter 2, section 2.6).

(19)	a.	vo	'village'	p^h-fo	'one's own village'	(SL3: 5)
	b.	vivus	'belt'	p^h-fivus	'one's own belt'	(SL2: 60)

3.3.3 Dimensional Invariance

The examples above exhibit an interesting asymmetry of obstruents. While the laryngeal phonology of non-aspirated plosives and voiced fricatives is affected by the surrounding segments, that of aspirated plosives and voiceless fricatives is not. This is an instance of dimensional invariance; aspirated plosives and voiceless fricatives exhibit invariance, whereas non-aspirated plosives and voiced fricatives do not.

Dimensional invariance can be captured by the Single mechanism hypothesis and the classification of obstruents into fortes and lenes (Austerlitz 1956, Jakobson 1957, Hattori 1962a). Fortis obstruents are the marked members of the contrast, whereas lenis obstruents are the unmarked (unspecified) members. Being unspecified for laryngeal features, it is predicted that the latter segments are vulnerable to influences from surrounding segments.

In contrast, dimensional invariance is difficult to capture in the feature specifications of the Dual mechanism hypothesis. This is because this hypothesis posits distinct features for plosives and fricatives. In this hypothesis, obstruents which exhibit

[4] This form is [n̥i-] in other dialects.

dimensional invariance do not share feature specifications: fortis obstruents are [+spread glottis] (/p^h/) and [-voice] (/f/), and lenis obstruents are [-spread glottis] (/p/) and [+voice] (/v/). If these feature specifications are assumed, it is inevitable that the relation between specific sets of obstruents and their properties (dimensional invariance) is arbitrary. In contrast, if the feature specifications of the Single mechanism hypothesis are assumed, this relation is a natural one.

3.3.4 Consonant Mutation

The next process which I will discuss is Consonant Mutation (to be discussed in detail in Chapter 4). Consonant Mutation (CM) is a process in which the initial obstruent of a morpho-syntactic constituent either undergoes Spirantization or Hardening in specific phonological and morpho-syntactic contexts. The inputs and outputs of CM are illustrated below.

(20)

Input sequences		Output sequences
Vowel - Plosive	>	Vowel - Fricative
Glide - Plosive	>	Glide - Fricative
Plosive - Plosive	>	Plosive - Fricative
Fricative - Fricative	>	Fricative - Plosive
Nasal - Fricative	>	Nasal - Plosive

Examples of CM are listed below. In the examples in (21), the initial obstruent of the allative marker /-roχ/ exhibits alternation, depending on the preceding segment. In (22) and (23), it is the initial obstruent of the second constituent of the NPs and VPs which alternates.

(21)

a.	tu-roχ	'to the lake'	(SL2: 15)
b.	tɨj-roχ	'to the tundra'	(SL2: 17)
c.	ŋajq-roχ	'to the puppies'	(SL2: 57)
d.	c^{h}aχ-toχ	'to the water'	(SL2: 58)
e.	qan-doχ	'to the dog'	(FN)

(22)

a.	t^{h}om	'fat'	c^{h}o o̥m	'fish fat'	(FN)
b.	c^{h}o	'fish'	lɨɣi so	'salmon'	(FN)

	c.	cif	'trace'	p^h-ɨtɨk zif	'father's trace'	(SL1: 9)
	d.	tɨf	'house'	Galik rɨf	'Galik's house'	(FN)
(23)	a.	xu-	'kill'	c^hxɨf k^hu-	'kill a bear'	(SL1: 7)
	b.	fi-	'dwell'	vo ŋaqr̥ p^hi-	'dwell in a village'	(SL1: 7)
	c.	xu-	'kill'	aŋ k^hu-	'kill whom?'	(SL3: 21)
	d.	r̥xɨrp-	'forget'	ŋiŋ t^hxɨrp-	'forget us'	(SL3: 64)

Laryngeal phonology interacts with CM in the following way: aspirated plosives alternate with voiceless fricatives, and non-aspirated plosives alternate with voiced fricatives. There are no instances of aspirated plosives alternating with voiced fricatives, or non-aspirated plosives alternating with voiceless fricatives.[5] This is a strict condition on CM which every dialect of Nivkh observes.

Again, we observe the same grouping of obstruents as seen in the previous sections: aspirated plosives with voiceless fricatives, and non-aspirated plosives with voiced fricatives. As discussed earlier, it is the Single mechanism hypothesis which captures these relations correctly. In this hypothesis, it follows from the specification of features that aspirated plosives pattern with voiceless fricatives, and non-aspirated plosives with voiced fricatives. These are the obstruents which share laryngeal feature specifications.

In contrast, the Dual mechanism hypothesis fails to capture this relation. In this hypothesis, it would have to be stipulated that the change of continuancy in CM accompanies a simultaneous change of laryngeal specification: [+spread glottis] > [-voice] (/p^h/ > /f/) and [-spread glottis] > [+voice] (/p/ > /v/). Such a stipulation is unavoidable since the relation between, say, aspiration and voicelessness is an arbitrary one in this hypothesis. With the same descriptive power, one could easily describe a mutation pattern in which aspirated plosives change to voiced fricatives, and non-aspirated plosives to voiceless fricatives. Such a pattern is attested in none of the Nivkh dialects, just as predicted by the Single Mechanism hypothesis, in which there is no way to describe such a mutation pattern. The Single mechanism hypothesis provides us with such a representation of features.

The discussions so far provide arguments in favor of the fortis/lenis classification of obstruents, and the Single mechanism hypothesis which captures this classification correctly. In the next section, however, I will discuss a process which seems to

[5] An exception is when non-aspirated plosives are preceded by tautosyllabic aspirated plosives (Clitics. See Chapter 2, section 2.6.1). This exception is due to syllable phonotactics.

contradict the conclusion so far.

3.4 Final Fricative Voicing

3.4.1 Description

There is one phonological process which contradicts the predictions of the Single mechanism hypothesis. This is a process which I will call Final Fricative Voicing (FFV).

In the Amur dialect, word-final fricatives surface as voiced when followed by vowels, sonorants and voiced fricatives. This process is also described in the earliest sources of the language and is called 'alternation of the final sounds' (e.g. Kreinovich 1937: 36).

(24)	a.	tɨf	'house'	tɨv-ux	'at house'	(SL3: 36)
	b.	kins	'devil'	kinz it-	'go insane'	(SL2: 26)
	c.	tɨf	'house'	tɨv ɲaqr̥	'one house'	(SL1: 27)
	d.	cʰxɨf	'bear'	cʰxɨv lɨj-	'kill bear'	(SL1: 7)
	e.	als	'berry'	alz ŋa-	'gather berries'	(SL2: 47)
	f.	tʰulf	'winter'	tʰulv vo	'winter village'	(FN)
	g.	ɲo-rχ	'to a storehouse'	ɲo-rʁ vi-r̥	'go to a storehouse'	(SL2: 34)
	h.	ɲaχ	'eye'	ɲaʁ vɨj	'under the eye'	(Pukhta 2002: 70)

Of the obstruents, only voiced fricatives trigger FFV. The fact that non-aspirated plosives do not trigger FFV is striking (25) since in the phonological processes seen so far, voiced fricatives and non-aspirated plosives have always patterned together.

(25)	a.	tɨf	'house'	tɨf coŋx	'corner of the house'	(SL2: 76)
	b.	cus	'meat'	cus pɨŋx	'meat soup'	(FN)
	c.	kɨlkar̥	'long'	kɨlkar̥ tɨf	'a very long house'	(SL3: 50)
	d.	coŋr̥	'head'	i-coŋr̥ po-	'hold its head'	(SL3: 51)
	e.	cʰxɨf	'bear'	cʰxɨf coŋr̥	'the head of a bear'	(SL3: 54)
	f.	als	'berry'	paʁla als povu-	'chew cowberries'	(SL3: 36)

g.	$c^haχ$	‘water’	$c^haχ$ ta-	‘drink water’	(SL2: 15)
h.	ŋif	‘heart’	ŋif qo-	‘the heart hurts’	(SL2: 30)
i.	paχ	‘rock’	paχ pal	‘rock-mountain’	(SL1: 38)

(26)

a.	$t^hɨtŋɨs$	‘roof’	$t^hɨtŋɨs$ $t^hxɨ$	‘on the roof’	(SL1: 42)
b.	ŋaf	‘thigh’	ŋaf p^huks	‘the belt on the thigh’	(SL2: 80)
c.	tɨf	‘house’	tɨf r̥ɨ	‘main door’	(FN)
d.	-ux	locative	miv-ux xau-	‘dry on the ground’	(SL2: 15)
e.	c^haf-c^hava-		(reduplication)	‘get drenched’	(SL1: 21)
f.	haŋrmas ‘gimlet’		haŋrmas k^hez-	‘told the gimlet’	(SL1: 21)

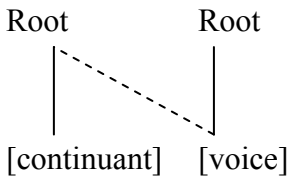
g. qan otχ $t^hnɨ$- (SL1: 22)
dog excrement see
‘(He) saw an excrement of a dog.’

h. c^haf r̥ɨ-xik-roχ mɨr- (SL1: 23)
whetstone door-on-ALL climb
‘The whetstone (anthropomorphized) climbed on the door’

In order to single out voiced fricatives as triggers of FFV to the exclusion of other obstruents, we need a laryngeal specification which is unique to voiced fricatives. Obviously, this is not possible in the Single mechanism hypothesis. No matter whether we assume [spread glottis] or [voice] as the contrastive feature, there is no way in the Single mechanism hypothesis to single out voiced fricatives to the exclusion of other obstruents.

In contrast, the Dual mechanism hypothesis is able to do this. In this hypothesis, voiced fricatives are the only obstruents with the specification [voice]. Accordingly, FFV can be described as regressive voice assimilation of word-final fricatives to the following [voice] segment.

(26) Regressive voice assimilation



The question is whether FFV is indeed an instance of voice assimilation. A closer look on the process reveals that FFV has characteristics which differ from typical cases of voice assimilation in other languages.

First, FFV is triggered not only by voiced fricatives but also by vowels and sonorants, as mentioned above. Recent understanding of regressive voice assimilation is that it is operative only in languages which have phonologically active [voice] (Iverson and Salmons 1995, 1997, Avery 1996, 1997, Avery and Idsardi 2001, van Rooy and Wissing 2001, Wetzels and Mascaró 2001, etc.). This means that in order to activate voice assimilation, the feature [voice] should be present as a contrastive feature in the triggering segment. This is an idea which is associated with the observation that regressive voice assimilation is closely related with prevoicing (negative voice onset time) (Westbury 1975, Kohler 1984).

The fact that non-contrastive voicing of sonorants also trigger FFV is not in concordance with such typical cases of voice assimilation as in, for instance, Russian or Dutch. In these languages voiced obstruents trigger voice assimilation, but sonorants do not.[6, 7]

(27) Russian (Padgett 2002: 2)

a.	ot-stupit$_j$	'step back'
b.	od-brosit$_j$	'throw aside'
c.	ot-jexat$_j$	'ride off'
d.	s-prosit$_j$	'ask'
e.	z-delat$_j$	'do'
f.	s-jexat$_j$	'ride down'

(28) Dutch (Heemskerk and Zonneveld 2000)

a.	meetband	[db]	'tape-measure
b.	dwars draad	[zd]	'cross-wire'
c.	kasboek	[zb]	'cash book'

[6] To be precise, in Dutch only voiced plosives trigger regressive voice assimilation. Voiced fricatives do not (see section 3.4.8 below).

[7] This does not hold for all dialects of Dutch. In West-Flemish and Limburgian Dutch, final obstruents are voiced when followed by vowels or sonorants: dat men[z] is 'that man is' (< /mens/ 'man'), ze[z] jaar 'six years' (< /zes/ 'six') (cf. de Schutter and Taeldeman 1986).

d.	prijslijst	[sl]	*prijz lijst[8]	'price list'
e.	lachlust	[xl]	*laɣlust	'inclination to laugh'

The different behavior of sonorants and obstruents as triggers of voice assimilation can be explained by looking at the segmental inventory of these languages. While voicing of obstruents is used to express a phonological contrast, voicing of sonorants is not. In the latter, voicing is not used contrastively and therefore plays no role in voice assimilation. FFV differs from voice assimilation in these languages since the non-contrastive voicing of vowels and sonorants triggers FFV as well.

Second, FFV targets fricatives but leaves plosives intact. Plosives in final positions do not undergo voicing in the same contexts in which fricatives do.

(29) a. tʰɨtŋis (SL1: 42)
'roof'

b. tʰomo xutɨk-ux (SL2: 24)
skylight hole-LOC
'in the skylight'

c. tʰut-ux (SL1: 12)
fire-LOC
'on the fire'

d. kʰɨsk ɲaqr (SL2: 4)
cat one
'one cat'

e. mackilk oɣla-ɣu (SL3: 54)
little child-PL
'little children'

Again, this contrasts with voice assimilation in Dutch and Russian. In these languages, voice assimilation targets plosives and fricatives equally (see the examples (27)a-b, d-e, and (28)a-c above). Thus, in order to identify FFV as an instance of voice assimilation,

[8] I owe these negative judgments to my Dutch colleagues in the department (University of Groningen).

we have to explain why plosives and fricatives are treated differently in WSN, unlike Russian or Dutch.

3.4.2 The Nature of FFV

In understanding the nature of FFV, the observation that it is sensitive to non-contrastive voicing is crucial. The prediction of the Modified Contrastive Specification is that processes of phonology have access only to features which are used contrastively in the segmental inventory (section 3.1.4). Non-contrastive features, on the other hand, are not visible to the processes of phonology. The fact that non-contrastive voicing of sonorants triggers FFV suggests that FFV might not be a phonological process at all. If FFV is indeed not phonological, we can maintain the hypothesis that voicing is inert during the phonology of WSN.

There is independent evidence which indicates that FFV might not be a phonological process. A closer look at this process reveals that it has characteristics which are typical of so-called 'fast speech' processes. Notably, FFV is not sensitive to syntactic boundaries. This is in sharp contrast with, for instance, Consonant Mutation. The maximal domain of CM consists of constituents which span specifier-head (NP) or complement-head (VP) (Chapter 4). In contrast to FFV, CM never overrides this domain even in fast speech; it does not apply across subject-predicate or subject-object boundaries (see the examples in Chapter 4, section 4.3.4).

In contrast, FFV may expand its domain of application in fast speech. While the complement-head (VP) and specifier-head (NP) domain provides the typical domain of application of FFV, there are also instances of FFV applying in larger domains. In the recordings which I have made, FFV often applies across subject-predicate, subject-object or NP-adverb boundaries. This is in sharp contrast with CM, which never applies across these boundaries (Chapter 4 section 4.3.4). CM strictly observes its maximal domain of application, even in fast speech.

(30) Subject-predicate

a. vulvulu c^{h}xɨv jiv-ra (< c^{h}xɨf) (SL1: 9)
black bear be-HILI
'There was a black bear.'

b. haŋrmaz ŋarma- (< haŋrmas) (SL1: 21)
gimlet wait
'The gimlet (anthropomorphized) waited for (someone).'

c. iv j-ama-ŋan (< if) (SL2: 26)
3SG INDEF-look-when
'When he looked at it.'

d. alz jiv- (< als) (SL3: 38)
berry exist
'There were berries.'

(31) Subject-object

iv ɲ-ŋamac ɣe- (< if) (SL1: 29)
3SG 1SG-slough take
'She took my slough away.'

(32) NP-adverb (or adverb-NP)

a. …ŋɨcɣ niɲaq… (< ŋɨcx) (SL2: 57)
foot for_a_while
'(She dried her) feet for a while.'

b. nav j-oɣla oɣla… (< naf) (SL3: 58)
now 3SG-child child
'Now, her grandchild…'

c. iv jaŋgur nɨ- (< if) (SL1: 14)
3SG how do
'How did he?'

d. iv nana p^hu- (< if) (SL1: 42)
3SG as_soon_as go_out
'As soon as she went out,'

The difference in speech rate sensitivity seems to indicate a critical difference between the two processes. In theoretical frameworks such as Lexical Phonology and Prosodic

Phonology, speech rate sensitivity is one of the diagnostics which differentiates processes from each other (e.g. Mohanan 1982, Kaisse 1991). The observation that CM does not enlarge its maximal domain of application in fast speech supports the view that it is a phonological process.[9] In contrast, FFV is not strictly bound to a specific domain. It applies whenever the target fricative and the trigger are pronounced successively. This receives a natural account if we regard FFV as a process which occurs close at the surface level.

Another difference between FFV and CM is the restriction on the target lexicon. As we will see in Chapter 4 (section 4.4.3), CM does not apply to recent loanwords (mainly from Russian): [c^{h}o konserf] 'fish can (Russian *konservy* 'can')' *[c^{h}o xonserf]. In contrast, FFV may apply to recent loanwords: [caz-ux] 'hour-LOC' (Russian *chas* 'hour'. Jakobson 1957: 83). The fact that FFV does not have a restriction on the target lexicon can be accounted for if we regard it as a process which applies automatically whenever the phonological context of the process is met.

The Single mechanism hypothesis with [spread glottis] as the active feature captures this qualitative difference between the two processes in the representation. Being a phonological process, it is the contrastive feature [spread glottis], which is visible to CM. Recall that laryngeal specifications interact with CM: fortis plosives alternate only with fortis fricatives and lenis plosives only with lenis fricatives (section 3.3.4). In contrast, FFV is associated with voicing of sonorants, which is non-contrastive in Nivkh. In addition, FFV is not bound to a specific syntactic domain, unlike CM. These observations are in agreement with the proposed representation of the Single mechanism hypothesis which has only [spread glottis] as the contrastive feature. In this representation of contrast, there is no reference to voicing at the underlying level. Accordingly, it predicts that processes which are associated with voicing, such as FFV, are non-phonological.

This analysis enables us to maintain the assumption of MCS that phonological processes have access only to features which are used contrastively in the segmental inventory. Processes of laryngeal phonology and the distribution of laryngeal contrast in WSN show that this feature is [spread glottis]. On the other hand, FFV, a processes associated with voicing, exhibits characteristics which differ substantially from CM. In the current analysis, this difference is encoded in the representation of the underlying contrast of segments, but crucially, not by stipulating each rule as such.

[9] In Chapter 4, I discuss other characteristics of CM which indicate its phonological nature, such as non-derived environment blocking.

From these discussions, it became obvious that FFV does not pose problem for the proposed hypothesis of laryngeal contrast. Rather, it provides arguments for the assumptions of MCS with respect to voicing in WSN.

3.4.3 Summary

From the discussions in the sections above, we arrive at the conclusion that [spread glottis] is the contrasting feature in the laryngeal system of WSN. In contrast, [voice] is not present at the underlying level since there is no evidence in the phonology of WSN which argues for its presence. In the current analysis, aspirated plosives and voiceless fricatives are the specified members of the contrast. This specification is also supported by dimensional invariance. These two obstruent types are hardly influenced by the surrounding sounds, and exhibit stable acoustic/auditory cues among large number of contexts. These arguments all provide support for the Single mechanism hypothesis, with [spread glottis] as the contrastive feature.

Note that in this hypothesis, non-aspirated plosives and voiced fricatives are unspecified for any laryngeal feature at the underlying level. However, these segments surface as voiced in a number of contexts (section 3.2, 3.3). This is especially the case with fricatives, which undergo FFV. In the previous discussions, we saw that FFV, and the voicing associated with it, could not be phonological. In what follows, we compare FFV with voicing in other contexts and discuss the nature of voicing in fricatives in more detail.

3.5 Voicing in Nivkh

3.5.1 FFV as Contextual Voicing

The discussions in the previous sections make clear that fricatives are specified for laryngeal features only in a single context, viz. word-initially, when they are contrastively fortis. In all other contexts, fricatives lack any laryngeal specification at the underlying level. These contexts are: a) word-initially when they are contrastively lenis, b) in medial position and c) in final position. In a), lenis fricatives are in phonological contrast with fortis fricatives by virtue of having no laryngeal specification at all (asymmetric contrast). In non-initial position, there is no laryngeal contrast and thus no underlying specifications of laryngeal features.

Being unspecified for any laryngeal feature, these fricatives behave by and large in the same way with respect to voicing; they are voiced when adjacent to vowels, sonorants or voiced fricatives,[10] but surface as voiceless when adjacent to plosives. For fricatives in final position, there is one additional context in which they surface as voiceless, namely, before a pause. In this way, the surface laryngeal phonology of these fricatives depends largely on the laryngeal phonology of the surrounding context. Fricatives surface as voiced in voicing-friendly contexts, i.e. vowels and sonorants. On the other hand, plosives and pauses constitute voicing-unfriendly contexts and cause adjacent fricatives to surface as voiceless. In Avery (1996, 1997), the voicing of segments which lack underlying laryngeal specifications in such voicing-friendly contexts is called 'contextual voicing' (CV). In CV languages, voiced obstruents are the unmarked members of the contrast, and

(33) "receive their voicing value from the surrounding context, being fully voiced when in a fully voiced environment and partially voiced or voiceless in initial or final position or adjacent to a voiceless consonant." (Avery 1996: 76)

In addition, such unspecified obstruents,

(34) "may take on the voicing properties of those sounds [=vowels and sonorants. HS] as the voicing feature has no reason to turn off." (Avery 1996: 83)

The behavior of the unspecified fricatives in WSN is in concordance with these descriptions of contextual voicing. In addition, this is basically also what we observe in FFV; final fricatives are contextually voiced in voicing-friendly contexts but not in voicing-unfriendly contexts. Since this is exactly what we observe in the behavior of medial fricatives as well, there is no need to distinguish medial from final positions and to postulate FFV as a separate rule. This leads us to the conclusion that FFV is an instance of contextual voicing.

[10] In addition, there is a context where fricatives are voiced before a voiceless fricative. I will discuss this in section 3.5.5.

3.5.2 Voicing Enhancement of Word-Initial Fricatives

While contextual voicing explains the behavior of medial and final fricatives, it does not cover all instances of voicing observed in fricatives. There is one context in which word-initial voiced fricatives behave differently from medial fricatives, viz. when preceded by plosives. While medial fricatives are voiceless in this context (section 3.2), word-initial fricatives are voiced.

(35)	a.	kʰeq vo-	‘catch a fox’	(SL2: 14)
	b.	ŋajq zif	‘trace of a puppy’	(SL2: 25)
	c.	kʰeq za-	‘beat a fox’	(SL2: 35)
	d.	j-acik ɣe-	‘took her younger sister away’	(SL2: 40)
	e.	mɨcik ra-	‘suck the breast’	(SL2: 50)

The voicing of word-initial fricatives in this context cannot be due to contextual voicing. Plosives create voicing-unfriendly contexts and thus negatively influence the voicing of neighboring obstruents. This is what we observe in fricatives which follow a plosive in medial position (e.g. [noqsi] ‘the place name Noqsi’).

The reason that lenis fricatives are not contextually ‘devoiced’ in word-initial positions is simple; devoicing destroys laryngeal contrast, since the opposite members of contrast for voiced fricatives are voiceless fricatives (fortis). Voicing thus provides a crucial phonetic cue of lenis fricatives and contributes to maintaining the laryngeal contrast in initial position, though it is not present in the underlying representation. In the literature, such an over-differentiation of phonological contrast is known as *enhancement* (Stevens and Keyser 1989, Avery and Idsardi 2001, etc.). Enhancement turns a phonological X/zero contrast into a phonetically equipollent contrast (X/Y) and leads to the widely observed phonetic over-differentiation of contrast (Avery and Idsardi 2001: 47). In Nivkh, voicing enhancement of word-initial fricatives changes the underlying phonological asymmetric contrast [spread glottis]/zero to a phonetic equipollent contrast at the surface level.

Interestingly, voicing enhancement applies only to fricatives. Word-initial lenis plosives are not targeted by voicing enhancement and remain voiceless. This is obvious from the fact that word-initial lenis plosives do not trigger FFV (section 3.4.1).

The reason why word-initial plosives do not undergo voicing enhancement in contrast to fricatives is perhaps related to the phonetic cues associated with fortis plosives. In the latter, aspiration provides a sufficient phonetic signal to distinguish

them from lenis plosives. Accordingly, there is no need to enhance the lenis plosives by voicing to over-differentiate the contrast.[11]

3.5.3 Voiceless Fricatives in Pre-Pausal Context

As we saw in the previous sections, fricatives surface as voiceless when nothing follows. In the current analysis, this is because pauses create voicing-unfriendly contexts (section 3.5.1). Thus, in pre-pausal context, fricatives undergo contextual 'devoicing'. In this sense, there is no specific phonological rule or constraint which accounts for the voicelessness of fricatives in final positions.

In the literature, however, there is another way to account for the voicelessness of final fricatives in Nivkh. Mattissen, for instance, posits a rule of Final fricative devoicing (Mattissen 2003: 40). In this section, I review this approach and discuss the nature of the restriction that final fricatives should surface as voiceless in Nivkh.

Mattissen's analysis of Final fricative devoicing is based on the observation that final fricatives are subject to a laryngeal contrast in Nivkh. While this observation is not in accordance with what we have seen so far for WSN (section 3.2), in the literature it is reported that there are dialects which display voicing contrast in final fricatives. The Southeastern (Poronaisk) dialect is such a dialect (Austerlitz 1956: 262, Hattori 1962a: 75-76). In this dialect, words which end in fricatives fall into two groups. In one group, the fricatives undergo FFV and surface as voiced when followed by sonorants or vowels. This is the pattern that we also observed in WSN. In the other group, fricatives do not undergo FFV and remain voiceless even in such voicing-friendly environments.[12]

(39) Alternating fricatives

a.	mif	'land'	miv ax	'cape (lit. 'tip of land')'
b.	kɨlmr̥	'fin'	kɨlmr maṛk	'a ventral fin'
c.	pos	'cloth'	poz uski	'price of cloth'
d.	wax	'grip of knife'	waɣ-ŋanɣ-	'find the grip of knife'

(Hattori 1962a: 75-76)

[11] In general, fricatives are less suited to bear laryngeal contrast than plosives. See Chapter 4, section 4.9.2 and Jansen (2004) for discussion.

[12] I have adjusted the transcription of these examples in the original source to the one adopted in this thesis.

(40) Non-alternating fricatives

a.	af	‘beard’	af ax	‘the tip of beard’
b.	uɽ	‘island’	uɽ mif	‘island’
c.	cas (Russian *chas* ‘hour’)		cas upɽ	‘watch band’
d.	wax	‘moss’	wax ŋanɣ-	‘find moss’
e.	alχ	‘a species of seal’	alχ ŋavɽki	‘seal fur’

(Hattori 1962a: 75-76)

Similarly, Austerlitz (1956: 262) reports the following minimal pair.

(41)	a.	ŋaf	‘sparrow’s nest’	ŋav-i	‘a sparrow’s nest, isn’t it?
	b.	ŋaf	‘thigh’	ŋaf-i	‘a thigh, isn’t it?’

Given these data, the most parsimonious analysis posits underlying voice for the alternating fricatives and underlying voicelessness for the non-alternating fricatives. In citation forms, the rule of Final fricative devoicing devoices all fricatives in final position and neutralizes the laryngeal contrast.

According to Hattori, words which end in non-alternating fricatives are non-productive and form a closed subset (Hattori 1962a: 75). They are either loanwords or old native vocabulary. The question is whether such non-alternating fricatives exist in WSN as well.

Mattissen (2003: 40-41) conducted a survey of words listed in the Nivkh-Russian and the Russian-Nivkh dictionaries (Savel’eva and Taksami 1965, 1970) and found the following words with non-alternating final fricatives. This dictionary is based on the Continental Amur dialect (the second author is a native speaker), which is known to be close to WSN (Chapter 1, section 1.2.3).

(42)	a.	liɣs	‘wolf’	liɣs-ux	‘from the wolf’
	b.	p^haχ	‘window’	p^haχ orŋ	‘window sill’

Other words which are listed as having non-alternating final fricatives are:

(43)	a.	ŋaf	‘thigh’,
	b.	ɨf	‘beard’
	c.	ves	‘crow’

d.	lɨx	‘weather, sky’
e.	nux	‘needle’
f.	paχ	‘stone’

(Mattissen 2003: 40)

This list contains two words which are also reported in the Southeastern dialect as containing non-alternating fricatives: /ɨf/ ‘beard’ and /ŋaf/ ‘thigh’. Mattissen did not mention whether these words form a specific subset in the lexicon of this dialect, as in the Southeastern dialect.

On the other hand, final fricatives which undergo FFV and surface as voiced in voicing-friendly contexts are also reported (Mattissen 2003: 40).

(44)	a.	tɨf	‘house’	tɨv-ux	‘from the house’
	b.	tux	‘hatchet’	tuɣ-nik	‘one hatchet’

In order to check the existence of non-alternating final fricatives in WSN, I conducted two surveys. First, I examined the speech in the sound materials which I recorded from the consultants. Next, I tested the words listed above (42-43) in an interview with one of my language consultants (GY).

In the ‘Sound Materials’ series (Shiraishi and Lok 2002, 2003, 2004), there are instances of FFV in words which are listed above as having non-alternating fricatives. The examples below all appeared in the recitation of folktales (consultant VA).

(45)	a.	lɨx	‘weather/sky’	lɨɣ ɨki-	‘The weather is bad’ (SL1: 20)
	b.	liɣr̥	‘wolf’	liɣr-liɣr[13]	‘wolf, wolf (repeated)’ (SL1: 17)

Next, I prepared sentences with words which are reported to have non-alternating final fricatives: /ves/ ‘crow’, /paχ/ ‘stone’, /pʰaχ/ ‘window’ and /ɨf/ ‘beard’. These target words were put in voicing-friendly contexts. I read the Russian translation of these sentences and asked GY to translate them into her dialect (WSN). The result was that GY pronounced the final fricatives as voiced.

[13] There is variation in the Amur dialect as to whether the final fricative of /liɣr̥/ is [r̥] or [s].

(46) a. liɣ-ux vez ɲeqr̥ pij-
sky-LOC crow one fly
'There was a crow flying in the sky.'

b. ɲ-ikin vez meqr ŋiŋ-
1SG-brother crow two catch
'My brother caught two crows.'

c. ɲ-ikin paʁ ɲeqr̥ po-
1SG-brother stone one take
'My brother took a stone.'

d. ɲ-itik p^{h}aʁ ɲeqr lit-
1SG-father window one make
'My father made a window.'

e. ɲaŋk ɲeqr iv mi si-
mosquito one beard inside get_into
'One mosquito flew into the beard.'

Of course, it is still possible that lexical items other than those checked above exhibit resistance to voicing (it is always harder to prove the non-existence of something than the existence). However, the observations above cast doubt on the existence of non-alternating fricatives in WSN.

In the literature, we find descriptions of the Amur dialect which are consistent with the observations above. In a recently published word list compiled by a speaker of the Continental Amur dialect (Pukhta 2002), the final fricative of /liɣs/ 'wolf' is transcribed as voiced when preceding a nasal: [liɣz nonk] 'a wolf cub'. Similarly, Jakobson (1957: 83) gives the example [caz-ux] 'hour-LOC' from the Russian *chas* 'hour' in a description of the Amur dialect. This example shows that in the Amur dialect final fricatives of recent loanwords are subject to voicing, in contrast to what is reported for the Southeastern dialect described above.

From the observations above, I conclude that in WSN the existence of non-alternating final fricatives is doubtful. The data and the descriptions above give support to the descriptions by Kreinovich (1937) and Jakobson (1957) that in the Amur

dialect voicing of final fricatives is not used contrastively and thus predictable from the surrounding segments.

The reason why Mattissen's description deviates from ours is possibly related to the data she used; Mattissen's analysis relies on information from a written source namely, the dictionaries of Savel'eva and Taksami (1965, 1970). However, as regards the transcription of voicing of final fricatives, this dictionary is not consistent, as Mattissen herself acknowledges (2003: 40, fn.3).[14] For instance, there are instances of both voiced and voiceless transcriptions in the final fricative of /tɨf/ 'house': *tɨv laʁaf* (S&T 1970: 366) and *tɨf laʁaf* (S&T 1970: 371) 'a space in front of the house'. Both appear as lexical entries. These examples indicate that the transcriptions do not provide reliable data in discussing phonological issues. Alternatively, inconsistencies in the transcriptions seem to indicate that FFV is variable and gradient. This is expected in the current analysis which regards FFV as an instance of contextual voicing (section 3.5.1).

3.5.4 Contextual Devoicing as a Prosodic Restriction

In the previous section, we saw that there is no evidence that voicing is used contrastively in final fricatives. Since there is no underlying contrast of voicing, there is no need to postulate any rule of Final devoicing. Accordingly, we can maintain the hypothesis that the voicelessness of final fricatives is due to contextual devoicing. Final fricatives do not undergo contextual voicing since they are followed by a pause and not by voicing-friendly segments which accommodate voiced fricatives. In this section, I would like to consider the nature of such contextual devoicing in pre-pausal context in more depth and discuss how it differs from typical cases of final devoicing in languages such as Dutch, German and Russian.

In Avery's typological analysis of laryngeal systems, final devoicing stems from a single constraint, the Laryngeal Condition (Avery 1996: 128).

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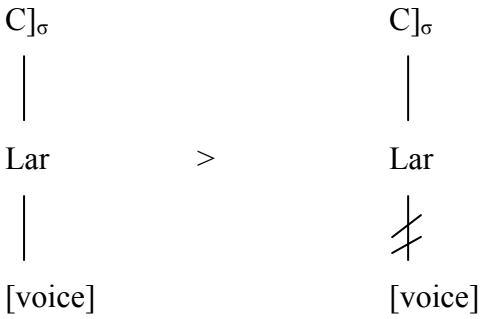
[14] Voicing of final fricatives is also transcribed inconsistently in the spelling of Nivkh as practiced in school textbooks. While most textbooks used to write a voiced fricative for final fricatives before suffixes which begin with vowels or sonorants (e.g. *tɨv-ux* 'house-LOC'), recent textbooks tend to write them as voiceless: *tif-ux* 'in the word'(Taksami and Polet'eva 1992). This is in contrast with early textbooks in which final fricatives are transcribed as voiced even when followed by a content word: *kinz ŋazaqr-* 'punish a devil' (Kreinovich 1933).

(47) Laryngeal Condition

Avery assumes that (47) is a target representation for all syllable-final obstruents. Typologically, there are two ways in which the Laryngeal Condition can be satisfied. In so-called 'voice' (LV) languages in which [voice] is active and thus is the dependent of the Lar node, [voice] delinks.

(48) Delinking of [voice]



This characterizes final devoicing in LV languages such as Russian.

On the other hand, in so-called 'aspiration' (CV) languages the Laryngeal Condition is satisfied by the addition of the Lar node to syllable-final position. This is an instance of Laryngeal Strengthening in Avery's terms.

(49) Laryngeal Strengthening

Laryngeal Strengthening characterizes final devoicing in aspiration languages such as German.[15]

[15] See Iverson and Salmons (1999) for a similar notion of 'final fortition' but Jansen (2004: 221-222) for criticism.

On the other hand, languages such as Dutch and Turkish have split laryngeal systems (Avery 1996, 1997). For instance, Dutch final devoicing is treated differently in plosives and fricatives since it is assumed that plosives are LV whereas fricatives are CV (Avery 1996, 1997, van Rooy and Wissing 2001, Iverson and Salmons 2003, Jansen 2004, etc.). This is exemplified by the fact that voiced plosives trigger regressive voice assimilation, whereas fricatives do not: *meet-band* [db] 'tape-measure' but *hartzeer* [ts] 'sadness' (van Rooy and Wissing 2001). This can be explained naturally if voiced fricatives of Dutch are lenes and do not have [voice], in contrast to voiced plosives.

In the discussions above, we concluded that WSN is an aspiration (CV) language. This raises the question of whether the voicelessness of final fricatives (and plosives) in WSN might be an instance of Laryngeal Strengthening, similar to German.

If this were the case, we would expect final voiceless fricatives to pattern with fortis obstruents. This is because Laryngeal Strengthening adds a Lar node to final obstruents, resulting in a specification which characterizes fortis obstruents in CV languages (49). Put differently, Laryngeal Strengthening is neutralization in the direction of the marked member of the contrast (Iverson and Salmons 1999: 144).

This analysis, however, is untenable. Final voiceless fricatives differ from fortis obstruents in crucial ways in WSN. First, WSN has many words which end in successive fricatives. In all such cases, the sequence is voiced-voiceless.[16]

(50)	a.	parf	'evening'
	b.	tovr̥	'white'
	c.	tiɣr̥	'tree'
	d.	t^{h}uɣr̥	'fire'
	e.	lavs	'mat'
	f.	haɣs	'cloth'
	g.	ɲivx	'man'
	h.	muɣf	'day'
	i.	rozf	'boundary'

The sequence voiced-voiceless fricatives is also observed across morpheme boundaries. This sequence surfaces when fricative-final stems are followed by morphemes (usually derivational suffixes) which consist of a single fricative.

[16] The voicing in these sequences will be taken up in section 3.5.5 below.

(51) a. jiv-f-toχ (SL1: 26)
exist-local nominalization-ALL
'To the place where s/he (it) is.'

b. xɨz-f
dig-local nominalization
'ditch'

Similarly, historically contracted forms of suffixes also exhibit the same sequence.

(52) a. e-rχ (< e-roχ)
3SG-ALL
'To him/her/it.'

b. i-ɣr̥ (< i-ɣir̥)
3SG-INS
'With him/her/it.'

These examples show that the sequence voiced-voiceless fricative is a common ending in WSN. However, recall that fortis obstruents, which are in contrast with lenis obstruents in word-initial position, do not allow voiced fricatives to precede (section 3.3). Since final voiceless fricatives are preceded by voiced fricatives in the examples above, it is unlikely that these final fricatives are fortes even though they are voiceless on the surface.

Second, the domain of final devoicing differs between Nivkh and 'true' final devoicing languages, such as German, Dutch or Russian. Unlike these languages, the final voicelessness of fricatives is not the result of a restriction that holds on the word domain in Nivkh. The application of FFV seen earlier tells us that the domain in which the final fricative should surface as voiceless is much larger in Nivkh. It is difficult to identify this domain, but since fricatives are voiceless in pre-pausal context, my guess is that it is equal to or larger than the Intonational Phrase. In Prosodic Phonology, pause insertion is interpreted as the insertion of a prosodic boundary between units high in the Prosodic Hierarchy, typically that of the Intonational Phrase (Nespor and Vogel 1986).

(53) a. [kinz it-]$_I$ kins /…/
devil say
'go insane'

b. [c^{h}xɨv lɨj-]$_I$ c^{h}xɨf /…/
bear kill
'kill a bear'

c. [alz ŋa-]$_I$ als /…/
berry gather
'gather berries'

This is in contrast with the domain of final devoicing of, for instance, Dutch. In Dutch, final devoicing typically targets syllable-final obstruents in a word domain (Booij and Rubach 1987: 7-8. ( ) denote syllable boundaries).

(54) a. /hɛld/ 'hero'
b. (hɛlt)

(55) a. /hɛld-ɪn/ 'heroine'
b. (hɛl)(dɪn)

(56) a. /mud/ 'courage'
b. (mut)
c. (mut)(vɑ)(tən) 'to take courage'

(57) a. /hud/ 'hat'
b. (hut)
c. (hu)(dən) 'hats'
d. (ən)(hu)(tɔp)(sɛ)(tən) 'to put on a hat'
e. *een hoed opzetten* (in Dutch orthography)

When a consonant-final word is followed by a vowel-initial word in connected speech, resyllabification takes place and the word-final consonant is syllabified as the onset of following syllable. This is exemplified in example (57d) above. In this example, the final /d/ of /hud/ is syllabified as the onset of the following syllable. Accordingly, it is

no longer in the appropriate context of final devoicing. Nevertheless, final devoicing applies.[17] This is because final devoicing of Dutch has the word as the domain of application. The quotation below illustrates the point.[18]

(58) "Since word-final stops may occur prevocalically in a sentence context, the syllable-final [± fortis] distinction should have the potential of surviving in these environments. The fact that it does not and that the prepausal form has been generalized shows that the word is an essential unit for the operation of these processes." (Kohler 1984: 165)

This in sharp contrast with the case of WSN observed above. In WSN, word-final fricatives undergo contextual voicing when located in a voicing-friendly context. Obviously, word-final fricatives surface as voiceless at the end of a much larger domain than in Dutch.[19]

The fact that final devoicing of WSN has a relatively large domain of application is comparable to such phenomenon as final lengthening (cf. Cambier-Langeveld 1999, 2000 for final lengthening in Dutch). Ernestus (2000), for instance, points out the correlation between voicelessness and the length of obstruents before a major phonological boundary.

(59) "Obstruents preceding major phonological boundaries, such as Intonational Phrases, are acoustically relatively long, and long obstruents tend to be perceived as voiceless. Obstruents preceding important phonological boundaries are therefore generally perceived as voiceless, unless special action is taken in order to make them sound as voiced. No such action is taken in the case of unspecified obstruents. The phonetic component consequently realizes unspecified obstruents before major phrase boundaries as voiceless." (Ernestus 2000: 160)

I take this to be a phonetically elaborated description of Avery's contextual (de)voicing in pre-pausal contexts.

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[17] Dutch differs in this respect from Turkish in which final devoicing fails to apply when a consonant-final word is followed by a vowel-initial word in connected speech (cf. Kaisse 1986, Rice 1990).

[18] This is the reason why Booij and Rubach assume Dutch final devoicing to be a postcyclic rule, i.e. a rule that applies after all morphology but precedes postlexical rules such as resyllabification (Booij and Rubach 1987: 7).

[19] This does not imply that pre-pausal forms (= citation form of words) are never 'generalized' in Nivkh. A case like this is discussed in Shiraishi (2004a).

To conclude, in WSN final fricatives are voiceless when they are final in a large prosodic domain. Although realized as voiceless on the surface, they are different from word-initial voiceless fricatives which are the marked members of the contrast (fortes). The current analysis encodes this difference in the representation: word-initial voiceless fricatives contain the Lar node whereas word-final fricatives lack any laryngeal feature. This makes the latter subject to contextual voicing. Moreover, the voicelessness restriction of final fricatives in WSN is neither an instance of Lar Strengthening nor Lar Delinking. Rather, it is an instance of contextual devoicing in pre-pausal contexts.[20]

3.5.5 Contextual Voicing of Successive Fricatives

In the previous section, we saw that successive voiced-voiceless fricatives are common endings in WSN. Our final question concerns the voicing in such clusters. In Avery's framework of laryngeal systems, segments are contextually voiced when surrounded by voicing-friendly segments, typically vowels and sonorants (Avery 1996: 150). However, voiced fricatives in final clusters are not surrounded by voicing-friendly segments in the strict sense, since they are followed by another fricative which also lacks any laryngeal specification. And yet they surface as voiced.

In my view, the sequence voiced-voiceless fricatives exemplify cases in which contextual voicing has applied to successive segments which lack laryngeal specifications. To be specific, I assume that such clusters undergo contextual voicing as a whole. In pre-pausal context, this means that the second fricative of the cluster is affected by the following silence (pause) and therefore does not undergo contextual voicing. On the other hand, the first fricative undergoes voicing under the influence of the preceding vowel. This is in accordance with the view that contextual voicing is 'phonetic interpolation'.

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[20] Ernestus (2000) and Jansen (2004) argue that final devoicing in Dutch cannot be accounted for by a phonological rule of any sort. Rather, they assume that Dutch final obstruents enter phonetics without any underlying [voice] specification and that the surface laryngeal value is determined by phonetics ('Complete Neutralization Hypothesis' in Ernestus' terms). In my view, this is not different from arguing that Dutch final devoicing is 'contextual devoicing', in the current sense of terminology. If this is right, such an argument brings final devoicing of Dutch and Nivkh close to each other.

(60) "It is possible to account for this [contextual voicing. HS] through a rule, but given the variability and the gradient nature of the voicing process in these languages it is more likely that it is a case of 'phonetic interpolation' (see Cohn 1993). By 'phonetic interpolation' I mean that properties of surrounding sounds tend to be taken on by sounds that have no specification for that property." (Avery 1996: 82)

When interpolated, the first fricative undergoes voicing since it is closer to the preceding vowel. On the other hand, the second fricative is perceived as voiceless since it precedes a pause, which is voicing unfriendly.

Support for this claim comes from the behavior of successive fricatives in medial position. Nivkh has a number of words which have fricative clusters in medial intervocalic positions. In all these cases, the fricatives are voiced.

(61)	a.	aɣri	'spit'
	b.	iɣrɨt	'together with him/her/it'
	c.	ŋɨrɣɨr	'breast'
	d.	erʁap-	'touch'
	e.	ɨɣzɨ-	'doesn't know'
	f.	ɨɣrɨkɨ	'once upon a time'
	g.	oɣri	'back of head'
	h.	erɣali	'very'

The voicing of medial fricatives receives a natural account if they undergo contextual voicing as a whole. The only difference with final clusters is that medial clusters are flanked by voicing-friendly segments and are therefore fully voiced by phonetic interpolation.

3.6 Conclusion

In this chapter, we saw that the classification of Nivkh obstruents into fortes and lenes can be justified on empirical grounds and that the feature [spread glottis] underlies the contrast between fortis vs. lenis in WSN. Accordingly, the Dual mechanism

hypothesis should be discarded since it fails to capture the asymmetric contrast which the laryngeal phonology of Nivkh obstruents exhibits.

The alternative assumption that [voice] underlies the laryngeal contrast was also argued to be untenable. In order to postulate [voice] as the contrastive feature at the underlying level, one has to find evidence in the phonology that it is active, such as voice assimilation. However, processes which involve voicing, such as FFV, did not provide evidence for the existence of [voice] at the underlying level. Notably, FFV showed characteristics typical of processes which occur at the surface phonetic level. We identified the source of voicing in WSN with enhancement and contextual voicing (= phonetic interpolation). These processes supplement unspecified obstruents with voicing at the surface level.

These discussions lead us to the conclusion that Nivkh is an aspiration language. Accordingly, the Dual mechanism hypothesis, and the Single mechanism hypothesis with [voice] as the contrastive feature should be discarded, since these representations make the wrong prediction that Nivkh is a voice language.

Chapter 4

Consonant Mutation as a Perceptually Motivated Process

4.1 Introduction

Nivkh Consonant Mutation consists of alternations of morpheme-initial obstruents in certain phonological and morpho-syntactic contexts. There are two directions of alternation: Spirantization, in which a plosive changes to a fricative, and Hardening, in which a fricative changes to a plosive. These two processes exhibit an interesting asymmetry with respect to their application to word-initial obstruents. While Spirantization applies in both VPs (1a) and NPs (1b), Hardening applies only in VPs (2a) but not in NPs (2b).

(1)	a.	kʰerqo- 'catch'	cʰo xerqo-	'catch fish'
	b.	pɨŋx 'soup'	pʰeq vɨŋx	'chicken soup'
(2)	a.	χa- 'shoot'	cxɨf qʰa-	'shoot a bear'
	b.	vo 'village'	tʰulv vo	'winter village'
			Cf. *tʰulv bo	

Together with the observation that CM targets morpheme-initial segments (but not medial or final ones), some authors regard this asymmetry as a support for the view that CM is primarily a syntactically motivated process, which has little to do with synchronic phonology (e.g. Kreinovich 1937: 60).

In this chapter, however, I will present new data which supports the view that CM is a synchronic phonological process. I compare CM with processes which are regarded as being morpho-syntactically motivated, such as CM in Irish, and discuss how they differ from Nivkh CM. In particular, I argue that Spirantization and Hardening are perceptually motivated processes. I will present several arguments in support of the view that Spirantization is an instance of perceptually motivated process of lenition, in the sense of Harris (Harris and Urua 2001, Harris 2005). The perceptually based approach to lenition contrasts with the artiulatory based approach.

In the literature, there are two different approaches to lenition. One approach defines lenition in articulatory terms, as defended by authors such as Flemming (1995) and Kirchner (1998, 2004). These authors assume that lenition occurs in order to minimize articulatory effort. An advantage of this approach is that it captures the speech rate-sensitive nature of lenition, a widely observed characteristic cross-linguistically. A faster speech rate involves shortening of articulatory gestures. This goes hand in hand with an increase in the velocity of the constriction gesture. Greater velocity implies a greater effort. To achieve some constriction target, more effort is required in higher speech rate than in slower speech rate (Kirchner 1998: 217-218). This is the reason why in faster speech lenition often has larger domains.

While this articulatory model captures the types of lenition which are speech-rate sensitive, it fails to cover processes which are not sensitive to speech rate. Nivkh Spirantization is such a process; it does not expand its domain in proportion to the speech rate. In addition, Spirantization exhibits characteristics which are not observed in articulatorily motivated lenitions. These are non-derived environment blocking and sensitivity to domain-internal morpheme juncture.

An alternative view is to regard lenition as a perceptually motivated process, defined as a phonological operation which diminishes the amount of information in order to accentuate syntagmatic contrast (Harris and Urua 2001, Harris 2005). I will show how this approach succeeds in accounting for the above-mentioned characteristics of Spirantization which the articulatory-based model fails to cover.

The perceptually motivated approach has an additional advantage that it accounts for many of the shortcomings in the previous descriptions of CM. For instance, some authors analyzed CM as a local phonological process, which involves both assimilation and dissimilation (Mattissen 1999, 2003, Kaneko 1999). However, this analysis has the disadvantage that it divides Spirantization in different contexts into two distinct processes (i.e. assimilation and dissimilation). I will show that such a division is undesirable from a phonological point of view, and argue that all instances of Spirantization can be unified, once we regard it as a non-local (non-assimilatory) process, which has no specific segments as triggers.

A similar problem exists in descriptions which describe Spirantization and Hardening as distinct rules (e.g. Hattori 1955). Such a description misses the crucial generalization that the segmental outputs of the two processes exhibit ‘conspiracy’. Notably, Spirantization fails to apply precisely in contexts where Hardening applies, and Spirantization applies in contexts where Hardening fails to apply. Clearly, there is a phonological conspiracy of the segmental effects which the two processes create. The discussions in this chapter make clear that it is this conspiracy of segmental effects which is used to demarcate certain morpho-syntactic boundaries in Nivkh. In

particular, I will argue that the conspiracy observed in the application of Hardening and the blocking of Spirantization is due to local phonological effects which disfavors specific sequences of segments for perceptual reasons. This contrasts with Spirantization, which is a non-local phonological process without any specific segments as triggers. The overall picture of CM that the current thesis depicts is that it involves both local and non-local phonological processes which are perceptually motivated.

The final discussion in this chapter concerns the asymmetry between Spirantization and Hardening with respect to the domain of application, demonstrated above (1-2). In the literature, there are two approaches to deal with this asymmetry. The most straightforward analysis is to stipulate that fricative-initial nouns are exceptions to Hardening (e.g. Kreinovich 1937: 64, Panfilov 1962: 15, Gruzdeva 1997: 89, Mattissen 2003: 49). Another analysis makes use of 'prespecification'; the manipulation of the underlying form of transitive verbs so that they undergo different phonology than nouns (Blevins 1993, Shiraishi 2000). Both analyses stipulate the exceptional behavior of lexical items, albeit in different ways, and their adequacy is difficult to evaluate from the known empirical facts. I will conclude the discussion with some suggestions for future research.

Finally, I would like to add that this chapter has the additional aim to make a contribution to the description of the phenomenon. In particular, I shed light on characteristics of CM to which hitherto little attention was paid, or which were simply unknown. As the discussion in this chapter reveals, such characteristics are nevertheless important in capturing the overall nature of the phenomenon. These are sensitivity to pause insertions and applicability to loanwords, among others.

As in the other chapters, most of the examples in this chapter are from my own fieldwork recordings. Generally speaking, the pattern of CM observed in these data is comparable with the earliest descriptions of the phenomenon in the beginning of the 20th century (Shternberg 1908, Kreinovich 1934, 1937). This fact verifies the reliability of those early descriptions, and the linguistic competence of the contemporary speakers, who are all bilingual in Russian and do not use Nivkh on a daily basis.

This chapter is organized as follows. I begin with a descriptive sketch of CM in sections 4.2, 4.3 and 4.4. In section 4.5, I introduce the hypothesis regarding the diachronic development of Hardening by Jakobson (1957) in order to explain why of the content words only transitive verbs undergo Hardening. Section 4.6 points out the problems that CM pose to existing theoretical understandings of related topics from a phonological point of view. In the past, various solutions to these problems have been advocated. I will review these in section 4.7. In section 4.8, I propose an alternative

analysis which unifies all instances of Spirantization as an instance of perceptually motivated lenition. Section 4.9 discusses contexts in which Spirantization and Hardening conspire to achieve the same sequence of segments. It will be proposed that that the output sequences of segments in these contexts are the results of local restrictions due to local cooccurrence restrictions of segments which are perceptually motivated. Section 10 discusses how to account for the fricative-initial nouns, which exceptionally fail to undergo Hardening. Section 4.11 concludes.

4.2 Descriptive Sketch 1: Phonological Contexts

Nivkh CM targets morpheme-initial obstruents and changes their continuancy in certain phonological and morpho-syntactic contexts. I will begin the sketch with description on the phonological contexts. The morpho-syntactic conditions are described in section 4.3.

4.2.1 Spirantization

Spirantization occurs when the initial plosive of a morpheme follows a vowel (4), glide (5) or a plosive (6). A linear version of the rule of Spirantization is given in (1).

(3) Spirantization

Plosive > Fricative / [Vowel, Glide, Plosive] [ ] _____

( ][denote morpheme boundaries)

(4)	a.	t^{h}om	‘fat’	c^{h}o ɾ̥om	‘fish fat’	(FN)
	b.	c^{h}o	‘fish’	liɣi so	‘salmon’	(FN)
	c.	piŋx	‘soup’	c^{h}o viŋx	‘fish soup’	(FN)
	d.	kujva	‘ring’	toto ɣujva	‘a silver ring’	(Pukhta 2002: 66)
(5)	a.	ciɣɾ̥	‘tree’	qoj ziɣɾ̥	‘larch tree’	(SL2: 3)

(6)	a.	cif	‘trace’	pʰ-ɨtɨk zif	‘father’s trace’	(SL1: 9)
	b.	tɨf	‘house’	Galik rɨf	‘Galik’s house’	(FN)
	c.	tʰom	‘fat’	hɨjk r̥om	‘fat of a hare’	(FN)
	d.	pɨɲx	‘soup’	pʰeq vɨɲx	‘chicken soup’	(FN)
	e.	pʰoqi	‘air bladder’	mɨkɨk foqi	‘air bladder of dace’	(FN)
	f.	cʰŋɨr̥	‘grass’	kʰer̥q sŋɨr̥	‘sea grass (= seaweed)’	(SL2: 54)

On the other hand, Spirantization does not apply when the plosive follows a fricative (7) or a nasal (8).

(7)	a.	tʰom	‘fat’	cʰxɨf tʰom	‘bear fat’	(FN)
	b.	coŋr̥	‘head’	cʰxɨf coŋr̥	‘bear head’	(SL3: 54)
	c.	pɨɲx	‘soup’	cʰxɨf pɨɲx	‘bear soup’	(FN)
	d.	cus	‘meat’	cʰxɨf cus	‘bear meat’	(FN)

(8)	a.	qʰal	‘clan’	pilavon qʰal	‘the clan of Pilavon’	(SL1: 11)
	b.	kʰiri	‘urine’	qan kʰiri	‘urine of dog’	(SL1: 21)
	c.	coŋr̥	‘head’	qan dʒoŋr̥	‘dog head’	(SL1: 22)
	d.	par̥k	‘only’	aŋ bar̥k	‘who else?’	(SL3: 26)
	e.	tɨf	‘house’	ɲiŋ dɨf	‘our house’	(SL3: 49)

Following nasals, non-aspirated plosives undergo voicing, as the transcriptions indicate (Chapter 3, section 3.3.1).

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

(9) Plosive

a.	ostol tʰxɨ	‘on the table’	(SL3: 71)
b.	vɨl-bɨlu-r	‘roll (reduplication)’	(SL1: 39)

(10) Fricative

a.	kul fi-n-gu	‘people who dwell on the shore’	(SL3: 57)
b.	vul-vulu-	‘black (reduplication)’	(SL1: 9)
c.	qal-ʁala	‘bright (reduplication)’	(SL1: 9)

4.2.2 Hardening

The phonological context of Hardening is complementary to that of Spirantization; it applies when a morpheme-initial fricative follows either a fricative (12) or nasal (13).

(11) Hardening

$$\text{Fricative} > \text{Plosive} \; / \; \begin{bmatrix} \text{Fricative} \\ \text{Nasal} \end{bmatrix} \; [\; \_\_\_\_$$

(12)	a.	xu-	‘kill’	cʰxɨf kʰu-	‘kill a bear’	(SL1: 7)
	b.	fi-	‘dwell’	vo ɲaqr̥ pʰi-	‘dwell in a village’	(SL1: 7)
	c.	fɨɲ-	‘throw’	cʰxɨf pʰɨɲ-	‘throw to the bear’	(SL1: 8)
	d.	r̥u-	‘follow’	pʰ-ɨtɨk zif tʰu-	‘follow father’s trace’	(SL1: 9)
	e.	ra-	‘drink’	cʰaχ ta-	‘drink water’	(SL2: 15)

(13)	a.	xu-	‘kill’	aŋ kʰu-	‘kill whom?’	(SL3: 21)
	b.	r̥xɨrp-	‘forget’	ɲiŋ tʰxɨrp-	‘forget us’	(SL3: 64)
	c.	za-	‘beat’	qan dʒa-	‘beat a dog’	(Gruzdeva 1997: 90)
	d.	zosq-	‘break’	ɨvɲ dʒosq-	‘break an oar’	(Gruzdeva 1997: 90)

There is a discrepancy between content words and function words in this context. In function words, only plosives surface after nasals. On the other hand, there is variation in the initial obstruent of content words.[1] As Kreinovich and Gruzdeva point out, there are instances of both application and non-application of hardening (Kreinovich 1937:

[1] These are restricted to transitive verbs for reasons that will be laid out in section 4.5.

50, Gruzdeva 1997: 90-91). In my data, hardening applies in the majority of cases, but there is also an instance of non-application.[2]

(14) meŋ vo-
rudder hold
'to steer' (SL2: 74)

It should be pointed out that homorganicity between the nasal and fricative is not relevant in determining the application of Hardening. Hardening applies regardless of whether the nasal is homorganic with the following obstruent, as some of the examples in (13) show. This is also the case with Spirantization; post-nasal plosives do not spirantize regardless of whether they are homorganic with the preceding nasal (see the examples in (8)). This lack of homorganicity indicates that a primarily articulatory account of Hardening is problematic, as we will see in section 4.9.2.

Hardening does not apply when the fricative follows a vowel (15), glide (16) or a plosive (17).

(15)	a.	xu-	'kill'	ŋa xu-	'kill an animal'	(SL1: 11)
	b.	ɣuz-	'pull out'	p^h-saqo ɣuz-	'pull out one's own knife'	(SL2: 14)
	c.	xaw-	'dry'	ma xaw-	'dry fish'	(SL3: 45)
(16)	a.	sew-	'dry'	kɨj sew-	'dry a sail'	
(17)	a.	xavu-	'warm'	tɨmk xavu-	'warm hands'	(SL1: 12)
	b.	r̥nɨ-	'see'	p^h-atik r̥nɨ-	'saw her younger sister'	(SL2: 42)
	c.	ɣe-	'marry'	nanak ɣe-	'marry the elder sister'	(SL3: 53)

4.2.3 Summary

The input and output sequences of CM are listed below. In principle, the input sequences are not allowed to surface across morpheme boundaries. When these

[2] It is not clear what causes this variation. Panfilov (1962: 16) lists a group of transitive verbs which never undergo hardening, e.g. /vaw-/ 'chew'. My informants, however, exhibit hardening for some of these verbs: [paʁla als povu-] 'chew cowberries' (SL3: 36)

sequences arise due to morpheme concatenation, either Spirantization or Hardening applies to repair them.

(18)

	Input sequences		Output sequences
a.	Vowel - Plosive	>	Vowel - Fricative
b.	Glide - Plosive	>	Glide - Fricative
c.	Plosive - Plosive	>	Plosive - Fricative
d.	Fricative - Fricative	>	Fricative - Plosive
e.	Nasal - Fricative	>	Nasal - Plosive

Whether the output sequences on the right are achieved by Spirantization or Hardening is a matter of input. Spirantization applies when a plosive is in the input and Hardening does when a fricative is in the input. In this way, Spirantization and Hardening conspire to achieve these output sequences of segments. However, some previous works overlooked this conspiracy and described the two processes as if they had independent structural goals. We will discuss this in section 4.6 below.

4.3 Descriptive Sketch 2: Morpho-Syntactic Contexts

CM applies across morpheme-boundaries within a specific domain which is syntactically defined.[3] The latter has two subtypes. One domain has a transitive verb as its head, and spans the complement and the verb.

(19) $_{VP}$[$_{NP}$[Noun-suffix-][Verb-suffix-]]

E.g. c^{h}xɨf	k^{h}u-c	'kill a bear'
bear	kill-IND	

Another domain has a noun as its head. The specifier in such an NP can be either a modifier or a possessor.

(20) $_{NP}$[[Noun][Noun-suffix]]

E.g. c^{h}o	vɨŋx	'fish soup'
fish	soup	

[3] There is various terminology in the literature to refer to this domain: 'dependent-head constellation' (Mattissen 2003: 44), 'polythematic section' (Jakobson 1957: 80), etc.

Within this domain, CM targets every morpheme-initial obstruent, i.e. it applies iteratively from the innermost morpheme to the outermost string of morphemes.

Crucially, CM is sensitive to domain-internal morpheme junctures. This means that it does not apply 'across-the-board' within the designated domain. In this connection, it should be pointed out that CM fails to apply in non-derived environments. In the examples below, the phonological conditions on CM are met and yet it does not apply. This is because these words are monomorphemic and do not constitute a derived environment.

(21)	a.	utku	*utɣu	'man'
	b.	ɨtɨk	*ɨrɨk	'father'
	c.	ŋɨɣs	*ŋɨɣc	'teeth'

Likewise, word-initial plosives do not undergo CM when they do not follow any morpheme.

(22)	a.	pɨɲx	*vɨɲx	'soup'
	b.	c^ho vɨɲx	*so vɨɲx	'fish soup'

The morpho-syntactic context of CM can be summarized as follows. CM applies to morpheme-initial obstruents when the latter is preceded by another morpheme within the designated syntactic domain (complement-head (VP) or specifier-head (NP)). Within this domain, various morpho-syntactic processes create CM contexts. Cliticization, reduplication, affixation, NP and VP formations may all feed CM. In the preceding sections, I illustrated cases of NP and VP formations. In the following sections, I illustrate CM in other morpho-syntactic contexts.

4.3.1 Cliticization

In Nivkh, pronouns truncate and cliticize to the following host to form a possessive construction (Chapter 2, section 2.6). These truncated forms trigger Spirantization of the following plosive. This is illustrated below with the truncated forms of the reflexive pronoun /p^hi/.[4]

[4] After /p^h-/ only voiceless fricatives surface (cf. Chapter 2, section 2.6.1).

(23)	a.	caqo	‘knife’	p^h-saqo	‘one’s own knife’	(SL2: 14)
	b.	tot	‘arm’	p^h-r̥ot	‘one’s (own) arm’	(SL2: 59)
	c.	qan	‘dog’	p^h-χan-gu	‘one’s own dogs’	(SL2: 6)

4.3.2 Reduplication

Reduplication is commonly used to express intensification, iteration or multiplication in Nivkh (Mattissen 2003: 19). The examples below illustrate that the reduplicants, copied to the right of the base, are not faithfully realized in case faithful realization yields a sub-optimal sequence of segments (i.e. segmental sequences on the left of (18)). The output sequences all conform to the structural goals of CM as outlined in section 4.2.3 above.

(24)	a.	pulk-vulk-u-	‘round’ (base /pulk/)	(SL2: 8)
	b.	c^herk-serk-	‘break’	(SL1: 39)
	c.	ɣur-kurd-	‘to stick’	(SL1: 26)
	d.	c^haf-c^hava-	‘wet’ (base /c^haf/)	(SL2:56)

4.3.3 Suffixation

The initial obstruents of suffixes are subject to the same regulations of CM as in other morpho-syntactic contexts. This is illustrated below with the allative marker /-roχ/.

(25)	a.	pxi-roχ	‘to the taiga’	(SL2: 6)
	b.	t^hut-roχ	‘to the fireplace’	(SL2: 31)
	c.	c^haχ-toχ	‘to the water’	(SL2: 58)
	d.	c^hiŋ-doχ	‘to you’	(SL2: 39)

Not all suffixes undergo CM. Postverbal suffixes often resist Spirantization and surface with sub-optimal sequences of segments (Jakobson 1957: 96-97, Mattissen

2003: 81).[5] Postnominal suffixes, on the other hand, undergo genuine application of CM. The reason why suffixes behave differently is historical. In earlier stages of the Amur dialect (to which WSN belongs), there was a participle suffix /ŋ/ between the verbal stem and some of the verbal suffixes. This suffix triggered regular application of CM after nasals (to be discussed in detail in section 4.4.4). Later in the course of history, this suffix dropped (Jakobson 1957, Mattissen 2003: 81-82). The loss of this suffix created a case of a phonological opacity (section 4.4.4). Accordingly, in the current Amur dialect it is impossible to tell whether a given verbal suffix undergoes CM. This information should be stored in the lexicon in the synchronic grammar (the examples below do not exhaust the list of suffixes).

(26) Alternating suffixes

a.	-ɣit-/-gɨt-	completive
b.	-vara/-bara	counter-assertive focus

(27) Non-alternating suffixes

a.	-ku-	causative
b.	-f	local noun formation
c.	-s	instrument noun formation

4.3.4 Maximal Domain of Application

As mentioned above, the maximal domain of CM is restricted to the minimal domain which spans either complement-head (VP) or specifier-head (NP). By 'minimal' I mean that there may be no intervening material like adverb or PP between the complement and the head; these constituents should be structurally adjacent in order to undergo CM. The insertion of adverb or PP between the complement and the head is disliked, as the examples below demonstrate (28a, 29a).

[5] According to Mattissen (2003: 81), 75% of the post-verbal suffixes which begin with an obstruent undergo CM.

(28) a. [NP]ɲ-ɨmɨk][NP]lep][ADV namnamgur] [V]ra-] *….namnamgur t^{h}a- (FN)
1SG-mother bread well bake
'My mother bakes bread well.'

b. Preferred word order:
[NP]ɲ-ɨmɨk] [ADV namnamgur] [NP]lep][V]ra-]

(29) a. [NP]ɲ-ɨmɨk][NP]lep][PP]tɨv-ux] [V]ra-] *…..tɨv-ux t^{h}a- (FN)
1SG-mother bread house-LOC bake
'My mother bakes bread in the house.'

b. Preferred word order:
[NP]ɲ-ɨmɨk] [PP]tɨv-ux][NP]lep] [V]ra-]

In fact, adverbs and PPs never trigger CM between adjacent morphemes, neither as a trigger nor as a target.

(30) a. [NP]j-ax] [ADV]niŋaq][Vq^{h}o-ku-] * …niŋaq χo-ku-
3SG-CAUS a_bit sleep-CAU
'(She) let her sleep for a while.' (SL2: 31)

b. [NP]p^{h}i][ADV]sɨk][VP[NP]caqo-ɣu mulk-ɣu][Vt^{h}o-]] *… sɨk saqo-…
REF all knife-PL basket-PL take
'He took all his knives and baskets.' (SL2: 43)

c. [NP]p^{h}i][ADV]i̯rk] [Vkinzi̯r-] *…i̯rk ɣinzi̯r-
REF already go_insane
'She was already insane.' (SL2: 26)

In addition, CM fails to apply when the target morpheme is preceded by a morpheme which belongs to a different CM domain. For instance, CM does not apply when the target morpheme is preceded by a subject.

(31) Subject-Predicate
[NP]k^{h}ɨsk][VP]qoju-] * k^{h}ɨsk ʁoju-
cat cry
'A cat cried.' (SL2: 3)

(32) Subject-Object

a. [$_{NP}$k^{h}eq][$_{VP}$[$_{NP}$k^{h}e] uɣ-] *k^{h}eq xe uɣ-
fox net get_into
'The fox got into the net.' (SL2: 16)

b. [$_{NP}$pikar tɨmk][$_{VP}$[$_{NP}$k^{h}uti] rulku-] * …tɨmk xuti…
big hand hole come_into
'A big hand came inside from the hole.' (SL2: 26)

c. [$_{NP}$j-ɨmɨk][$_{VP}$[$_{NP}$p^{h}-oɣla] k^{h}ez-] * j-ɨmɨk f-oɣla….
3SG-mother REF-child tell
'The mother told her child.' (SL1: 9)

The two sentences below differ minimally from each other with respect to the application of Hardening. In (33a), the initial fricative of the predicate verb does not undergo Hardening since the preceding noun is the subject and lies outside of the CM domain (complement-head). On the other hand, in (33b) the initial fricative of the predicate undergoes Hardening since the noun is the complement and forms a VP with the verb.

(33) a. [$_{NP}$eɣlŋ][$_{VP}$ro-] ('child' is subject)
child hold
'The child holds (something).'

b. [$_{VP}$[$_{NP}$eɣlŋ][$_{V}$ t^{h}o-]] ('child' is object)
child hold
'(Someone) holds the child.'
(Gruzdeva 1997: 83, East-Sakhalin dialect)

4.4 Descriptive Sketch 3: Other Characteristics

4.4.1 Pause-Sensitivity

CM is sensitive to pause insertions. When a pause intervenes between the triggering morpheme and the target morpheme, CM does not apply. This is observed for both Spirantization (34a,b) and Hardening (34c).

(34)	a.	qoj	'larch'	vac….qoj	'iron larch'	(Kreinovich 1937: 15)
	b.	t^{h}om	'fat'	hɨjk…. t^{h}om	'fat of a hare'	(FN)
	c.	ɻ̥uv-	'burn'	ciɣɻ̥….. ɻ̥uv-	'burn woods'	(SL2: 25)

Kreinovich was aware that CM is a pause-sensitive process and criticized the way his precursor Lev Shternberg recorded data from the consultants (Kreinovich 1937: 15). Shternberg (or his consultants) dictated Nivkh stories word-by-word, thereby ignoring regular applications of CM. Indeed, Shternberg's publication of Nivkh texts (e.g. Shternberg 1908) contains many forms which do not follow canonical patterns of CM. Taking into consideration the way Shternberg dictated data, these forms can be considered as citation forms which appeared in extraordinarily deliberate speech.

Pause-sensitivity indicates that temporal adjacency is crucial for the application of CM, in addition to structural adjacency.

4.4.2 Non-Hardening of Fricative-Initial Nouns

As illustrated in the section title, word-initial fricatives of nouns do not undergo Hardening. These fricatives remain unchanged in Hardening contexts, that is, when preceded by fricatives or nasals.

(35)	a.	vo	'village'	maɣr vo	'the place name Maghr'	(SL3: 34)
	b.	ɻ̥ɨ	'door'	tɨf ɻ̥ɨ	'entrance door'	(FN)
	c.	vo	'village'	viɣɻ̥kun vo 'the place name Vygrshkun'		(SL3: 5)
	d.	vaqi	'box'	t^{h}eŋ vaqi	'coal box'	(S&T 1970: 381)
	e.	viɲ	'pot'	la-ŋ viɲ	'iron pot'	(SL1: 12)

The reason why fricative-initial nouns do not undergo Hardening is historical. This is described in section 4.5 below.

4.4.3 Applicability to Loanwords

Old well-assimilated loanwords undergo CM while recent loanwords do not. In Nivkh, old loanwords are of Chinese or Tungusic origin.

(36) a. taj ‘pipe’ mandʒu raj ‘Chinese pipe’ (Chinese *yen tai*) (S&T 1970)

b. siŋr-u- ‘to torture’ c^hxɨf c^hiŋr-u- ‘to torture a bear’ (Nanai *siŋgərə*) (Jakobson 1957: 90)

Recent loanwords are from Russian. In most contexts, these words do not undergo CM. The only context in which recent loanwords undergo Spirantization is when they are preceded by a clitic (37c).

(37) a. kommunist partija ‘communist party’

b. c^ho konserf ‘fish can (Russian *konservy*)’

c. p^h-xooperative ‘one’s own cooperative (Russian *kooperativ*)’ (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 (Chapter 2, section 2.3.2): [kovorotk] from Russian *skovorodka* ‘frying-pan’ (Pukhta 2002: 58), [estarik] from Russian *starik* ‘old man’ (SL3: 23).

Recent loanwords may participate in CM as triggers, however, as the examples below illustrate.

(38) a. tor ‘law’ sovet ror ‘Soviet law (Russian *sovet*)’ (Kreinovich 1933)

b. fi- ‘dwell’ bajdukof p^hi-‘dwell on (the island of) Baidukov[6]’ (SL3: 32)

[6] An island off the mouth of the Amur River named after the Russian aviator Georgii Filipovich Baidukov (see Map 3).

4.4.4 Elided Nasal and Phonological Opacity

In the Amur dialect group, final nasals in some words and suffixes are deleted. Although these nasals never surface, they can be reconstructed by comparing Amur dialect forms with forms found in the Sakhalin dialect. In the latter dialect these nasals are retained.

(39)	Amur dialect		Sakhalin dialect	
	a.	eɣa	eɣaŋ	‘cow’
	b.	pitɣɨ	pitɣaŋ	‘book’
	c.	oɣla	eɣlŋ	‘child’
	d.	-gu/-ɣu	-gun/-ɣun	plural suffix

Although unpronounced, elided nasals pattern with overt nasals in CM: they block Spirantization and trigger Hardening. This is shown in the examples below. In these examples, elided nasals cause opaque applications of CM (elided nasals are indicated by superscripted ^{N}).[7]

(40)						
	a.	piŋx	‘soup’	eɣa^{N} biŋx	‘beef soup’	(FN)
	b.	rɨw-	‘learn’	pitɣɨ^{N} dɨw-	‘learn (to read) a book’	(FN)
	c.	r̥o-	‘take’	p^{h}-umgu oɣla^{N} t^{h}o-	‘take the daughter’	(SL2: 45)

The opaque application of CM is mainly confined to the speech of the oldest generation. The younger generation tends to neglect elided nasals in favor of a transparent application. The examples below exhibit this gradation in the speech of four speakers of the Amur dialect (three WSN, one Continental). For comparison, I add examples of overt nasals in the list.

Consultant VK (WSN. Born in 1929)

(41)					
	Nasal	a.	p^{h}ɨkɨn dɨf	(< tɨf)	‘one’s brother’s house’
	Elided nasal	b.	eɣa^{N} t^{h}om		‘cow fat (butter)’
		c.	eɣa^{N} biŋx		‘cow soup’

[7] This is an opacity created by the counterbleeding type of rule interaction.

Consultant AK (Continental. Born in 1936)

(42)	Nasal	a.	Data missing		
	Elided nasal	b.	urla^{N} t^{h}om		‘good fat’
		c.	eɣa^{N} t^{h}om		‘cow fat (butter)’
		d.	eɣa^{N} cus~dʒus		‘cow meat (beef)’

Consultant LK (WSN. Born in 1939)

(43)	Nasal	a.	ɲ-ikɨn dɨf		‘my brother’s house’
	Elided nasal	b.	urla^{N} t^{h}om		‘good fat’
		c.	eɣa^{N} r̥om	(< t^{h}om)	‘cow fat (butter)’
		d.	horla^{N} pɨŋx		‘delicious soup’
		e.	eɣa^{N} dʒus	(< cus)	‘cow meat (beef)’
		f.	loci^{N} rɨf	(< tɨf)	‘Russian house’

Consultant SP (WSN. Born in 1942)

(44)	Nasal	a.	keŋ t^{h}om		‘whale fat’
		b.	ɲiŋ vɨŋx~bɨŋx	(< pɨŋx)	‘our soup’
		c.	ikɨn dɨf	(< tɨf)	‘brother’s house’
	Elided nasal	d.	horla^{N} vɨŋx~bɨŋx	(< pɨŋx)	‘delicious soup’
		e.	eɣa^{N} zus	(< cus)	‘cow meat (beef)’
		f.	eɣa^{N} t^{h}om		‘cow fat (butter)’

While the older two speakers (VK and AK) exhibit opaque application of CM, the younger two speakers (LK, SP) show variation between opaque and transparent pronunciations. The youngest speaker SP exhibits fluctuation even in a single context: [horla^{N} vɨŋx]~[horla^{N} bɨŋx] ‘delicious soup’.

4.5 The Diachronic Development of Hardening

Jakobson (1957) postulated the following diachronic scenario of Hardening. In Early Nivkh, there were no roots which began with a fricative. This can be still observed in old loanwords from Tungusic: fricative-initial roots are adapted to Nivkh with initial plosives (Kreinovich 1937: 53-54).

(45)		Nivkh	Tungusic	
	a.	cʰafq	safugu	‘chopsticks’
	b.	cʰam	saman	‘shaman’
	c.	cʰoxc-	sokto-	‘to get drunk’
	d.	qʰal	xala	‘clan’
	e.	qʰac-qʰac	xasi-xasi	‘different’

Most of the fricative-initial words in the contemporary Amur dialect belong to one of the following vocabulary: 1) lexically marginal items such as recent loanwords, onomatopoeia [8] and taboo-words, [9] 2) words which are historically derived from plosive-initial roots, and 3) words which are historically derived from initial labial glides.[10] In Contemporary Nivkh, Hardening applies only to words which belong to 2). This group consists of transitive verbs. In Nivkh, a number of pairs of transitive and intransitive verb roots differ only in the continuancy of the initial obstruent.

(46)		Intransitive verb roots		Transitive verb roots	
	a.	pɨks-	‘disappear’	vɨks-	‘throw’
	b.	tɨw-	‘to get accustomed’	rɨw-	‘teach’
	c.	tʰa-	‘to be roasted’	r̥a-	‘roast’

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

(47)		Nominal roots		Verbal roots	
	a.	pʰuf	‘saw’	fuf-	‘to saw’
	b.	cʰafq	‘chopsticks’	safq-	‘to eat with chopsticks’
	c.	kʰes	‘information’	xes-	‘to tell’

Regarding these pairs, Jakobson hypothesized that fricative-initial transitive verbs were historically derived from plosive-initial forms through the attachment of the

[8] E.g. /ral/ ‘frog’, /xaj/ ‘pigeon’, /zaq/ ‘tomtit’ (Jakobson 1957: 93).

[9] E.g. /raf/ ‘the little house erected in the cemetery for the deceased kinsman after the cremation of his body’ (Jakobson 1957: 91).

[10] The original form which contains an initial glide can be observed in the Sakhalin dialect: /wat/ ‘iron, metal’ for the Amur form /vɨc/.

prepositive pronoun /i-/ (or /e-/), 'someone/something'. When attached to verbal roots, this pronoun indicates the transitive voice and the absence of a definite object. In Early Nivkh, the absence of the definite object had to be expressed explicitly by this pronoun. The objectless use of transitive verbs was prohibited. This is shown below with the verb /-k^{h}u-/ 'kill'.

(48) Early Nivkh (* = reconstructed forms)

a. *ŋa k^{h}u-
animal kill
'kill an animal'

b. *liɣs k^{h}u-
wolf kill
'kill a wolf'

c. *i-k^{h}u-[11]
INDF-kill
'kill someone/something'

The initial plosive of the verbs changed to fricatives when preceded by a vowel, due to Spirantization: /ŋa k^{h}u-/ > /ŋa xu-/ 'kill an animal', /i-k^{h}u-/ > /i-xu-/ 'kill someone/something'.[12]

The combination indefinite pronominal prefix+transitive verb was subject to a further change. In the course of history, the initial /i-/ dropped, probably for phonological reasons. Front high vowels are inherently short and therefore vulnerable to deletion. Support for this scenario comes from cases in which /i-/ is retained before consonant clusters. In such a case /i-/ is harmonically dependent on the vowel of the host and alternates with /e-/ when the latter is /o/ or /a/. Vowels which undergo vowel harmony indicate recessive nuclei (Harris 1997: 361).

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[11] The final /u/ later dropped.

[12] I follow here Robert Austerlitz's amendment to Jakobson's hypothesis (Austerlitz 1977). Whereas Jakobson assumed that /i-/ concatenated with fricative initial roots (/i-xu-/), Austerlitz assumed plosive-initial roots. Taking into account the phonotactic regularity that words should begin with plosives (see the examples in (41)), Austerlitz's amendment (spirantization by /i-/, then loss of /i-/) seems plausible.

(49) a. i-ɣlu- ‘be afraid of’
b. i-rlɨ- ‘pull’
c. i-ndɨ- ‘see’ (Kreinovich 1937: 94)

(50) a. e-rʁop- ‘touch’
b. e-ʁna- ‘spread’
c. e-ʁra- ‘bore’ (Kreinovich 1937: 94)

The /i-/ survived only in cases in which its loss would otherwise yield phonologically marked structure, such as a word-initial consonant cluster or syllables with an empty onset (including /h/). In roots which begin with /h/ or a vowel, /i-/ becomes non-syllabic and fills the onset (52c, d).

(51) i-deletion

a.	*i-lɨt-	>	lɨt-	‘do’
b.	*i-zu-	>	zu-	‘wash’

(52) i-retention

a.	i-ɣrɨ-	>	iɣrɨ-	‘to be with someone’
b.	i-ɣlu-	>	iɣlu-	‘be afraid of’
c.	i-ɨs-	>	jɨs-	‘call’
d.	i-hɨjm-	>	jɨjm-	‘know’

After i-deletion,

(53) “…there arose the possibility of an objectless use of transitive verbs, as, for instance /lɨt/. Then /i-/ in such forms as /iɣrɨ-/ 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 (section 4.4.2). Nominal roots did not follow the diachronic path of the transitive verbs. Crucially, fricative-initial nouns are not derived from their plosive-initial counterparts, since there are no such plosive-initial counterparts. This constitutes a critical difference with transitive verbs.

At the same time, fricative-initial nouns escaped the phonotactic restriction that roots should begin with a plosive. This was either because they were marginal in the lexicon, or because they were loanwords borrowed after this phonotactic constraint had lost power.[13] This made the behavior of fricative-initial nouns in CM a unique one. Alternatively, this is the reason why, among content words, only transitive verbs undergo Hardening.

4.5.1 Plosive-Initial Transitive Verbs

While most of the transitive verbs begin with fricatives for the reason mentioned in the previous section, a small set of such verbs begins with plosives.

(54) a. pota- ‘dry some fish’
b. kiwr- ‘pad footwear with grass’
c. k^{h}erqo- ‘fish with a hook’

These verbs are morphologically analyzed as noun+verb complexes, e.g. /pota-/ < /poti-a-/, where /poti/ is ‘a hole made in a fish in order to string it on a stick for drying’ and /-a-/ ‘to dig across, to make’ (Jakobson 1957: 91). These forms were then reanalyzed as simplex forms and subsequently used as transitive verbs. This is obvious from the fact that these verbs subcategorize for an internal argument. As expected, the initial plosives of these verbs undergo Spirantization.

(55) a. liɣi vota-
salmon dry_fish
‘dry salmon’

b. ki ɣiwr-
footwear adjust_footwear
‘pad footwear with grass’

c. c^{h}o xerqo-
fish take_on_the_hook_for_the_net
‘angle for fish’

[13] E.g. /seta/ ‘sugar’, /xo/ ‘bottle’, /xaza/ ‘scissors’ (all from Nanai. Kreinovich 1937).

As Jakobson (1957: 91) points out, these transitive verbs are newly formed verbs after i-deletion took place. This is the reason why they begin with plosives in citation forms.

4.6 Problems with Previous Analyses of CM

4.6.1 Introduction

Having observed the basic characteristics of CM, we are now ready to discuss the nature of this process. In particular, we want to know what the driving force behind CM is. Why should it occur and what is its function in the grammar of Nivkh? In pursuing this issue, I will compare the operation of CM with various phonological phenomena in other languages.

In order to narrow down the issue, I focus on the following concrete questions. Each concerns specific aspects of CM.

Question 1: Why do vowels, glides and plosives all trigger the same process (Spirantization) in spite of the fact that they do not form a natural class?

Question 2: Why is Spirantization blocked after fricatives and nasals? And why does Hardening apply in this context?

Question 3: Cross-linguistically, spirantization is triggered by continuants, typically vowels and glides (Kirchner 1998, 2004). However, in Nivkh, plosives trigger Spirantization to the same extent as vowels and glides. How can we account for this fact?

Question 4: There is a cross-linguistic tendency that spirantization targets segments in prosodically weak positions, such as root-final positions, unstressed syllables and affixes (Kirchner 1998, Harris and Urua 2001, Harris 2005). This is attested in many of the world's languages which have lenition processes: e.g. Spanish (Harris 1969), Campidanian Sardinian (Bolognesi 1998) and Ibibio (Harris and Urua 2001). On the other hand, spirantization in prosodically strong positions, such as root-initial, stressed syllables, content words, is rare and if it

> happens it implies spirantization in weak position as well (Kirchner 1998, Ségéral and Scheer to appear). This is the case with, for instance, Florentine Italian (Giannelli and Savoia 1979). In contrast, in Nivkh it is the morpheme-initial position which is targeted by Spirantization to the exclusion of medial and final positions. How can we account for this?

As we will see below, some of these questions have already been discussed in the literature. In the subsequent sections, I will begin with considering question 1) and review various approaches to this problem proposed in previous works.

4.6.2 The 'Natural Class' Problem

As seen in section 4.2.1 above, Spirantization applies after vowels, glides and plosives. On the other hand, it does not apply after fricatives and nasals. Regarding this grouping of triggering segments, one may ask what the driving force behind Spirantization is, given the fact that segments of the triggering set do not form a natural class.[14] The spreading of [+continuant] from neighboring continuants (mostly vowels), which is the standard autosegmental approach to spirantization (e.g. Padgett 1995), is not applicable since plosives trigger Spirantization to the same extent as vowels do.

In general, spirantization occurs more readily the greater the openness of the flanking segments of the target consonant (Kirchner 1998, 2004). This is a cross-linguistic tendency, and is dubbed the *Aperture Conditioning Generalization* by Kirchner (1998).

(56) The Aperture Conditioning Generalization

> Ceteris paribus, if a consonant C lenites when preceding (or following) X, and X' has an aperture greater than or equal to X, then C lenites, to the same extent or to a greater extent, when preceding (or following) X' as well.
>
> (Kirchner 1998: 189)

[14] "No formal statement of Gilyak (Nivkh) lenition has succeeded in stating the set of triggering segments as a natural class." (Blevins 1993: 1)

Thus lenition is more likely to occur in an [a-plosive-a] sequence than in an [ə-plosive-ə] context since in the former the displacement of the articulator (tongue/jaw) is greater (i.e. must travel further) to reach its constriction target. The idea behind this generalization is that lenition is driven by a phonetic imperative to minimize articulatory effort (Kirchner 1998: 2-3). The greater the displacement involved in a gesture, the greater the force required for the gesture, hence the greater the effort cost thereof. Lenition targets more effortful gestures since "the impetus to lenite more effortful gestures is stronger than the impetus to lenite easier gestures." (Kirchner 2004: 315)

The openness of the segments is represented in the Aperture Scale below. This scale is based on studies of jaw movements and the typological survey of lenition triggers (Kirchner 1998: 197).

(57) The Aperture Scale (greater openness > smaller openness)
low vowels > mid vowels > high vowels > liquids > glides > nasals > plosives > strident fricatives …> full or partial geminate

A typical example of spirantization that follows the Aperture Conditioning Generalization is found in the Dravidian language Shina. In this language, plosives spirantize when the aperture of the flanking segments is greater than or equal to that of [ɾ] (Kirchner 1998: 185, data from Rajapurohit 1983).

(58)	a.	baβo	'father'
	b.	səðiː	'monkey'
	c.	muɣuɾ	'bowl'
	d.	daɾβak	'race'
	e.	paɾða	'veil'
	f.	guɾɣuɾ	'churning rod'

There is, however, no spirantization after a plosive. This is predicted by the Aperture scale; plosives have smaller openness than [ɾ].

(59)	a.	ekbo	'alone'
	b.	səkdəɾ	'file (tool)'

In contrast, Nivkh Spirantization does not follow the Aperture Conditioning Generalization. The Spirantization context is not proportional to the Aperture Scale, which is defined on the degree of jaw aperture of the flanking segments. Examples like /k^{h}e̥rq sŋɨr/ (< /c^{h}ŋɨr/) 'seaweed' (section 4.2.1) show that Spirantization applies even when the plosive is flanked by a plosive and a nasal. As their low ranking on the Aperture Scale indicates, these segments are not typical lenition-triggers at all.

In the literature, there are roughly three approaches to account for the natural class problem, which I will call the Syntactic approach, the Assimilation-dissimilation approach and the Underspecification approach, respectively. In what follows, I will review these approaches and point out their problems.

4.7 Review of Previous Approaches

4.7.1 The Syntactic Approach

One solution to circumvent the natural class problem is to give up phonological analysis altogether and assigns CM to the morpho-syntax. CM is then the remnant of what once was a productive phonological rule that has fossilized in the morpho-syntax of the language, comparable to the consonant mutations of Celtic languages. Kreinovich, (1937, 1958, 1966), Austerlitz (1990), Watanabe (1992) and Gruzdeva (1997) take such a view (or something close to it). These authors regard CM as a pure syntactic marker that highlights syntactic relations such as modifier-noun or object-predicate. For instance, Watanabe (1992: 185) claims that CM compensates for the lack of overt morphological case marking in Nivkh. Being conditioned syntactically, there is no need for a phonological explanation to account for the fact that the triggering set of segments does not form a natural class.

The problem with this approach, however, is that it overlooks the phonological traits of Spirantization. First, as mentioned in section 4.4.1, Spirantization is sensitive to pause insertion. This is in sharp contrast with consonant mutation in Irish, which is reported not to be sensitive to pause insertion (Rotenberg 1978). In Irish, consonant mutation takes place even when a substantial pause intervenes between the triggering and the target segments.

(60) Ba…..[dh]ochtuir i
was doctor her
'She…..was a doctor.' (Rotenberg 1978: 96)

Pause sensitivity is used as a diagnostic for rule types in theoretical frameworks such as Lexical Phonology (Mohanan 1982, etc.) and Prosodic Phonology (Kaisse 1985, 1991, Nespor and Vogel 1986, Hayes 1990, etc.). This difference with Irish is therefore crucial and should not be overlooked.

Second, CM is not restricted to indicate a specific syntactic relation or category. It applies to every morpheme-initial obstruent within a designated domain. Thus the claim that CM demarcates boundaries of words which are in specific syntactic relationship, such as attributive-noun or object-predicate, cannot be generalized to, for instance, CM in suffixes.

Third, in Nivkh there are practically no restrictions on the vocabulary which triggers Spirantization. As seen in section 4.4.3, even recent loanwords from Russian may participate in CM as triggers. Again, this contrasts with Irish, which exhibits severe restrictions on the triggering set of constituents. In Irish, the triggers of consonant mutation are a closed set of items which are typically associated with functional categories, such as complementizers, tense and negative morphemes, determiners and pronominal possessive markers (Duffield 1997).

Fourth, Spirantization is applicable to a wide range of vocabulary in Nivkh. As seen in section 4.4.3, it only excludes recent loanwords. This contrasts with morpho-syntactic processes in other languages such as Rendaku (Sequential Voicing) of Japanese, which is largely limited to native vocabulary (Vance 1987, Ito and Mester 1995, 1999, Takayama 2005, etc). Another difference with Rendaku is that Rendaku has a number of idiosyncratic exceptions (Vance 1987, Ohno 2005) whereas in Nivkh exceptions are either systematic (recent loanwords) or marginal (some verb suffixes, see section 4.3.3), but crucially not idiosyncratic.

To conclude, the syntactic approach fails to capture the main phonological characteristics of Spirantization and groups it mistakenly with consonant mutation in Irish or Rendaku in Japanese, in which morpho-syntax plays an important role.

4.7.2 The Dissimilation-Assimilation Approach

The second approach to CM divides Spirantization into two distinct processes, and seeks solutions for the natural class problem. This approach analyzes CM as consisting of assimilation and dissimilation. Proponents of this analysis assume that Spirantization and Hardening are local phonological processes which apply in order to avoid the clustering of two plosives or two fricatives (Mattissen 1999: 299, 2003: 52-53, Kaneko 1999: 273-274). These are the segmental alternations which occur in plosive-plosive and fricative-fricative clusters. On the other hand, Spirantization after

vowels and glides, and voicing after nasals are considered processes of assimilation. Since dissimilation and assimilation are distinct processes which are triggered by different segments, it is no longer necessary to group plosives with vowels as members of the triggering group of Spirantization. As a result, the natural class problem disappears.

The shortcomings of this approach are the following. First, this analysis divides Spirantization into two processes (assimilation and dissimilation), thereby fails to relate the facts which all instances of Spirantization share. These are i) common outputs (fricative) and ii) common domains of application. Thus in this approach, it is a pure coincidence that both dissimilation and assimilation yield a fricative, and that no other measures are taken to avoid the clustering of plosives or fricatives (such as vowel epenthesis).

Second, this approach fails to explain why Spirantization targets morpheme-initial obstruents but not medial or final ones. The latter option seems more natural, in view of the prosodically non-prominent nature of non-initial positions cross-linguistically. In fact, the initial position of words is the most lenition-inhibiting context cross-linguistically (Harris 1997, Kirchner 1998, Honeybone 2005, Ségéral and Scheer to appear, etc.). The typological implication is that if a language exhibits lenition in strong positions, segments in weak positions should also be targeted by lenition, but not vice versa. Florentine Italian exemplifies such a case. In this dialect, word-initial plosives undergo spirantization when they are preceded by a vowel (61b, d, f). It is therefore expected that plosives in prosodically weaker positions undergo spirantization as well. This prediction is borne out. In medial positions, only fricatives surface (62).

(61)

a.	pentola	‘pot’
b.	la fentola	‘the pot’
c.	tavola	‘table’
d.	la θavola	‘the table’
e.	kasa	‘house’
f.	la xasa	‘the house’

(62)

a.	kafo	‘head’
b.	pɾaθo	‘meadow’
c.	amixo	‘friend’

(Giannelli and Savoia 1979. Cited from Kirchner 1998: 254)

In fact, it is reported that many Florentine speakers have difficulty in producing voiceless plosives in such medial positions when attempting to imitate Standard Italian (Giannelli and Savoia 1979).

Cypriot Greek exhibits another case of spirantization which targets weak positions. In this dialect, successive plosives are avoided by spirantizing the first plosive of the cluster (Kaisse 1988, 1992). The forms with the plosives can be observed by comparing Cypriot forms with those found in other Greek dialects.

(63)		Cypriot	Standard Greek	
	a.	extimo	ektimo	'I appreciate'
	b.	hefta	hepta	'seven'
	c.	skafto	skapto	'I dig'

Crucially, Cypriot Greek does not repair the plosive clusters by spirantizing the second plosive. This is because the second plosive in a cluster is prevocalic and thus in a strong position. This is in contrast with Nivkh, in which Spirantization targets the second plosive in the cluster. However, the Dissimilation-assimilation approach fails to explain where this difference with Cypriot Greek comes from. Why does Nivkh repair the clustering of plosives by spirantizing the one in strong position (second segment), unlike Cypriot Greek?

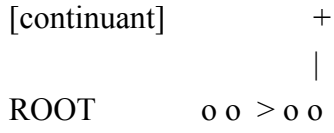
An Optimality Theoretic analysis using positional faithfulness (Beckman 1998) helps to highlight the problem. This framework breaks up faithfulness constraints according to the context, and assumes that the constraint which is associated with prominent position (root-initial, stressed syllable, foot-initial, syllable onset, etc.) is universally high-ranked. While such an analysis correctly captures the prosodic asymmetry between prominent and non-prominent positions, it becomes problematic to handle the type of processes as observed in Nivkh, in which the morpheme-initial position is targeted to the exclusion of medial and final positions (e.g. [mɨkɨk foqi] 'air bladder of dace' *[mɨɣɨɣ foʁi]). This is a serious problem for the Dissimilation-assimilation approach.

Without linguistically plausible solutions to these problems, the Dissimilation-assimilation approach cannot be accepted as a satisfactory alternative.

4.7.3 Underspecification Approach

Blevins (1993) advocates a third analysis, in which she makes use of underspecification. In order to group the triggering segments as a natural class, she proposes to underspecify the feature [continuant] in plosives and group them with vowels and glides. Spirantization applies when there are successive segments which are not specified for [continuant] at the underlying level. Blevins further assumes that Spirantization is a feature-filling rule which inserts [+continuant] on the second segment (Blevins 1993: 8).

(64) Spirantization



To make this rule work, Blevins assumes the following feature specifications for the consonantal inventory of Nivkh (only the relevant features are shown).

(65)

		[consonantal]	[continuant]
Aspirated plosives	/p^h/		
Non-aspirated plosives	/p/		
Voiceless fricatives	/f/		+
Voiced fricatives	/v/		+
Nasals	/m/		-
Lateral	/l/		(-)
Glides	/j/	-	

There are, however, a number of problems with this analysis. First, the underspecification of [continuant] in plosives is not independently motivated in the phonology of Nivkh. Blevins motivates it from the universal markedness of segment types: all languages have plosives, while not all languages have fricatives (Blevins 1993: 6). However, there is no language-internal evidence in Nivkh which supports this underspecification.

Second, this analysis postulates a rule which is language specific. Formulated as in (64), it is hard to see any relation between Nivkh Spirantization and spirantization in other languages. As a consequence, this analysis gives the impression that

Spirantization is an isolated phenomenon with no parallels in the phonological systems of the world's languages.

Third, the Spirantization rule (64) says nothing about the phonological nature of the process. Why should successive segments with unspecified [continuant] features be repaired by the insertion of [+continuant] on the second member? Blevins (1993: 8) admits that this rule is "phonologically odd" and concludes disappointingly that this oddness cannot be explained in synchronic terms (Blevins 1993: 9, footnote 9).

Fourth, her analysis assumes a rule which is sensitive to the absence of feature specification. Although Blevins carefully eschews the use of the term 'constraint' and refers to (64) as a "context-sensitive feature filling rule" (Blevins 1993: 9), this rule is practically indistinguishable from an OCP constraint of the type *[0continuant][0continuant]. The existence of constraints (or rules) which are sensitive to the absence of feature specifications (and not their presence) is controversial (cf. Dresher, Piggott and Rice 1994, Inkelas, Orgun and Zoll 1997, Avery and Idsardi 2001, etc.) and such phonological tools should be treated with caution.

This part of her analysis depends on a version of Underspecification theory in which she works with. In this theory, which she calls 'Relative Underspecification', it is assumed that negatively specified features and unspecified features can be treated separately in the phonology. This is the reason why Spirantization rule (64) does not apply after nasals. Nasals are specified as [-continuant] and thus behave differently from plosives, which are unspecified for [continuant]. Therefore, both nasals and fricatives (which are specified as [+continuant]) are able to block Spirantization, although they do not share feature specifications and do not form a natural class.

In sum, Blevins' analysis depends on the assumption that [continuant] expresses a ternary contrast ([+continuant] vs. [-continuant] vs. [0continuant]). Introducing ternary contrasts in the feature system opens the way to an excessively powerful descriptive device and should be avoided (cf. Stanley 1967, Dresher, Piggott and Rice 1994).

4.8 A Unified Account of Spirantization

4.8.1 Introduction

In section 4.6, I laid out the problems which Spirantization poses for current understandings of lenition. In the preceding sections, I reviewed the solutions of previous authors with special emphasis on the 'natural class' problem. The three approaches reviewed above differ substantially from each other, and indicate that there

is no agreement on how to capture the process. In particular, these works either gave up on analyzing the phenomenon as a synchronic phonological process (the Syntactic approach and the Underspecification approach), or on treating Spirantization as a unified phenomenon (Dissimilation-assimilation approach).

In this section I propose an alternative analysis which unifies all instances of Spirantization. I will present arguments in support of the hypothesis that CM is a synchronic phonological process which is motivated on perceptual grounds. In particular, I argue that Spirantization is an instance of a perceptually motivated process of lenition, characterized as a phonological operation which degrades information in the speech signal to accentuate the syntagmatic contrast among constituents (Harris and Urua 2001, Harris 2005). In what follows, I will unpack these remarks and show how they answer the problems seen above.

4.8.2 Lenition Degrades Phonetic Information

Harris, in a number of publications on lenition, describes the acoustic events that occur during spirantization as follows (Harris 1997, 2005, Harris and Urua 2001). When plosives undergo spirantization, the closure phase of the plosive is suppressed. In acoustic terms, this implies the loss of abrupt and sustained drop in amplitude from the speech signal. This signal cue characterizes the silent interval during the closure, and is a crucial perceptual cue to perceive and identify the acoustic event as that of a plosive, together with formant transitions and the noise bursts of release. Since spirantization removes such a cue, which is associated with the closure of the plosive, the spirantized segment lacks the selection of cues that are present in the non-spirantized congener. This is illustrated below with an example of the spirantization of a labial plosive [p] to a labial fricative [v]. The signal cues which are present are put in square brackets.

			Signal cue
(66)	a.	Labial plosive [p]	[Abrupt and sustained drop in amplitude]
			[Noise]
			[Labial spectral pattern]
	b.	Labial fricative [v]	[Noise]
			[Labial spectral pattern]
		Lost signal cue	<Abrupt and sustained drop in amplitude>

For lexical access, the listener has to reconstruct the original non-spirantized segment from the acoustic cues that have survived spirantization. These are the spectral pattern and the continuous noise associated with fricatives.

Since spirantization suppresses a signal cue, the non-spirantized segment is always richer in phonetic content (signal cue) than the spirantized congener. Spirantization is not the only process which suppresses the phonetic content of a segment. If the release burst is suppressed together with abrupt amplitude drop, the output is a frictionless bilabial glide [w], which would involve an instance of vocalization [p]>[w]. Similarly, if the spectral peak is suppressed, debuccalization [ɸ]>[h] occurs. The common denominator of these processes is the loss of perceptual information from the speech signal. This is the reason why Harris unifies these processes (spirantization, vocalization and debuccalization) as instances of lenition, even though they look different from each other on the surface.

4.8.3 Elements

Lenition, defined as information loss, cannot be adequately described using traditional binary systems of phonological features (Harris 1997, 2005, Harris and Urua 2001). In a system of binary features, spirantization is formulated as a feature-changing operation, such as [-continuant] > [+continuant]. This rule simply states a change of feature value and fails to capture the informational asymmetry between the input and output of the process. Binary features are not suitable to capture the observation made above that the informational weight is not identical in the input and output of lenition.

Instead of binary features, Harris proposes to use alternative phonological units which he calls ‘elements’. Unlike features, elements are unary, like the features in MCS (Chapter 3); they are either present or absent. When spirantization occurs, the element [edge], which characterizes the abrupt and sustained drop in overall amplitude, is suppressed (see (68)). The elements [noise] and [rump], which represent aperiodic energy and labial spectral pattern respectively, survive spirantization.

(67)

			Elements
a.	Labial plosive	p	[rump, edge, noise]
b.	Labial fricative	ɸ	[rump noise]
c.	Labial approximant	w	[rump]

(68) Spirantization (suppression of [edge])
[rump, <edge>, noise]

4.8.4 Spirantization as a Perceptually Motivated Process of Lenition

In section 4.8.2, we observed that lenition refers to a number of phonological processes which degrade information from the speech signal. The next question is why signal cue should be suppressed and perceptual information degraded. Harris' answer is the following. The loss of a perceptual cue highlights the informational asymmetry between segments which stand in syntagmatic contrast to each other. The citations below illustrate the point.

(69) a. "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)

b. "Information is not evenly distributed across phonological strings, its occurrence being subject to segmental, prosodic, or morphological conditions. Rich informational content is typically concentrated in positions of prosodic or morphological prominence… Informationally impoverished positions, such as those displaying neutralization, typically occur in contexts that are prosodically weak or morphologically recessive (affixes for example)." (Harris and Urua 2001: 86)

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)

Aspiration of English provides an example.

(70) Aspiration in English is not only paradigmatically informative, acting as the most robust local cue to the 'voice' identity of plosives, but it is also syntagmatically informative to the extent that it adheres to the onset of a stressed syllable and thus demarcates the left edge of a foot." (Harris and Urua 2001: 76)

Another example comes from Ibibio.[15] In this language, non-foot-initial plosives undergo lenition (vocalization) in prevocalic context (Harris and Urua 2001).[16]

(71)	a.	dɨp	'hide'	dɨβe	'hide oneself'
	b.	deep	'scratch'	deeβe	'not scratching'
	c.	bɔp	'tie'	bɔβɔ	'tie oneself'
	d.	bet	'shut'	beɾe	'be shut'
	e.	koot	'call'	kooɾo	'not calling'
	f.	fʌk	'cover'	fʌɣɔ	'cover oneself'
	g.	faak	'wedge'	faaɣa	'not wedged'

(72)	a.	kɔp	'lock'	kɔβ usʌŋ	'lock the door'
	b.	bet	'push'	beɾ owo	'push someone'
	c.	kʌk	'shut'	kʌɣ usʌŋ	'shut the door'

On the other hand, plosives in foot-initial position are immune to lenition. Thus there is an informational asymmetry with plosives in non-initial position. Crucially, informational asymmetry is realized in a restricted domain in Ibibio, which is the foot. Vocalization is not an automatic process which lenites plosives in every intervocalic context. Foot-initial plosives resist lenition even when they are located in intervocalic contexts as a result of morphological concatenation. The examples below illustrate such a case with prefixation ([ ] demarcate foot boundaries) (Harris and Urua 2001: 91).

(73)	a.	u-[taŋ]	*uɾaŋ	'plaiting'
	b.	u-[kʌp]	*uɣʌp	'covering'
	c.	i-[tooro]	*iɾooro	'(s)he is praising'

These examples show that for lenition to occur, the target should be located in a prosodically weak position. There is independent evidence that prefixes lie outside of the foot in Ibibio (Harris and Urua 2001: 87). The blocking of vocalization would be expected if the domain of vocalization were the foot.

[15] A Lower Cross language of the Delta Cross (Benue-Congo) family, spoken in Nigeria.

[16] Tones are omitted from the transcription.

Similarly, plosives which fall outside of the foot do not undergo vocalization either (Harris and Urua 2001: 91).[17]

(74)	a.	[dappa]-ke	*dappaɣa	'not dream'
	b.	[kɔŋŋɔ]-ke	*kɔŋŋɔɣɔ	'not unhook'
	c.	[damma]-ke	*dammaɣa	'is not crazy'

The domain-sensitive nature of lenition in Ibibio is reminiscent of Nivkh Spirantization. Like vocalization in Ibibio, Spirantization is not an automatic process; it strictly occurs within the specific domain which is defined syntactically (specifier-head (NP)/complement-head(VP)). This domain is strictly observed even in faster speech rate, unlike lenition in Florentine Italian. This observation leads us to conclude that Spirantization is not an articulatory motivated process (Kirchner 1998, 2004), but that it is perceptually motivated, like vocalization in Ibibio. Spirantization diminishes perceptual cues from the speech signal. When combined, domain-sensitivity and information loss function in a way which Harris characterized as the fundamental motivation of lenition; the accentuation of syntagmatic contrast. From this point of view, the lenition processes in Ibibio and Nivkh are identical. In Nivkh, the domain of Spirantization is larger than in Ibibio (the units which are syntagmatically contrasted are also larger, as we will see below). But crucially, it shares with Ibibio the generalization that i) lenition degrades information from the speech signal, and ii) lenition operates within a specific informational domain.

The analysis that Spirantization is lenition is supported independently by the fact that it yields non-strident fricatives. Being an information-degrading operation, lenition is supposed to yield non-strident fricatives instead of strident fricatives, which are rich in phonetic information (Harris and Urua 2001). The measurements conducted by the Russian phoneticians report that the frication of Nivkh fricatives is extremely weak (Zinder and Matusevich 1937, Rushchakov 1981). This matches my own impression. During the interviews with the consultants, I often heard a labio-velar approximant [w], which is reported not to occur in onset positions in WSN (Chapter 2). Later on, I found that this sound corresponds to [v]. This impression is shared by Zinder and Matusevich who note that the dental articulation of [v] is very weak (Zinder and Matusevich 1937: 119).

[17] Vowels within the foot exhibit vowel harmony.

4.8.5 Informational Asymmetry: the Units

In Nivkh, Spirantization creates informational asymmetry in the designated syntactic domain, which is specifier-head (NP) and complement-head (VP). Within these informational domains, the initial morpheme does not undergo Spirantization while the remaining non-initial morphemes may be targeted by Spirantization. Clearly, there is an informational asymmetry between the domain-initial morpheme and the remaining non-initial morphemes. By spirantizing the initial plosives of the latter, the domain-initial morpheme is contrastively highlighted.

In this respect, the differences between Spirantization and vocalization in Ibibio are interesting and are worth pointing out. First, Spirantization has a larger domain than vocalization. In Spirantization the maximal domain of application is the domain that spans the syntactic constituents complement-head (VP) or specifier-head (NP). In Ibibio it is the foot. Second, and most importantly, Spirantization is sensitive to domain-internal (morpheme) junctures while vocalization in Ibibio is not. In the current analysis, this difference is captured as the difference in the units which enter the syntagmatic contrast. In Nivkh, informational asymmetry is realized among morphemes, as is obvious from the fact that Spirantization targets only morpheme-initial segments. It does not target every plosive within its domain. This is obvious from the fact that it exhibits non-derived environment blocking (section 4.3), and is exemplified in the existence of words such as [mɨkɨk foqi] ‘air bladder of dace’ from [p^{h}oqi] ‘air bladder’. If Spirantization were not sensitive to domain-internal morpheme junctures and applied ‘across-the-board’, it would yield a form like *[mɨɣɨɣ foʁi]. This is not what we observe.

On the other hand, in Ibibio, informational asymmetry is realized between the foot-initial segment and every non-foot-initial segment. Within the foot, vocalization is not sensitive to any juncture. This contrasts with Spirantization, which is sensitive to internal junctures within its informational domain. In the traditional way of description of phonological processes, Spirantization should be classified as a ‘cyclic’ process, in the sense that it applies successively to each morpheme within a specific domain (NP, VP).

Cyclic application is problematic in much of the previous literature which deals with lenition. Most works deal only with lenition processes which apply non-cyclically. These are lenitions which typically target non-initial positions, to the exclusion of the prosodically prominent word-initial positions. In addition, it is also often the case that such processes expand the domain of application in proportion to speech rate; in faster speech, the domain becomes larger and/or the type of lenition

becomes radical (debuccalization, or the segment drops entirely). This is observed in lenition in the Italian dialects. On the other hand, Nivkh exhibits the opposite case. Spirantization targets initial position of morphemes to the exclusion of non-initial position. In addition, it does not expand its domain in proportion to speech rate.

My proposal is that lenitions which are sensitive to domain-internal junctures differ from lenitions which are insensitive to these junctures with respect to the units which are syntagmatically contrasted. While in the latter case it is each position within a specific domain which are contrasted, in the former it is morphemes (content words, suffixes, particles). This means that in Spirantization, the initial plosive of the CM domain fails to undergo lenition not because it is word-initial, but because it is in the most prominent position of this domain. On the other hand, the initial segments of non-initial morphemes are in weak positions and may be targeted by Spirantization, even though they are morpheme-initial. This is schematically illustrated below.

(75) $_{NP}$[[Noun][Noun-suffix]]
[[x……][x…-x…]]

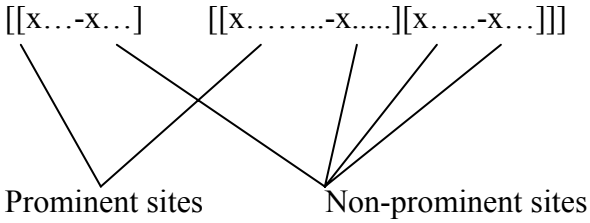
Prominent site Non-prominent sites

Since NPs constitute Spirantization domains, each non-initial morpheme enters the syntagmatic contrast by spirantizing the initial plosive. Suffixes never begin a CM domain. Therefore, Spirantization always applies to the initial position of a suffix whenever it can.

In a transitive structure, the subject is separated from the object-predicate cluster which constitutes a CM domain by itself.[18] In this structure, there are two prominent positions: the initial positions of the subject and the object. On the other hand, the initial plosive of the transitive verb is embedded in the complement-head domain (VP) and may be targeted by Spirantization (recall the examples in section 4.5.1).

[18] Subjects constitute separate prosodic domains in many sandhi phenomena, such as in tone sandhi in Ewe (Clements 1978), obstruent voicing in Korean (Cho 1990) and vowel shortening in Kimatuumbi (Odden 1990).

(76) $[_{NP}$[Noun-suffix]$]_{VP}[_{NP}$[Noun-suffix][Verb-suffix]]]



4.8.6 Advantages of the Lenition Approach

The current approach has a number of advantages over previous analyses. Notably, it succeeds in explaining many of the peculiarities of CM which were pointed out in section 4.6.1 above.

First, it explains why the target is restricted to morpheme-initial positions to the exclusion of medial and final positions. In the current analysis, this is because the units which enter the syntagmatic contrast are morphemes. Segments in medial and final position do not undergo Spirantization, since they are irrelevant for the contrast among morphemes. Medial and final positions are typically targets in lenition processes which apply across-the-board within a specific domain. This is exemplified, for instance, in Florentine Italian,[19]and most of the lenition processes discussed in Kirchner's dissertation (Kirchner 1998).

Second, the current approach does not face the natural class problem. Since Spirantization is motivated by perceptual demands (accentuating syntagmatic contrast), there is no need to group the triggering set of segments (vowels, glide, plosives) as a natural class. This is because in the current approach Spirantization is not a local process which occurs between adjacent triggers and targets. Plosives undergo Spirantization when they are in informationally light positions and not because they are preceded by vowels, glides or plosives. In this sense, there is no specific segment or group of segments which trigger Spirantization.[20]

Third, the current approach does not violate Kirchner's Aperture condition (section 4.6.2). This condition is defined in articulatory terms. The perceptually motivated analysis of lenition does not challenge generalizations which are defined in articulatory terms.

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[19] Nespor and Vogel (1982) assume the domain of spirantization of Florentine Italian to be the Intonational Phrase.

[20] Spirantization is blocked, however, by a specific group of segments (fricatives and nasals) as mentioned earlier. These contexts will be taken up in section 4.9 below.

Fourth, the current approach succeeds in explaining the difference with Irish with respect to sensitivity to pause insertions. Pause-sensitivity characterizes the phonological nature of Spirantization. It indicates that when prosodic and syntactic domains do not coincide, it is the prosodic domain to which the process gives priority. This is a characteristic shared by many of the phonological processes in the world's languages which apply in relatively large prosodic domains (Nepor and Vogel 1986, several contributors to Ewen and Anderson 1987, and Inkelas and Zec 1990, among others).

On the other hand, mutation in Irish is not sensitive to pause insertions (Rotenberg 1978 and section 4.7.1 above). This is because consonant mutation in the Celtic languages is not phonologically motivated (Grijzenhout 1995, Duffield 1997, Jaskuła to appear, etc.). Rather, it marks certain syntactic and morphological categories by means of phonological alternations (cf. Rotenberg 1978 on Irish). In contrast, characteristics such as pause-sensitivity indicate that Nivkh Spirantization is a phonological process. It is used to demarcate syntactic domains, but crucially, not morphosyntactic categories. This constitutes a crucial difference with consonant mutation in Celtic.

4.9 Blocking of Spirantization and the Application of Hardening

Spirantization does not target morpheme-initial plosives in all phonological contexts. As seen in section 4.2.1, it does not apply after fricatives and nasals. At the same time, these are the contexts where Hardening is triggered. In what follows, I will examine segmental alternations in similar contexts in other languages, and discuss why segments surface in the way they are on the surface. The discussions reveal that the segmental alternations in these contexts are local, i.e. triggered by the interaction of adjacent segments. This is in contrast with Spirantization, which I argued to be a non-local process in the above sections.

4.9.1 Post-Fricative Context

Cross-linguistically, successive fricatives tend to be disfavored as outputs of phonological processes. In what follows, I introduce such cases.

In Polish, spirantization is blocked if it would result in successive fricatives (Łubowicz 2002).

(77)	dronǰ+ek > dron[ž]ek		‘pole (diminutive)’
Cf.	róžǰ+ek > róžǰek	*róžž+ek	‘brain (diminutive)’

ǰ= postalveolar affricate, ž= postalveolar fricative

In English, there is the sporadically observed hardening of [θ] to [t] when it follows a fricative: [sikst] ‘sixth’, [twɛlft] ‘twelfth’ (Boersma 1998: 434).

The problem with successive fricatives has a perceptual basis. The cues in aperiodic signals are highly vulnerable and easily masked by other aperiodic noise (Wright 2004: 45).

On the other hand, fricative+plosive clusters preserve auditory cues much better. In such a cluster the offset frequency of the fricative spectrum serves as a cue to the place of articulation of the following plosive (Wright 2004: 38).

From these observations, I conclude that the post-fricative context blocks Spirantization for perceptual reasons. Successive fricatives yield weak auditory cues as compared to fricative+plosive clusters. This is an instance of dissimilation, disfavoring identical manner of articulation in successive fricatives. This dissimilation, however, is not operational in all lexical items. As seen in section 4.4.2, fricative-initial nouns never undergo Hardening. In such a context there is no other option except to yield the perceptually disfavored fricative+fricative clusters.

The current approach incorporates the dissimilation of adjacent fricatives in the following way. As discussed above, Spirantization applies to domain-internal morpheme junctures and creates informational asymmetry among morphemes within the domain. However, in case Spirantization leads to outputs that are extremely weak in auditory cues due to the local phonological environment (successive fricatives), it fails to apply and an alternative output with a stronger auditory cue is selected. Likewise, the same perceptual motivation triggers Hardening in the appropriate morpho-syntactic context.

This option is available only across morpheme boundaries. In monomorphemic words, we observe a number of examples with successive fricatives both medially and finally.

(78)	a.	aɣri	‘spit’	(FN)
	b.	covʁaj	‘wooden bowl’	(Pukhta 2002: 58)

	c.	ŋaʁri	‘shoulder’	(Pukhta 2002: 68)

(79)	a.	haɣs	‘clothes’	(FN)
	b.	taʁs	‘ornament’	(FN)
	c.	pɨvs	‘pestle’	(Pukhta 2002: 58)
	d.	luvr̥	‘spoon’	(Pukhta 2002: 58)
	e.	livs	‘dish’	(Pukhta 2002: 58)

In derived environments, successive fricatives surface in the following two contexts; i) when the fricative is part of a nominal stem (section 4.4.2), and ii) when the fricatives are part of morphemes which belong to different CM domains.

To conclude, what we observe in the post-fricative context is the result of a conflict between two opposing requirements; lenition (degrading of information) and preservation of auditory cues. In this particular context, the latter one wins.

4.9.2 Post-Nasal Context

The second context in which Spirantization fails to apply and Hardening is triggered is after nasals (section 4.2.1). But before discussing this context, I would like to emphasize once again that the nasal+plosive cluster surfaces irrespective of whether these segments are homorganic or not (/pilavon q^hal/ [pilavon q^hal] ‘the clan of Pilavon’). We emphasize this because cross-linguistically, homorganic nasal+plosive clusters tend to block spirantization. This is reported, for instance, in Spanish (Harris 1969) and Liverpool English (Honeybone 2005). In these languages, plosives that constitute part of geminate and/or a homorganic nasal+plosive cluster resist spirantization. In Spanish, spirantization of the voiced plosive is blocked in the latter context: *a Barcelona* [aβarθelona] but *en Barcelona* [embarθelona] (Honeybone 2005: 187). Liverpool English spirantizes non-initial [t, k]: e.g. *book* with a final [x] and *city* with a medial [θ]. In nasal+plosive clusters, however, spirantization is incomplete: *moment* with a final [tθ] and *inconvenience* with a postnasal [kx] are the preferred forms (Honeybone 2005: 182). On the other hand, in Nivkh, a nasal+plosive cluster needs not be homorganic to block Spirantization; any nasal+plosive cluster does so. This refutes an analysis which attributes the blocking of Spirantization to ‘(partial) geminate inalterability’ (Hayes 1986, Kirchner 1998, Honeybone 2005).

Similarly, the blocking cannot be due to the Nasal/Continuant Marking Condition of Padgett (1995). According to this condition, nasal+fricative clusters are disfavored for the following reason. While nasals frequently place-assimilate to a following plosive, they rarely assimilate to a following fricative: e.g. *impossible* but *infamous*, instead of **imfamous*. According to Padgett, this is because place assimilation implies stricture assimilation. Thus, when a nasal assimilates to the place node of the following segment, it will automatically assimilate to the stricture node as well. Accordingly, assimilation to a fricative yields a nasalized fricative, a phonologically highly marked segment. This is the reason why in nasal+fricative contexts, languages show diverse outputs: no assimilation (English, see above), default place assignment (Polish), or deletion of the nasal (Zoque, Lithuanian). According to Padgett, these are all strategies to prevent nasalized fricatives.

Again, this is not a viable analysis for Nivkh. In Nivkh, Spirantization is blocked independently of place assimilation. Obviously, the clustering of nasals and fricatives should be disfavored for another reason. The lack of homorganicity between the nasal and the fricative indicates that an articulatory account is not promising.

As a first observation, it should be pointed out that nasals are the most typical segments which induce voicing of the following (lenis) plosive in WSN (Chapter 2 and 3). Thus, in discussing the phonological events that occur in post-nasal contexts, it seems promising to focus on this characteristic of the nasals.

In Nivkh, voiced plosives hardly ever occur in word-initial position. It is reported that initial voiced plosives occur only in names (80) or in affective-expressive forms (81) (Kreinovich 1937: 81-82, Panfilov 1962: 7, Mattissen 2003: 73).

(80)
a. Benik
b. Dun
c. Gudan

(81)
a. bilk~~i~~r- < pilk~~i~~r- ‘big’
b. duzla- < tuzla- ‘cold’

On the basis of this restricted distribution of voiced plosives, Mattissen points out that voiced plosives are an indication of medial position (Mattissen 2003: 74). This assumption is compatible with the current approach, if we conceive of voicing as an instance of lenition. In fact, voiced plosives are even better signals of medial position than fricatives: while fricatives occur word-initially (at least in Contemporary Nivkh), the initial occurrence of voiced plosives is rare. The use of voiced plosives as a cue to signal medial position is, however, restricted, because in order to undergo voicing,

plosives should be preceded by sonorants, notably nasals (Chapter 3). The blocking of Spirantization after nasals indicates that whenever a voiced plosive is available in the phonological environment, it is selected in preference to the fricative, the former being a more suitable cue of medial position than the latter. I assume that it is this perceptual motivation which blocks lenis plosives from undergoing Spirantization after nasals. Or, put differently, in this context lenition takes the form of voicing instead of Spirantization.

The case with aspirated plosives requires a different explanation. Aspirated plosives do not undergo voicing and thus cannot signal medial position in the way lenis plosives do. Yet they resist Spirantization (section 4.2.1).

The key lies, again, in the voicing effect of nasals. The post-nasal context is a voicing-inducing context cross-linguistically (cf. Pater 1999 and references therein). As seen above, Nivkh is not an exception to this tendency. This voicing, however, does not neutralize the laryngeal contrast between fortis and lenis obstruents (Chapter 3). The maintenance of a laryngeal contrast in such a voicing-inducing context does not come for free, however. It is reported that languages which maintain a laryngeal contrast in post-nasal contexts adopt special measures to protect the voicelessness of plosives. Hayes and Stivers (in progress) compared the pronunciation of nasal+plosive clusters of the pseudo-words *tompa* and *tomba* of English speakers in an experiment and observed that in /mp/ the nasal was (relatively) short and the plosive long, whereas in /mb/ the nasal was long and the plosive short. From this observation, they conclude that the greater length of the plosive in /mp/ relative to /mb/ is an important factor in maintaining the perception of the voicelessness of /p/. Another means of resisting voicing that they found was aspiration (vocal cord abduction). The plosive of /mp/ had a significantly longer voice onset time than the plosive in /rp/ (in the pseudo-word *tarpa*). Hayes and Stivers assume that aspiration is a speaker-specific strategy in English to maintain the voicelessness of /p/ (Hayes and Stivers in progress: 30).

Hayes and Stivers' point is that voicing is preferred after nasals in all languages which have nasal+plosive clusters, and that this voicing is a threat to those languages which have a laryngeal contrast in this position. The result is that some languages give up on maintaining the laryngeal contrast (as in the native Yamato vocabulary of Japanese). English maintains the contrast by the enhancement strategies mentioned above: durational adjustment and aspiration. Nivkh patterns with English in maintaining a laryngeal contrast after nasals. Although no measurements were conducted, it is highly possible that Nivkh has enhancement strategies like English to over-differentiate the laryngeal contrast in post-nasal context. This is especially likely since Nivkh, like English, is an aspiration language (Chapter 3).

In general, fricatives are less suited to bear a laryngeal contrast than plosives (Steriade 1993, Avery 1996, Jansen 2004). Fricatives have relatively restricted phonetic means of expressing laryngeal contrast as compared to plosives. The continuous airflow across an oral constriction required for the production of fricative noise puts inherent limitations on the number of laryngeal actions and configurations that are available (Jansen 2004: 83). The inferiority of fricatives in exercising a laryngeal contrast as compared to plosives is typologically confirmed. According to Jansen (2004: 79-80), the UCLA Phonetic Segment Inventory Database (UPSID, 1984 version) counts 236 (74.4%) languages out of 317 languages which have a laryngeal contrast (based on some sort of VOT distinction) in plosives, but only 119 (40.5%) of the languages have a laryngeal contrast in fricatives. This suggests that laryngeal contrast (supported by voicing distinctions) is less stable in fricatives than in plain stops (Jansen 2004: 80).

From these observations, I conclude that Spirantization is blocked in the post-nasal context in order to maintain the laryngeal contrast. The voicing associated with nasals provides a constant pressure to the following obstruent to undergo voicing. To counterbalance this pressure and protect the laryngeal contrast, plosives fare better than fricatives. By not spirantizing the plosive, the laryngeal contrast maintains the rich phonetic means which are available in plosives (VOT, presence and relative amplitude of aspiration noise and release burst) but not in fricatives.

To conclude, the conflict here is between a syntagmatic contrast (lenition) and a paradigmatic contrast (maintain laryngeal contrast). The data show that it is the paradigmatic requirement that wins in this context.

4.9.3 Summary

We account for the two contexts in which Spirantization and Hardening conspire to yield the same sequences of segments, which are fricative+plosive and nasal+plosive, in the following way: these sequences surface due to perceptual demands which operate on local basis (i.e. beween adjacent segments). The disfavored outputs are fricative+fricative and nasal+fricative clusters. The former is avoided because of the weak auditory cues which successive fricatives yield. This is an instance of dissimilation. The latter cluster is avoided for perceptual reasons as well. A nasal induces voicing of the following plosive. Since voiced plosives are better cues for domain-internal positions, voicing is preferred in this context. At the same time, voicing is a threat for the maintenance of laryngeal contrast. Since plosives are more suited to resist voicing from the nasal than fricatives, and to bear laryngeal contrast in

general, they are selected as outputs. In both contexts, the preferred outputs appear for local perceptual reasons.

4.10 Hardening: How to Account for the Exceptions

In the previous sections, we saw that transitive verbs are the only targets of Hardening among content words. When preceded by a complement, it is predictable from the phonological context whether the initial obstruent of the verb is a plosive or fricative. In other words, the contrast between a plosive and a fricative is neutralized in this context. A plosive is the preferred output when the preceding segment is either a nasal or a fricative. When preceded by a vowel, a glide or a plosive, transitive verbs surface with an initial fricative. Since the citation form of many of the transitive verbs begins with a fricative for historical reasons (section 4.5), we identified the appearance of plosive-initial forms in the relevant context as a result of Hardening.

On the other hand, fricative-initial nouns do not undergo Hardening in the phonological context in which transitive verbs undergo Hardening (section 4.4.2). In fact, fricative-initial nouns never exhibit Hardening in any context. In section 4.5, we saw that this asymmetry had an historical origin. Fricative-initial transitive verbs are considered to be derived historically from plosive-initial forms by the attachment of the indefinite pronominal prefix *i-/e-* (Jakobson 1957, Austerlitz 1977). In many cases, these plosive-initial forms were the intransitive counterparts of transitive verbs (section 4.5).

In contrast, nouns did not undergo such a derivation. Unlike transitive verbs, fricative-initial nouns did not derive from plosive-initial forms. This crucial difference between the transitive verbs and nouns led to their different behavior with respect to Hardening. The question is how to account for this difference, which has an historical origin, in the synchronic analysis.

There are two ways of describing this noun/verb asymmetry in previous literature. One sort of description is to stipulate that fricative-initial nouns are exceptions to Hardening (e.g. Kreinovich 1937: 64, Panfilov 1962: 15, Gruzdeva 1997: 89, Mattissen 2003: 49). Another way of description is to make use of 'prespecification',[21] and to manipulate the underlying form of transitive verbs. In this approach, transitive verbs

[21] 'Precompilation' is a similar notion used by Hayes (1990). Nivkh CM (thus both Spirantization and Hardening), however, differs from typical cases of precompiled phrasal processes discussed by Hayes. For instance, a typical precompiled process is not sensitive to pause insertions (Hayes 1990: 107), whereas Nivkh CM is (section 4.4.1).

are regarded as 'exceptions' which solely undergo Hardening (Blevins 1993, Shiraishi 2000). This analysis follows the diachronic development of transitive verbs (section 4.5), and assumes that transitive verbs begin with a plosive at the underlying level. As a consequence, transitive verbs behave like plosive-initial nouns: they undergo Spirantization when preceded by a vowel, a glide or a plosive, but when preceded by a nasal or a fricative, they surface with an initial plosive. This is illustrated below.

(82) Derivation of transitive verbs

Underlying form	/q^{h}a/	'shoot'	(Cf. citation form /χa-/)
a.	c^{h}xɨf q^{h}a	'shoot a bear'	
b.	ŋa χa-	'shoot an animal'	

(83) Derivation of Nouns

Underlying form	/pɨŋx/	'soup'	(Cf. citation form /pɨŋx/)
a.	c^{h}xɨf pɨŋx	'bear soup'	
b.	c^{h}o vɨŋx	'fish soup'	

As a consequence of such a prespecification, this analysis eschews Hardening, refusing it any status in Nivkh phonology. In order to derive the surface forms, only Spirantization is needed. Like nouns, the only process which transitive verbs undergo is Spirantization. Since the underlying form of the transitive verbs begins with a plosive, there is no need to postulate a process of Hardening in order to account for the plosive-initial forms which appear after nasals and fricatives. In other words, plosive-initial forms do not surface as a result of Hardening, but are regarded as the underlying forms. Thus what looks like the result of Hardening on the surface is in fact the result of the blocking of Spirantization.

Note that this analysis postulates different forms for the underlying and the citation forms of the transitive verbs. The latter is derived by a rule which spirantizes the initial plosive of the transitive verbs. Crucially, this rule targets only transitive verbs. It applies when the transitive verb lacks an overt complement, and signals that the complement is an unspecified object 'someone/something'. Blevins (1993) expresses this as an addition of the lexical feature [+unspecified object] in her rule of Verb spirantization.

(84) Verb spirantization (Blevins 1993)

[+cont]
⋮
[o
V^o [+unspecified object]

The prespecification approach explains the noun-verb asymmetry in the following way. Since there is no process of Hardening, there is no way for the initial fricatives of nouns to change to plosives even in contexts where fricatives are the disliked outputs (section 4.4.2). What we observe as CM on the surface is thus the result of either Spirantization or the blocking of it. There is no active process of Hardening which changes fricatives to plosives. Accordingly, there is no need for a rule-specific stipulation which states that fricative-initial nouns are systematic exception to Hardening.

From the known empirical facts on the phenomenon, it is difficult to evaluate the adequacy of the two approaches. Both approaches stipulate in the grammar that there are exceptional items (exceptions to a rule, or exceptionally prespecified items), and are therefore indistinguishable on that point. It goes without saying that an analysis without any stipulation is desirable. Such an analysis seems possible, since the exceptions to Hardening are not arbitrary but systematic in Nivkh. The exceptional items of Hardening are the nouns. Likewise, in the prespecification approach, the lexical items which undergo prespecification are transitive verbs, and not an arbitrary set of lexical items. I will leave this issue for future research. [22]

4.11 Conclusion

In this chapter I advocated an analysis which regards CM as a perceptually motivated process. Like processes such as vocalization and debuccalization, spirantization diminishes perceptual information from the speech signal, thereby creating informational asymmetry within a specific domain. In Nivkh, Spirantization targets every initial position of a non-initial morpheme within the designated syntactic domain. As a result of this operation, segments in domain-initial positions are contrastively

[22] Shiraishi (2004a) proposes an analysis of Hardening which attempts to avoid morpheme-specific stipulations.

emphasized. Seen from this perspective, Spirantization is a non-local process in the sense that it has no specific segments as triggers.

On the other hand, there are also contexts in which Spirantization fails to apply. Since these are exactly those contexts in which Hardening applies, it is obvious that the two processes conspire to achieve the same sequence of segments. These are the contexts where fricatives are disliked for perceptual reasons. As a result, it is plosives which surface in these contexts, either as a result of Hardening or the blocking of Spirantization.

The overall picture of CM should now be clear. CM involves local and non-local processes, which are both perceptually motivated. Spirantization is a non-local process, which applies in order to create informational asymmetry among morphemes within a specific domain. However, it fails to apply if its application would create perceptually problematic sequences of segments. At the same time, Hardening applies in the same contexts in order to repair problematic sequences of segments. The current analysis captures this conspiracy of Spirantization and Hardening as an interaction of local and non-local perceptual demands. Accordingly, we maintain the view that Nivkh CM is a perceptually motivated process.

Chapter 5

Conclusion

This thesis discussed two topics from the phonology of WSN: laryngeal phonology and Consonant Mutation. These were discussed in Chapters 3 and 4, respectively. For each of the topics, I drew the following conclusions: 1) Nivkh is an aspiration language, and 2) Consonant Mutation is a perceptually motivated process.

In Chapter 3, I argued that Nivkh is an aspiration language. This implies that Nivkh has the laryngeal feature [spread glottis] as the contrastive feature in both plosives and fricatives. In the past, many works overlooked the fact that aspirated plosives and voiceless fricatives pattern together in the laryngeal phonology of Nivkh, and that there is an asymmetry between the members of the contrast. Notably, aspirated plosives and voiceless fricatives are the obstruent series which exhibit dimensional invariance, which means that they exhibit stable acoustic/auditory cues in a large number of contexts. This is unlike the opposite members of the contrast, the non-aspirated plosives and the voiced fricatives, which are susceptible to influences from surrounding segments. This asymmetry is captured by the classification of Nivkh obstruents into fortis and lenis (Austerlitz 1956, Jakobson 1957, Hattori 1962). In the current analysis, it is captured by feature specifications: aspirated plosives and voiceless fricatives are the obstruent types which are specified for a laryngeal feature at the underlying level (by [spread glottis]), whereas non-aspirated plosives and voiced fricatives are unspecified.

In the subsequent discussions, it was made clear that voicing plays no role in the lexical phonology of Nivkh. A process in which voicing is apparently involved, Final Fricative Voicing, was identified with an instance of contextual voicing, which we described as a phonetic interpolation from the surrounding voiced segments to a segment which lacks underlying laryngeal specifications. In addition to contextual voicing, voicing was also involved in enhancement, a phonetic operation which over-differentiates segmental contrasts at the surface level. We concluded that in WSN, contextual voicing and enhancement are the main sources of voicing. Accordingly, we maintain the hypothesis that WSN has an asymmetric laryngeal contrast with [spread glottis] as the only active feature.

Another topic of this thesis, Consonant Mutation was discussed in Chapter 4. Consonant Mutation exhibits a number of characteristics which make it difficult to capture it as a phonological process at first glance. For instance, Spirantization applies after plosives, which is known to be the most unlikely context for a synchronic process of spirantization to apply cross-linguistically (e.g. Ségéral and Scheer, to appear). In addition, Spirantization targets morpheme-initial segments to the exclusion of medial and final segments. Again, this is not in agreement with the cross-linguistic tendency that spirantization targets prosodically weak positions to the exclusion of prosodically strong positions. These peculiarities led many of the previous authors to conclude that CM is a primarily syntactically motivated process, which is not associated with synchronic phonology (e.g. Kreinovich 1937). Other authors gave up on analyzing Spirantization as a unified phenomenon, and divided it into distinct processes of assimilation and dissimilation (e.g. Mattissen 2003).

In this chapter, however, I argued that CM is a synchronic phonological process, and presented new data, which I collected in fieldwork, in support of this view. Notably, CM is sensitive to pause insertion (section 4.4.1). This constitutes a crucial difference with consonant mutation in languages such as Irish, which is not sensitive to pause insertions (Rotenberg 1978). The current thesis correctly captures this difference by claiming that CM is a primarily a phonologically motivated process.

The current thesis captures another characteristic of CM which was often overlooked in previous works: the conspiracy of Spirantization and Hardening. Spirantization applies in contexts where Hardening does not, and Hardening applies in contexts where Spirantization does not. The current thesis captures this conspiracy by analyzing CM as an interaction of a local and a non-local process which are motivated on perceptual grounds. In particular, I argued that Spirantization is a non-local (non-assimilatory) process: a perceptually motivated instance of lenition (e.g. Harris 2005). A perceptually motivated lenition applies in order to create informational asymmetry between segments in a specific domain (Harris and Urua 2001, Harris 2005). On the other hand, I argued that Hardening, and the failure of Spirantization in the same context, should be regarded as a result of a local demand, which disfavors specific sequences of segments for perceptual reasons. This is in contrast to the non-local process of Spirantization, which is not triggered by specific types of segments. The current thesis regards CM as an interaction of non-local process of Spirantization and locally induced segmental alternations, such as Hardening and the blocking of Spirantization.

While I focused on only two phonological topics in this thesis, there are many other interesting topics which are worth discussing in separate papers. I usually encountered such interesting data when listening to recordings, but occasionally also

when I was in the fortunate position to listen 'live' to the conversation of the language consultants. Some of these interesting processes were introduced in Chapter 2. In the future, I would like to examine such phonological events in more detail and test the hypotheses on more data.

At the same time, it is of special importance to facilitate access to the linguistic data, especially with respect to a relatively undocumented language such as Nivkh. The publication of sound recordings makes it easier to check the hypotheses advanced in this thesis and elsewhere. Such an effort also contributes to document an endangered language which has only 477 speakers left and to provide feedback to the local community (Chapter 1).

The discussions in chapters 3 and 4 benefited greatly from new data which I recorded from the contemporary speakers of WSN. These discussions demonstrate how valuable such information can be in a proper understanding of linguistic phenomena. In this respect, fieldwork remains an inevitable part of the linguistic enterprise also in the future.

References

Archangeli, D. (1984) *Underspecification in Yawelmani phonology and morphology*. Ph.D. thesis, Massachusetts Institute of Technology.

Archangeli, D. (1989) Aspects of underspecification theory. *Phonology* 5: 183-207.

Austerlitz, R. (1956) Gilyak nursery words. *Word* 12 (2): 260-279.

Austerlitz, R. (1959) Semantic components of pronoun systems: Gilyak. *Word* 15: 102-109.

Austerlitz, R. (1974) Paleosiberian languages. In *Encyclopedia Britannica* 13: 914-916.

Austerlitz, R. (1977) The study of Paleosiberian languages. In D. Armstrong and C. van Schoonveld (eds.) *Roman Jakobson: Echoes of His Scholarship*, pages 13-20. Lisse: Peter de Ridder Press.

Austerlitz, R. (1990) Typology in the service of internal reconstruction: Saxalin Nivx. In W. Lehman (ed.) *Language Typology 1987: Systematic Balance in Language*, pages 17-33. Amsterdam: Benjamins.

Avery, P. (1996) *The Representation of Voicing Contrasts*. Ph.D. thesis, University of Toronto.

Avery, P. (1997) Voicing specification and the specification of [voice]. In P. Avery and C. Smallwood (eds.) *Toronto Working Papers in Linguistics* 16 (1): 21-36.

Avery, P. and W. Idsardi (2001) Laryngeal dimensions, completion and enhancement. In T. Hall (ed.) *Distinctive Feature Theory*, pages 41-70. Berlin and New York: Mouton de Gruyter.

Beckman, J. (1998) *Positional Faithfulness*. Ph.D. thesis, University of Massachusetts, Amherst.

Bessonova, N. (2003) Znachenie narodnogo naslediia v vospitanii i obuchenii doshkol'nika. In T. Roon and M. Prokof'ev (eds.), 216-219.

Blevins, J. (1993) Gilyak lenition as a phonological rule. *Australian Journal of Linguistics* 13: 1-21.

Boersma, P. (1998) *Functional Phonology: Formalizing the Interactions between Articulatory and Perceptual Drives* [LOT international series 11]. Ph.D. thesis, University of Amsterdam (The Hague: Holland Academic Graphics).

Bolognesi, R. (1998) *The Phonology of Campidanian Sardinian: A Unitary Account of a Self-Organizing Structure*. Ph.D. thesis, University of Amsterdam (The Hague: Holland Academic Graphics).

Bondarko, L. and L. Zinder (1962) Foneticheskaia kharakteristika razlichnykh tipov sintaksicheskikh sochetanii v nivkhskom iazyke. *Voprosy iazykoznaniia* 11 (4): 84-89.

Booij, G. and J. Rubach (1987) Postcyclic versus postlexical rules in lexical phonology. *Linguistic Inquiry* 18 (1): 1-44.

Burykin, A., A. Girfanova, A. Kastrov, I. Marchenko and N. Svetozarova (eds.) *Kollektsii narodov severa v fonogrammarkhive pushkinskogo doma*. Faculty of Philology, University of Saint Petersburg.

Cambier-Langeveld, T. (1999) The interaction between final lengthening and accentual lengthening: Dutch versus English. In R. van Bezooijen and R. Kager (eds.) *Linguistics in the Netherlands* 16: 13-26.

Cambier-Langeveld, T. (2000) *Temporal Marking of Accents and Boundaries*. Ph.D. thesis, University of Leiden.

Carr, P., J. Durand and C. Ewen (eds.) (2005) *Headhood, Elements, Specification and Contrastivity: Phonological Papers in Honour of John Anderson*. Amsterdam: John Benjamins.

de Carvalho, C., T. Scheer and Philippe Ségéral (eds.) *Lenition and Fortition*. Berlin and New York: Mouton de Gruyter.

Cho, Y-M. (1990) Syntax and phrasing in Korean. In S. Inkelas and D. Zec (eds.) 47-62.

Clements, G. (1978) Tone and syntax in Ewe. In D. Napoli (ed.) *Elements of stress, tone and intonation*, pages 21-99. Washington D.C.: Georgetown University Press.

Cohn, A. (1993) The status of nasalized consonants. In M. Huffman and R. Krakow (eds.) *Nasals, Nasalization and the Velum*, pages 329-367. San Diego: Academic Press.

Docherty, G. (1992) *The Timing of Voicing in British English Obstruents*. Berlin: Foris.

Dresher, E., G. Piggott and K. Rice (1994) Contrast in phonology: overview. In C. Dyck (ed.) *Toronto Working Papers in Linguistics* 13 (1): iii-xvii.

Duffield, N. (1997) Configuring mutation in Irish. *Canadian Journal of Linguistics* 42: 75-110.

Durand, J. and B. Laks (eds.) (1996) *Current Trends in Phonology: Models and Methods*. Salford: University of Salford Publications.

Eremin, S., C. Taksami and V. Zolototrubov (1988) *Nivkhi Sakhalina*. Novosibirsk: Nauka.

Ernestus, M. (2000) *Voice Assimilation and Segment Reduction in Casual Dutch*. Ph.D. thesis, Free University of Amsterdam.

Ewen, C. and J. Anderson (1987) *Phonology Yearbook 4*.

Federal State Statistics Service (2004) *Russian Census 2002*. URL: www.perepis2002.ru

Flemming, E. (1995) *Auditory Representations in Phonology*. Ph.D. thesis, University of California at Los Angeles.

Giannelli, L. and L. Savoia (1979) Indebolimento Consonantico in Toscana. *Revista Italiana di Diallettologia* 2: 23-58.

de Graaf, T. (1992) Small languages and small language communities: news, notes and comments 9: The small languages of Sakhalin. *International Journal of the Sociology of Language* 94: 185-200.

de Graaf, T. (2004) The status of endangered languages in the border areas of Japan and Russia. In J. Argenter and R. McKenna Brown (eds.) *Endangered Languages and Linguistic Rights. Proceedings of the Eighth FEL Conference*. 153-160.

de Graaf, T. and H. Shiraishi (2004) Voices from tundra and taiga, capacity building for some endangered languages of Russia. In P. Austin (ed.) *Language Documentation and Description* 2, pages 59-70. The School of Oriental and African Studies, University of London.

Grant, B. (1995) *In the Soviet House of Culture: A century of Perestroikas*. Princeton University Press: Princeton.

Grijzenhout, J. (1995) *Irish Consonant Mutation and Phonological Theory*. Ph.D. thesis, Utrecht University.

Gruzdeva, E. (1997) Aspects of Nivkh morphophonology: initial consonant alternation after sonants. *Journal de la Société Finno-Ougorienne* 87: 79-96.

Gruzdeva, E. (1998) *Nivkh*. München: Lincom Europa.

Harris, James (1969) *Spanish Phonology*. Cambridge: MIT Press.

Harris, J. (1994) *English Sound Structure*. Oxford: Blackwell.

Harris, J. (1997) Licensing inheritance: an integrated theory of neutralisation. *Phonology* 14: 315-370.

Harris, J. (2005) Vowel reduction as information loss. In P. Carr, J. Durand and C. Ewen (eds.), 119-132.

Harris, J. and E-A. Urua (2001) Lenition degrades information: consonant allophony in Ibibio. *Speech, Hearing and Language: Work in Progress* 13: 72-105.

Hattori, T. (1955) Giriyakugo. In S. Ichikawa and S. Hattori (eds.) *Sekai gengo gaisetsu* 2, pages 751-775. Tokyo: Kenkyusha.

Hattori, T. (1962a) Versuch einer Phonologie des Südostgiljakischen (I). *Journal of Hokkaido Gakugei University (Sapporo)* 13 (1): 67-130.

Hattori, T. (1962b) Versuch einer Phonologie des Südostgiljakischen (II). *Journal of Hokkaido Gakugei University (Sapporo)* 13 (2): 29-96.

Hattori, T. (1986) Nivkh. *Kokubungaku Kaishaku to Kanshoo* 51 (1): 129-132.

Hattori, T. (1988) Giriijakugo. In T. Kamei, R. Koono and E.Chino (eds.) *The Sanseido Encyclopaedia of Linguistics* 1, pages 1408-1414. Tokyo: Sanseido.

Hayes, B. (1986) Inalterability in CV Phonology. *Language* 62: 321-351.

Hayes, B. (1990) Precompiled phrasal phonology. In S. Inkelas and D. Zec (eds.) 85-108.

Hayes, B., D. Steriade and R. Kirchner (eds.) *Phonetically Based Phonology*. Cambridge: Cambridge University Press.

Hayes, B. and T. Stivers (in progress) Post nasal voicing. Ms., University of California at Los Angeles.

Heemskerk, J. and W. Zonneveld (2000) *Uitspraakwoordenboek*. Utrecht: Spectrum.

Honeybone, P. (2005) Sharing makes us stronger: process inhibition and segmental structure. In P. Carr, J. Durand and C. Ewen (eds), 167–192.

Inkelas, S., O. Orgun and C. Zoll (1997) The implications of lexical exceptions for the nature of grammar. In I. Roca (ed.), 393-418.

Inkelas, S. and D. Zec (eds.) (1990) *The Phonology-Syntax Connection*. Chicago: The University of Chicago Press.

Ito, J. and A. Mester (1995) Japanese phonology. In J. Goldsmith (ed.) *The Handbook of Phonological Theory*, pages 817-838. Oxford: Blackwell.

Ito, J. and A. Mester (1999) The structure of the phonological lexicon. In N. Tsujimura (ed.) *The Handbook of Japanese Linguistics*, pages 62-100. Oxford: Blackwell.

Iverson, G. and S-C Ahn (to appear) English voicing in dimensional theory. In P.Carr and P.Honeybone (eds.) *Language Sciences -Issues in English Phonology*.

Iverson, G. and J. Salmons (1995) Aspiration and laryngeal representation in Germanic. *Phonology* 12: 369-396.

Iverson, G. and J. Salmons (1999) Glottal spreading bias in Germanic. *Linguistische Berichte* 178: 135-151.

Iverson, G. and J. Salmons (2003) Legacy Specifications in the Laryngeal Phonology of Dutch. *Journal of Germanic Linguistics* 15.1: 1-26.

Jakobson, R. (1957) Notes on Gilyak. In *Studies Presented to Yuen Ren Chao on his Sixty-fifth Birthday* = Academia Sinica, Taiwan, *Bulletin of the Institute of History and Philology* 29 (1): 255-281. Reprint in R. Jakobson (1971): *Selected Writings II. Word and Language,* pages 72-97. The Hague and Paris: Mouton.

Jakobson, R. and L. Waugh (1987) *The Sound Shape of Language*. Berlin and New York: Mouton de Gruyter.

Jakobson, R., G. Fant and M. Halle. (1951) *Preliminaries to Speech Analysis*. Cambridge: MIT Press.

Janhunen, J. (1993) *UNESCO Red Book on Endangered Languages.* http://www.helsinki.fi/~tasalmin/nasia_index.html.

Jansen, W. (2004) *Laryngeal Contrast and Phonetic Voicing. A Laboratory Phonology Approach to English, Hungarian, and Dutch*. Ph.D.thesis, University of Groningen.

Jaskuła, K. (to appear) The origins of Celtic lenition. In C. de Carvalho, T. Scheer and P. Ségéral (eds.) *Lenition and Fortition*. Berlin and New York: Mouton de Gruyter.

Jessen, M. (1998) *Phonetics and Phonology of Tense and Lax Obstruents in German*. Amsterdam: John Benjamins.

Jessen, M. and C. Ringen. (2002) Laryngeal features in German. *Phonology* 19: 189-218.

Kaisse, E. (1985) *Connected Speech*. Orlando: Academic Press.

Kaisse, E. (1986) Locating Turkish devoicing. In *Proceedings of the West Coast Conference on Formal Linguistics* 5: 119-128.

Kaisse, E. (1988) Modern Greek continuant dissimilation and the OCP. Ms., University of Washington, Seattle.

Kaisse, E. (1991) Toward a typology of postlexical rules. In S. Inkelas and D. Zec (eds.), 127-143.

Kaisse, E. (1992) Can [consonantal] spread? *Language* 68: 313-332.

Kaneko, T. (1999) *For Indigenous Languages*. Tokyo: Sofukan.

Kenstowicz, M. and C. Kisserberth (1979) *Generative Phonology: Description and Theory.* New York: Academic Press.

Kiparsky, P. (1973) Abstractness, opacity, and global rules. In O. Fujimura (ed.) *Three dimensions of linguistic theory*, pages 57-86. Tokyo: Taikusha.

Kiparsky, P. (1982) From cycle to lexical phonology. In H. van der Hulst and N. Smith (eds.), *The structure of phonological representations (Part 1)*, pages 131-176. Foris: Dordrecht.

Kirchner, R. (1998) *An Effort-based Approach to Consonant Lenition*. Ph.D. thesis, University of California at Los Angeles.

Kirchner, R. (1999) Preliminary thoughts on "phonologisation" within an exemplar-based speech processing system. In G. Matthew (ed.) *UCLA Working Papers in Linguistics* 1: 207-231.

Kirchner, R. (2004) Consonant lenition. In B. Hayes, D. Steriade and R. Kirchner (eds.), 313-345.

Kohler, K. (1984) Phonetic explanation in phonology: the feature fortis/lenis. *Phonetica* 41: 150-174.

Kreinovich, E. (1933) *Cuz dif.* Moscow and Leningrad: Uchpedgiz.

Kreinovich, E. (1934) Nivkhskii (giliackii) iazyk. In Ia. Al'kor (ed.) *Iazyki i pis'mennost' narodov severa* III. Leningrad: Instituta narodov severa (Trudy po lingvistike, 3: 181-222).

Kreinovich, E. (1937) *Fonetika nivkhskogo (giliackogo) iazyka*. Moscow and Leningrad: Uchpedgiz.

Kreinovich, E. (1979) Nivkhskii iazyk. *Iaziki azii i afriki* 3, pages 295-329. Moscow: Nauka.

Ladefoged, P. and I. Maddieson (1996) *The Sounds of the World's Languages.* Oxford: Blackwell.

Laigun, N. (2003) Zhiznedeiatel'nost' korennykh malochislennykh narodov sakhalina: real'nost' i prespektivy. In T. Roon and M. Prokof'ev (eds.), 235-243.

Łubowicz, A. (2002) Derived environment effects in optimality theory. *Lingua* 112: 243-280.

Mamcheva, N. (2003) *Obriadovye muzykal'nye instrumenty aborigenov sakhalina*. Yuzhno-Sakhalinsk: Sakhalin National University Press.

Mattissen, J. (1999) Dependent-head synthesis in Nivkh – with an outlook on polysynthesis in the Far Northeast. *Sprachtypologie und Universalienforschung* 52 (3/4): 298-319.

Mattissen, J. (2003) *Dependent-Head Synthesis in Nivkh: A Contribution to A Typology of Polysynthesis*. Amsterdam: John Benjamins.

Mohanan, K. (1982) *Lexical Phonology*. Ph.D. thesis, Massachusetts Institute of Technology.

Nakagawa, H., T. Sato and K. Saito (1993) Regional differences in the basic vocabulary of the Nivkh language in Sakhalin. In K. Murasaki (ed.) *Ethnic Minorities in Sakhalin,* pages 209-254. Report of Grant-in-Aid 02044002 of the Japanese Ministry of Education, Culture and Sport.

Nakanome, A. (1917) *Nikubun bunten*.Tokyo: Sanseido.

Nespor, M. and I. Vogel (1982) Prosodic domains of external sandhi rules. In H. van der Hulst and N. Smith (eds.) *The Structure of Phonological Representations* (Part I), pages 225-255. Dordrecht: Foris.

Nespor, M. and I. Vogel (1986) *Prosodic Phonology*. Dordrecht: Foris.

Nichols, J. (1989) On alienable and inalienable possession. In W. Shipley et al. (eds.) *In Honor of Mary Haas: From the Haas Festival Conference on Native American Linguistics*, pages 557-610. Berlin: Mouton de Gruyter.

Novikova, K. and V. Savel'eva (1953) K voprosy o iazykakh korennykh narodnostei sakhalina. In *Iazyka i istoriia narodnostei krainego severa SSSR,* pages 84-133. Leningrad: Lenigradskii Gosudarstvennyi Universitet. Reprint of the English translation by T.Hattori appeared in (2000) in *T.Hattori – Selected Writings*, pages 309-341, Sapporo: Hokkaido shuppan kikaku center.

Odden, D. (1990) Syntax, lexical rules and postlexical rules in Kimatuumbi. In S. Inkelas and D. Zec (eds.), 259-277.

Ohno, K. (2005) *Sei-daku*: Diachronic developments in the writing system. In J. van de Weijer, K. Nanjo and T. Nishihara (eds.) *Voicing in Japanese*, pages 47-70. Berlin and New York: Mouton de Gruyter.

Padgett, J. (1995) *Stricture in Feature Geometry*. Stanford: CSLI Publications.

Padgett, J. (2002) Russian voicing assimilation, final devoicing, and the problem of [v]. Ms., University of California at Santa Cruz.

Panfilov, V. (1962) *Grammatika nivkhskogo iazyka* 1. Moscow and Leningrad: Nauka.

Panfilov, V. (1965) *Grammatika nivkhskogo iazyka* 2. Moscow and Leningrad: Nauka.

Panfilov, V. (1968) Nivkhskii iazyk. In P. Skorik (ed.) *Iazyki narodov SSSR* 5, pages 408-434. Leningrad: Nauka.

Pater, J. (1999) Austronesian nasal substitution and other NC effects. In R. Kager, H. van der Hulst, and W. Zonneveld (eds) *The Prosody Morphology Interface*, pages 310-343. Cambridge: Cambridge University Press.

Payne, T. (1997) *Describing Morphosyntax: A Guide for Field Linguists*. Cambridge: Cambridge University Press.

Polet'eva, S. (2003) Prepodavanie nivkhskogo iazyka v shkole (iz opyta raboty). In T. Roon and M. Prokof'ev (eds.), 209-215.

Pukhta, M. (2002) *Nivkh-Russian Conversation and Daily-life Thesaurus*. ELPR publication series A2-017.

Pulleyblank, D. (1983) *Tone in Lexical Phonology*. Ph.D. thesis, Massachusetts Institute of Technology.

Rajapurohit, B. (1983) *Shina Phonetic Reader*. Mysore: Central Institute of Indian Languages.

Rice, K. (1990) Predicting rule domains in the phrasal phonology. In S. Inkelas and D. Zec (eds.) 289-312.

Rice, K. (1994) Laryngeal Features in Athapaskan Languages. *Phonology* 11 (1): 107-148.

Roca, I. (ed.) (1997) *Derivations and Constraints in Phonology*. Oxford: Clarendon Press.

Roon, T. and M. Prokof'ev (eds.) (2003) *Narody i kul'tury dal'nego vostoka: Vzgliad iz XXI veka*. Yuzhno-Sakhalinsk: Sakhalinskoe knizhnoe izdatel'stvo.

van Rooy, B. and D. Wissing (2001) Distinctive [voice] implies regressive voice assimilation. In T. Hall (ed.) *Distinctive Feature Theory*, pages 295-334. Berlin and New York: Mouton de Gruyter

Rotenberg, J. (1978) *The Syntax of Phonology*. Ph.D. thesis, Massachusetts Institute of Technology.

Rushchakov, V. (1980) O sootnoshenii otdel'nykh kharakteristik konsonantizma v nivkhkom i koreiskom jazykakh. In *Diakhronija i tipologiia iazykov* (Lingvisticheskie issledovaniia 1980), pages 178-182. Moscow: AN SSSR, Institut iazykoznaniia.

Rushchakov, V. (1981) *Akusticheskie kharakteristiki soglasnykh nivkhskogo iazyka*. Ph.D. thesis, Akademiia nauk SSSR, Leningradskoe otdelenie instituta iazykoznaniia.

Sangi, V. and L. Gashilova (2003) *Slovar' nivxsko-russkii (sakhalinskii dialect)*. Saint Petersburg: The Russian Ministry of Education.

Savel'eva, V. and C. Taksami. (1965) *Russko-nivkhskii slovar'*. Moscow: Sovetskaia enciklopediia.

Savel'eva, V. and C. Taksami. (1970) *Nivkhsko-russkii slovar'*. Moscow: Sovetskaia enciklopediia.

de Schutter, G. and J. Taeldeman (1986) Assimilatie van stem in de zuidelijke Nederlandse dialekten. In M. Devos et al. (eds.) *Vruchten van zijn akker. Opstellen van (oud)medewerkers en oud-studenten voor Prof. V.F. Vanacker*, pages 91-133. Seminarie voor Nederlandse Taalkunde en Vlaamse Dialectologie, Rijksuniversiteit Gent.

Ségéral, P. and T. Scheer (to appear) Positional factors in lenition and fortition. In C. de Carvalho, T. Scheer and P. Ségéral (eds.) *Lenition and Fortition*. Berlin and New York: Mouton de Gruyter.

Shiraishi, H. (2000) Nivkh consonant alternation does not involve hardening. *Journal of Chiba University Eurasian Society* 3: 89-119. Abridged version appeared in the *Proceedings of the 120th meeting of the Japanese Society of Linguists*, 42-47.

Shiraishi, H. (2001) Metrical evidence for cliticization in Nivkh pronouns. *Proceedings of the 123rd meeting of the Japanese Society of Linguists*, 224-229.

Shiraishi, H. (2004a) Base-Identity and the Noun-Verb Asymmetry in Nivkh In D. Gilbers, M. Schreuder and N. Knevel (eds.) *On the Boundaries between Phonetics and Phonology*, pages 159-182.

Shiraishi, H. (2004b) Phonologically driven allomorphy of Nivkh transitive verbs: with implication for the nature of prefix i-. In F. Endo (ed.) *Languages of the North Pacific Rim* 9, pages 179-196. ELPR publication series A2-043.

Shiraishi, H. and G. Lok. (2002) *Sound Materials of the Nivkh Language 1: Folktales of V.F.Akiliak-Ivanova*. ELPR publication series A2-15. Available from http://ext-web.edu.sgu.ac.jp/hidetos/.

Shiraishi, H. and G. Lok (2003) *Sound Materials of the Nivkh Language 2: Songs and Folktales of the Amur Dialect*. ELPR publication series A2-36. Available from http://ext-web.edu.sgu.ac.jp/hidetos/.

Shiraishi, H. and G. Lok (2004) *Sound Materials of the Nivkh Language 3: Pygsk*. Publication of the international NWO project "Voices from Tundra and Taiga", University of Groningen. Available from http://ext-web.edu.sgu.ac.jp/hidetos/.

Shternberg, L. (1905) *The Social Organization of the Gilyak*. In B. Grant (ed.) (1999) New York and Seattle: American Museum of Natural History and the University of Washington Press.

Shternberg, L. (1908) Materialy po izucheniiu giliackogo iazyka i fol'klora. In *Obrachy narodnoi slovesnosti* 1, Part I. Saint Petersburg: Imper. akademii nauk.

Stanley, R. (1967) Redundancy rules in phonology. *Language* 43 (2): 393-436.

Steriade, D. (1987) Redundant values. *CLS* 23 (2): 339-362.

Steriade, D. (1993) Closure, release and nasal contours. In M. Huffman and R. Krakow (eds.) *Phonetics and Phonology 5: Nasals, Nasalization and the Velum*, pages 401-470. New York: Academic Press.

Stevens, K. and S. Keyser (1989) Primary features and their enhancement in consonants. *Language* (65): 81-106.

Takahashi, M. (1942) *Karafuto Girijakugo*. Osaka: Asahi Shimbunsha.

Takayama, T. (2005) A survey of Rendaku in loanwords. In J. van de Weijer, K. Nanjo and T. Nishihara (eds.) *Voicing in Japanese*, pages 177-190. Berlin and New York: Mouton de Gruyter.

Taksami, C. (1997) Lecture note at Chiba University, September 1997.

Taksami, C., M. Pukhta and A. Vingun (1982) *Nivkhgu bukvar' dlia podgotovitel'nogo klassa nivkhskikh shkol* (amurskii dialect). Leningrad: Prosveshchenie.

Taksami, C. and S. Polet'eva (1992) *Lyi betarh*. Saint Petersburg: Shkolnaia biblioteka.

Tangiku, I. (2006) Nivufugo no hyooki. In A. Shiohara and S. Kodama (eds.) *Writing unwritten languages*, pages 123-142. Tokyo: Research Institute for Languages and Cultures of Asia and Africa.

Trubetzkoy, N. (1939) *Grundzüge der Phonologie*. Prague: Travaux du Cercle Linguistique de Prague.

Vance, T. (1987) *An Introduction to Japanese Phonology*. New York: SUNY Press.

Vysokov, M. (2006) *Istoricheskii opyt kolonizatsii sakhalina rossei v 19-20 vekakh*. Lecture at the Slavic Research Center, Hokkaido University, June 22, 2006.

Watanabe, M. (1992) Giriyakugo tadooshibun no tokuchoo. In O. Miyaoka (ed.) *Kita no gengo: ruikei to rekishi*, pages 179-190. Tokyo: Sanseido.

Westbury, J. (1975) The status of regressive voicing assimilation as a rule of Russian. *Texas Linguistic Forum* 1: 131-144.

Wetzels, L. and J. Mascaró (2001) The typology of voicing and devoicing. *Language*, 77 (2): 207-244.

Wright, R. (2004) A review of perceptual cues and cue robustness. In B. Hayes, D. Steriade and R. Kirchner (eds.), 34-57.

Zinder, L. and M. Matusevich. (1937) Eksperimental'noe issledovanie fonem nivkhskogo iazyka. In E. Kreinovich (1937) *Fonetika nivkhskogo (giliackogo) iazyka*, pages 103-151. Moscow and Leningrad: Institut narodov severa.

Zwicky, A. (1977) *On Clitics*. Reproduced by the Indiana University Linguistics Club. Bloomington, Indiana.

Samenvatting

Het toetreden van Michael Gorbatjov tot de hoogste macht van de Soviet-Russische politiek en zijn perestrojka hebben belangrijke consequenties gehad voor het bestuderen van de talen die gesproken worden op het grondgebied van de toenmalige Soviet-Unie. Westerse taalkundigen stroomden naar gebieden die lange tijd alleen toegankelijk waren voor Russische onderzoekers en konden daar veldwerk verrichten. De kontakten met de sprekers van minderheidstalen in Rusland hebben het hun mogelijk gemaakt om de beschrijving van deze talen door Russische specialisten na te gaan en gedeeltelijk te vernieuwen.

Nivch (ook Giljak genoemd), een geïsoleerde taal in het Amoer-gebied en op het eiland Sachalin in het Russische Verre Oosten, is één van zulke talen (zie kaarten 1-3). Veldwerk ter bestudering van deze taal van een heel klein volk (met 4902 vertegenwoordigers volgens de volkstelling van 2002) door een groep Westerse taalkundigen werd pas mogelijk tijdens de eerste internationale expeditie naar Sachalin in 1990 (de Graaf 1992). Helaas waren de Nivchs in die tijd al zodanig gerussifiseerd dat slechts 20% van hen nog de eigen taal beheerste. Er werd nog maar zelden in het Nivch gesproken en dan alleen door leden van de oude generatie. Om te kunnen communiceren met hun kleinkinderen, moesten de grootouders Russisch spreken, voor de meesten van hen vaak een vreemde taal.

In de afgelopen jaren is deze toestand verder verslechterd. Onze ervaring met de sprekers laat zien dat de Nivch-taal alleen nog gesproken wordt door vertegenwoordigers van de generatie boven de zestig (Hoofdstuk 1). De taal wordt allang niet meer overgedragen op de jonge generatie. Het Nivch is in deze zin een ‘stervende taal’ en het ziet er naar uit dat in de nabije toekomst de taal werkelijk uitsterft met de dood van de laatste sprekers.

Wat denken de Nivchs zelf over deze situatie? Uit onze gesprekken blijkt dat velen van hen het zeer pijnlijk vinden dat ze hun taal aan het verliezen zijn. “De taal is de kern van de cultuur en van onze identiteit als Nivch”, zo vertelde ons een onderwijzeres tijdens ons veldwerk in het dorp Nekrasovka in Noord-Sachalin. Ieder jaar overlijden oude Nivchs, met hun excellente kennis en spreekvaardigheid van de taal. Zo’n dood doet pijn, niet alleen bij de nabestaanden, maar ook bij het gehele volk. Met iedere dood gaat kennis van de taal, cultuur, traditie en geschiedenis van de samenleving verloren. Dit is een groot verlies voor het volk, als men bedenkt hoe weinig vertegenwoordigers van deze generatie er nog over zijn. Dit verklaart ook waarom ons vaak gevraagd wordt haast te maken met het beschrijven en documenteren

van de taal. In het bijzonder voor de Nivchs vormt ons werk een belangrijke taak die moet worden uitgevoerd voordat het te laat is.

Sommige Nivchs hebben zelf het initiatief genomen om in dezen iets te ondernemen. Zo zijn er volksensembles opgericht in verschillende dorpen. Er worden regelmatig festivals gehouden met toneel, dans of zang als uitingen van de Nivch-cultuur. Sinds 1980 wordt het Nivch onderwezen in de dorpen Nekrasovka, Nogliki en Chir-Unvd (zie kaart 2). Dit is echter niet voldoende om de taal weer tot leven te brengen, wat velen van de Nivchs zich realiseren (Hoofdstuk 1, sectie 1.2.4). De 'herleving' van een taal wordt pas mogelijk met een systematische ondersteuning door de overheid en de sterke wil daartoe van het volk zelf. Beide ontbreken helaas in de huidige Russische samenleving. Terwijl veel Nivchs het pijnlijk vinden dat ze hun taal aan het verliezen zijn, zijn er maar weinig van hen die er werkelijk iets aan kunnen doen. Velen van hen lijden onder de talloze problemen in de Russische Federatie: werkloosheid, alcoholmisbruik, criminaliteit, milieuvervuiling, enz. In werkelijkheid hebben de meeste Nivchs hun handen vol om aan hun dagelijkse brood te komen en zijn er zeer weinig die nog tijd en energie over hebben voor het handhaven van de taal en cultuur.

Eén van de doelen van dit proefschrift is om bij te dragen aan een verbetering van deze situatie. Alleen al het feit dat een buitenlander hun taal bestudeert geeft het gevoel aan de Nivchs dat hun taal een zeker prestige heeft. Zo zien ze dat hun taal nog steeds de moeite waard is om bestudeerd te worden, nadat Soviet-Russische taalkundigen als Kreinovich en Panfilov in het verre verleden nauwkeurige beschrijvingen hebben achtergelaten. In dit proefschrift kan men zien hoe verschillende fonologische verschijnselen van het Nivch interessant zijn voor moderne theorieën en hoe de gevonden data en de gevoerde discussies bij kunnen dragen tot de ontwikkeling daarvan.

Een ander doel van dit proefschrift is daarom gericht op de fonologische beschrijving van het Nivch-dialect van West-Sachalin, op basis van data die we verzameld hebben bij ons veldwerk (Hoofdstuk 2 en Shiraishi and Lok 2002, 2003, 2004). Uit ons veldwerk blijkt, dat een aantal van de fonologische eigenschappen die beschreven zijn in de eerste helft van de vorige eeuw nog terug te vinden zijn in de taal van de huidige sprekers. Dit is bijvoorbeeld te zien in de consonantmutatie en de spirantisatie van velaire en uvulaire plosieven (Hoofdstuk 2, sectie 2.5.1, Hoofdstuk 4). De mutatiepatronen van de consonanten die onze sprekers laten zien, komen in de meeste gevallen overeen met de beschrijving van Kreinovich (1937). Sterker nog, door ons onderzoek is een nauwkeuriger beschrijving mogelijk gemaakt. Zo blijkt dat de spirantisatie van de velaire en uvulaire plosieven alleen verplicht is tussen een

zelfstandig morfeem en een suffix en dat het optioneel is tussen twee zelfstandige morfemen (Hoofdstuk 2, sectie 2.5.1).

Er zijn ook nieuwe feiten naar voren gekomen. Het onderscheid tussen 'alienable' en 'inalienable possession' is één daarvan. In de literatuur is het bekend dat in een possessieve constructie van het Nivch de possessieve pronomina worden afgekort: /ŋ-ɨtɨk/ 'mijn vader' (/ŋi/ 'mijn', /ɨtɨk/ 'vader'). In onze data vinden we echter een aantal woorden die de volledige pronominale woordvormen vereisen in plaats van de afgekorte vormen: /p^{h}i-oq/ 'eigen jas' (/p^{h}i/ 'eigen', oq 'jas'), maar niet */p^{h}-oq/. Uit ons onderzoek blijkt dat het onderscheid tussen deze twee possessieve strategieën niet een willekeurige keuze is voor de gebruikte vorm, maar dat deze keuze gebaseerd is op een semantisch criterium. De afgekorte pronomina worden gebruikt in bloedverwantschapstermen en bij de benoeming van lichaamsdelen en voor de Nivch cultureel belangrijke objecten. Daarentegen is het gebruik van de volledige vormen te zien bij woorden als 'kleding' en 'ski's'. Het bezit van de laatste objecten kan worden beëindigd en de verhouding tot de bezitter is losser in vergelijking met de eerste groep woorden. Een dergelijk onderscheid in possessieve strategieën staat in verschillende talen bekend als 'inalienable/alienable possession' (cf. Nichols 1989).

In de Hoofdstukken 3 en 4 concentreren we ons op twee onderwerpen: laryngale fonologie en consonantmutatie. In het laatste decennium zijn er veel publikaties verschenen over deze onderwerpen uit de theoretische fonologie. Ons doel is om de vruchten van deze discussies over te brengen naar de beschrijving en de analyse van fonologische verschijnselen in het Nivch.

In Hoofdstuk 3 wordt het laryngale contrast van obstruenten aan de hand van een aantal laryngale verschijnselen in de taal besproken. Nivch obstruenten tonen een contrast tussen geaspireerde plosieven (zoals /p^{h}/) en niet-geaspireerde plosieven (/p/), en tussen stemloze fricatieven en stemhebbende fricatieven (zoals tussen /s/ en /z/). Terwijl in de literatuur (Kreinovich 1937, Panfilov 1962, et.al.) vaak wordt aangenomen dat in het Nivch i) de laryngale kenmerken die de obstruenten onderscheiden verschillen in plosieven en fricatieven (respectievelijk aspiratie en stemhebbendheid), en ii) de fonologische kenmerken van in paren voorkomende obstruenten fonologisch gezien even sterk zijn (symmetrisch contrast), presenteren we argumenten die deze standpunten in twijfel trekken.

Wat betreft i) wijzen we erop dat de plosieven en de fricatieven onderliggend één laryngaal kenmerk ([spread glottis]) gemeen hebben. Een argument hiervoor komt voort uit de consonantmutatie. In dit verschijnsel wisselen geaspireerde plosieven af met stemloze fricatieven en niet-geaspireerde plosieven met stemhebbende fricatieven. Een analyse waarin aspiratie en stemhebbendheid beide een rol spelen is problematisch

bij het beschrijven van deze afwisselingen. Dit komt omdat zo'n analyse niet duidelijk maakt waarom de afwisselingen zijn zoals ze zijn. Met dezelfde argumentatie zou men net zo goed een regel kunnen geven waarin een geaspireerde plosief afwisselt met een stemhebbende fricatief, of een niet-geaspireerde plosief met een stemloze fricatief. Aangezien de afwisselingen altijd optreden tussen een geaspireerde plosief en een stemloze fricatief en tussen een niet-geaspireerde plosief en een stemhebbende fricatief, is het aannemelijk dat deze paren gemeenschappelijk een laryngaal kenmerk hebben, en dat consonantmutatie dit kenmerk niet aantast.

Wat betreft ii) wijzen twee observaties erop dat het fonologische kenmerk van één van de samengevoegde obstruenten sterker is dan dat van de opponent. Ten eerste zijn er enige verschijnselen die de laryngale kenmerken van de niet-geaspireerde plosieven en van de stemhebbende fricatieven aantasten, terwijl dit niet geldt voor de geaspireerde plosieven en de stemloze fricatieven (sectie 3.3). Er bestaat dus een asymmetrie binnen de obstruenten: obstruenten die sterkere kenmerken vertonen zijn de geaspireerde plosieven en de stemloze fricatieven. De tegenovergestelde groep obstruenten, de niet-geaspireerde plosieven en de stemhebbende fricatieven, zijn zwakker, in de zin dat ze kwetsbaar zijn onder de invloed van laryngale fonologische eigenschappen van de naburige segmenten. Zo'n asymmetrisch contrast kan worden aangetoond met onderspecificatie: het niet speciferen van de kwetsbare kenmerken in een fonologisch contrast (zie 1).

(1)

p^h	p	f	v
|		|	
[spread glottis]		[spread glottis]	

De tweede obervatie die het asymmetrische contrast ondersteunt, is de inertie (of onzichtbaarheid) van stemhebbenheid in de fonologie van het Nivch. Verschijnselen waaraan stemhebbendheid gebonden is, hebben eigenschappen die afwijken van typische verschijnselen van de (lexicale) fonologie. 'Final Fricative Voicing' (FFV) is zo'n verschijnsel. In het Nivch wordt een fricatief die aan het eind van een morfeem staat stemhebbend uitgesproken wanneer deze gevolgd wordt door een klinker, een sonorant of een stemhebbende fricatief. Uit ons onderzoek blijkt dat dit verschijnsel niet gevoelig is voor een syntactische grens, maar dat het altijd plaatsvindt wanneer de relevante segmenten naast elkaar komen te staan. Dit is in tegenspraak met consonantmutatie, waarin de aanwezigheid van een syntactische grens de toepassing van de regel kan blokkeren (Hoofdstuk 4). Dit verschil in gevoeligheid voor syntactische informatie wijst erop dat FFV een verschijnsel is dat dichter op de fonetische oppervlakte plaatsvindt in vergelijking met consonantmutatie. Deze

observatie suggereert dat stemhebbendheid geen rol speelt in de fonologie van het Nivch, of met andere woorden, dat het fonologisch 'inert' is. Deze discussies leiden ons tot de conclusie dat het laryngale contrast in het Nivch asymmetrisch is en dat de geaspireerde plosieven en de stemloze fricatieven gespecifeerd zijn voor het laryngale kenmerk [spread glottis]. Deze analyse classificeert het Nivch als een 'aspiratietaal'.

Hoofdstuk 4 bespreekt consonantmutatie, een verschijnsel dat ook in het verleden veel aandacht heeft getrokken van de fonologen. Consonantmutatie van het Nivch is een verschijnsel waarin binnen een syntactisch bepaald domein plosieven veranderen in fricatieven (spirantisatie) en fricatieven in plosieven ('hardening'). Na een overzicht van dit verschijnsel presenteren we een aantal problemen die het ons moeilijk maken om het verschijnsel te beschrijven als een fonologisch proces. Eén van deze problemen is het feit dat spirantisatie ook plaatsvindt na een plosief. Dit is in tegenspraak met typologisch bekende patronen van spirantisatie, waarbij in het algemeen plosieven spirantisatie ondergaan na een continuant (klinker, glijklank), maar zelden of nooit na een plosief (Kirchner 1998, 2004). Een ander probleem is dat spirantisatie alleen van toepassing is op morfeem-initiële plosieven, maar niet op plosieven in andere posities. Dit is in tegenspraak met spirantisatie in andere talen waarin juist alleen de niet-initiële plosieven spirantisatie ondergaan. De in de literatuur gangbare analyse gaat uit van de verklaring dat spirantisatie een vorm van verzwakking (lenitie) is. Plosieven in niet-initiële posities zijn prosodisch gezien zwak, en dus de primaire doelen van spirantisatie. Daarentegen is een morfeem-initiële positie prosodisch sterk, en dus zijn het de niet-initiële die spirantisatie ondergaan. Spirantisatie in het Nivch is uitzonderlijk omdat juist het omgekeerde het geval is.

Tenslotte moet de fonologische context van 'hardening' worden verklaard. 'Hardening' vindt plaats na een fricatief of een nasaal. Dit is precies de context waar spirantisatie geblokkeerd wordt. Er bestaat dus een 'samenzwering' tussen de twee processen. Beide zorgen ervoor dat de klankopeenvolgingen altijd fricatief-plosief of nasaal-plosief zijn, in plaats van fricatief-fricatief of nasaal-fricatief. Maar wat is de reden dat de laatste opeenvolgingen vervangen moeten worden door de eerste?

Deze eigenschappen van consonantmutatie hebben sommige Nivchologen doen concluderen, dat het primair een syntactische verschijnsel is, vergelijkbaar met consonantmutatie van het Iers. Deze eigenaardigheden hoeven fonologisch niet verklaard te worden als consonantmutatie een syntactische verschijnsel is. Er zijn echter aanwijzingen die erop duiden dat consonantmutatie in het Nivch een fonologisch verschijnsel is. Deze zijn onder andere de gevoeligheid voor pauzes (sectie 4.4.1) en de observatie dat consonantmutatie geen idiosyncratische uitzonderingen heeft (sectie 4.7.1). Wij stellen voor dat hier de consonantmutatie een combinatie is van een lokaal ('hardening') en een niet-lokaal proces (spirantisatie). Er

wordt besproken dat spirantisatie een vorm van lenitie is die in de zin van Harris gemotiveerd is op perceptuele basis (Harris en Urua 2001). Een door de perceptie gemotiveerde lenitie vindt plaats binnen een bepaald domein om asymmetrie te creëren in de perceptuele informatie die het klanksignaal bevat. Deze asymmetrie in de informatie accentueert het syntagmatische contrast tussen de onderdelen van het domein. In het Nivch overbrugt dit domein i) specifier en hoofd in NP's en ii) complement en hoofd (werkwoord) in VP's. Spirantisatie creëert asymmetrie tussen de sterke positie van het domein, dat is, de initiële positie van zo'n domein, hetgeen nooit het doel van spirantisatie is (sectie 4.3.4), en alle initiële posities van de rest van de morfemen in het domein. Vanuit deze observatie volgt dat het syntagmatische contrast in het Nivch bestaat tussen het allereerste morfeem van het domein en de rest van de morfemen. De niet-initiële posities binnen een morfeem leveren niets extra's om dit syntagmatische contrast tussen de morfemen te creëren. Dit is ons antwoord op de vraag waarom alleen de morfeem-initiële plosieven spirantisatie ondergaan. Tevens verklaart deze analyse waarom spirantisatie plaats kan vinden na een plosief, in tegenspraak met het typologisch gangbare patroon dat spirantisatie van toepassing is na een continuant, maar niet na een plosief. Perceptueel gemotiveerde lenitie heeft geen bepaald segment dat de spirantisatie van de nevenplosief veroorzaakt. Het is daarom dat wij in het Nivch spirantisatie analyseren als een niet-lokaal proces.

Hetzelfde kan niet gezegd worden van 'hardening', die we verklaren als een lokaal proces, dat veroorzaakt wordt door de aanwezigheid van een bepaald segment in de naburige fonologische omgeving. Er wordt aangetoond dat klankopeenvolgingen van een fricatief en een fricatief om perceptueele redenen niet aannemelijk is (sectie 4.9.1). De verandering van de tweede fricatief in een plosief ('hardening'), en het niet toepassen van spirantisatie in deze context is dus een vorm van dissimilatie. De klankopeenvolgingen van een nasaal en een fricatief worden eveneens vermeden om perceptuele redenen (sectie 4.9.2).

Samenvattend kan geconcludeerd worden dat in het Nivch consonantmutatie een combinatie is van een lokaal verschijnsel ('hardening', en het niet toepassen van spirantisatie) en een niet-lokaal verschijnsel (spirantisatie).

De verschillende theoretische beschouwingen in dit proefschrift worden geïllustreerd met en getoetst aan een groot aantal voorbeelden die resulteren uit het door ons op Sachalin verrichte veldwerk. Deze worden weergegeven in een drietal eerder gepubliceerde boeken (Shiraishi en Lok 2002, 2003, 2004), waarin de desbetreffende spraakfragmenten niet alleen in de tekst worden geciteerd, maar ook op de bijgevoegde CD's kunnen worden beluisterd. Dit materiaal is tevens van groot belang bij de documentatie van de Nivch-taal en kan worden gebruikt bij een verdere

beschrijving van de taalstituatie en het ontwikkelen van didactische hulpmiddelen voor deze taal.

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