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Topics in Nivkh phonology

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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
/p/ /b/	/p/ /b/	/p/ /b/
R R	R R	R R
Lar Lar	SV	Lar
	[voice]	

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.

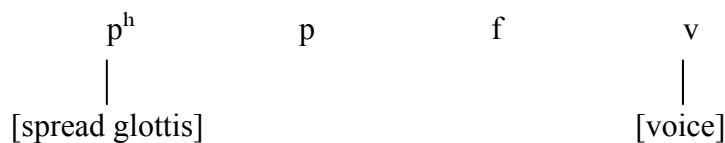
The next question is which of the two candidate features, [spread glottis] and [voice], underlies the laryngeal contrast. I discuss various phenomena in the laryngeal phonology and conclude that [spread glottis] is the contrasting feature. This leads us to the conclusion that Nivkh is an aspiration language.

3.1.2 Symmetric vs. Asymmetric Contrast

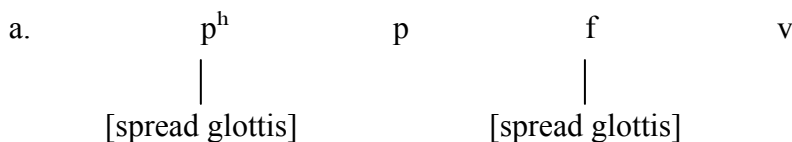
A related topic which I will discuss in this chapter concerns the type of contrast. In the previous section, laryngeal contrast is represented with binary features which are fully specified for both members of the contrast (+/-). An alternative way to represent contrast is to use unary features. Using 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.

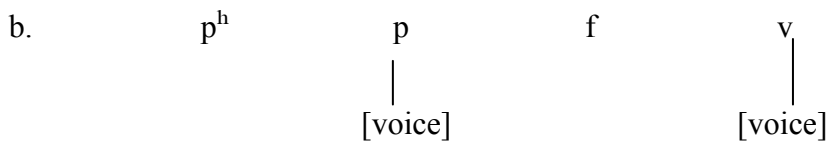
(4) Dual mechanism hypothesis



(5) Single mechanism hypothesis



or,



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.	p ^h aχ	‘window’	paχ	‘stone’
	b.	t ^h u	‘sledge’	tu	‘lake’
	c.	k ^h eŋ	‘sun’	keŋ	‘whale’
	d.	fi-	‘dwell’	vi-	‘go’
	e.	ra-	‘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’	ye-	‘get, buy’
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In medial positions, plosives are voiceless and non-aspirated unless preceded by sonorants.

(7)	a.	atak	‘grandfather’	(SL3: 50)
	b.	ikin	‘brother’	(SL3: 56)
	c.	kikun	‘eagle-owl’	(FN)
	d.	ŋiki	‘tail’	(FN)
	e.	caqo	‘knife’	(SL2: 4)
	f.	utku	‘man’	(SL1: 33)
	g.	t ^h itŋis	‘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.	andzi	‘again’	(many examples throughout SL1-3)
	c.	p ^h ingaj-	‘prepare food’	(SL2: 50)
	d.	ciŋgi	‘the place name Ten’gi’	(SL3: 3)
	e.	tilgu-	‘tell a story’	(SL2: 64)
	f.	nijda	‘the place name Nyida’	(SL3: 12)
	g.	oɟdom	‘baby’	(SL1: 40)

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

(9)	a.	ŋizit	‘folktale’	(SL3: 50)
	b.	k ^h uyi	‘Ainu’	(SL3: 15)
	c.	liyi	‘salmon’	(FN)
	d.	χaza	‘scissors’	(FN)
	e.	hava-	‘open the mouth’	(SL3: 66)
	f.	c ^h ari	‘bog bilberry’	(SL3: 34)
	g.	olyoŋ	‘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.	paɣla	‘red’	(SL3: 38)
	n.	e-rɣap-	‘touch’	(SL2: 78)
	o.	azri-	‘carefully’	(SL2: 25)
	p.	iyriki	‘once upon a time’	(SL3: 3)
(10)	a.	muɣki	‘horn’	(FN)
	b.	uski	‘corridor’	(SL3: 23)
	c.	oɣcol	‘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)	joya	‘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.	itik	‘father’	(SL3: 4)
	b.	tot	‘arm’	(FN)
	c.	nonoq	‘puppy, cub’	(SL3: 58)
	d.	t ^h it	‘morning’	(SL1: 7)

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

Fricatives are voiceless in final position.

(13)	a.	c ^h xif	‘bear’	(SL1: 7)
	b.	lix	‘sky/weather’	(SL1: 20)
	c.	als	‘berry’	(SL3: 71)
	d.	kins	‘devil’	(SL1: 11)
	e.	tolf	‘summer’	(SL3: 45)
	f.	apɣ	‘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 ^h esq	‘net’	(SL2: 15)
	d.	otx	‘excrement’	(SL1: 22)
	e.	c ^h acf	‘swamp’	(FN)

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

(15)	a.	k ^h arŋ	‘ice’	(SL2: 3)
	b.	ivɲ	‘oar’	(SL2: 74)
	c.	sizm	‘Japanese’	(SL3: 13)
	d.	lavs	‘mat’	(SL2: 33)
	e.	hays	‘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. | tif | ‘house’ | qan dif | ‘doghouse’ | (SL2: 33) |
| | b. | p _ɪ ŋx | ‘soup’ | ŋiŋ biŋx | ‘our soup’ | (FN) |
| | c. | tif | ‘house’ | ŋiŋ dif | ‘our house’ | (SL3: 49) |
| | d. | coŋɣ | ‘head’ | qan d _ʒ oŋɣ | ‘head of dog’ | (SL1: 22) |
| | e. | paŋk | ‘only’ | aŋ baŋk | ‘who?’ | (SL3: 26) |
| (17) | a. | q ^h al | ‘clan’ | pal-ŋ q ^h al | ‘clan of mountains’ | (SL2: 38) |
| | b. | q ^h al | ‘clan’ | pila von q ^h al | ‘the clan of Pilavon’ | (SL1: 11) |
| | c. | k ^h iri | ‘urine’ | qan k ^h iri | ‘urine of dog’ | (SL1: 21) |
| | d. | p ^h uf | ‘saw’ | ŋiŋ p ^h uf | ‘our saw’ | (FN) |
| | e. | t ^h i | ‘ray’ | keŋ t ^h i | ‘sun ray’ | (S&T 1970: 381) |
| | f. | t ^h xirp- | ‘forget’ | ŋiŋ t ^h xirp | ‘forget us’ | (SL3: 64) |
| | g. | q ^h aχ | ‘spear’ | ŋiŋ q ^h aχ | ‘our spear’ | (FN) |
| | h. | fitis | ‘blanket’ | ŋiŋ fitis | ‘our blanket’ | (FN) |
| | i. | ɣi | ‘door’ | ŋiŋ ɣi | ‘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’ imyu 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 [nɾi-] 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.	tij-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-dox		‘to the dog’	(FN)	
(22)	a.	t ^h om	‘fat’	c ^h o ɾom	‘fish fat’	(FN)
	b.	c ^h o	‘fish’	liyi so	‘salmon’	(FN)

	c.	cif	‘trace’	p ^h -it̩k zif	‘father’s trace’	(SL1: 9)
	d.	tif	‘house’	Galik rif	‘Galik’s house’	(FN)
(23)	a.	xu-	‘kill’	c ^h xif k ^h u-	‘kill a bear’	(SL1: 7)
	b.	fi-	‘dwell’	vo ɲaqr̩ p ^h i-	‘dwell in a village’	(SL1: 7)
	c.	xu-	‘kill’	aŋ k ^h u-	‘kill whom?’	(SL3: 21)
	d.	ɣx̩rp-	‘forget’	ɲiŋ t ^h x̩rp-	‘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.	tif	‘house’	tiv-ux	‘at house’	(SL3: 36)
	b.	kins	‘devil’	kinz it-	‘go insane’	(SL2: 26)
	c.	tif	‘house’	tiv ɲaɣ	‘one house’	(SL1: 27)
	d.	c ^h xif	‘bear’	c ^h xiv lij-	‘kill bear’	(SL1: 7)
	e.	als	‘berry’	alz ɲa-	‘gather berries’	(SL2: 47)
	f.	t ^h ulf	‘winter’	t ^h ulv vo	‘winter village’	(FN)
	g.	ɲo-rɣ	‘to a storehouse’	ɲo-rɣ vi-ɣ	‘go to a storehouse’	(SL2: 34)
	h.	ɲaɣ	‘eye’	ɲaɣ vij	‘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.

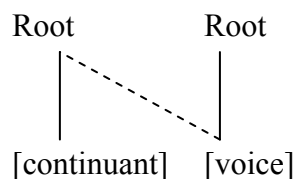
(25)	a.	tif	‘house’	tif coɲx	‘corner of the house’	(SL2: 76)
	b.	cus	‘meat’	cus piɲx	‘meat soup’	(FN)
	c.	kilkaɣ	‘long’	kilkaɣ tif	‘a very long house’	(SL3: 50)
	d.	coɲɣ	‘head’	i-coɲɣ po-	‘hold its head’	(SL3: 51)
	e.	c ^h xif	‘bear’	c ^h xif coɲɣ	‘the head of a bear’	(SL3: 54)
	f.	als	‘berry’	paɣla 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^hitŋis ‘roof’ t^hitŋis t^hxi ‘on the roof’ (SL1: 42)
- b. ŋaf ‘thigh’ ŋaf p^huks ‘the belt on the thigh’ (SL2: 80)
- c. tif ‘house’ tif ɾi ‘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^hni- (SL1: 22)
dog excrement see
‘(He) saw an excrement of a dog.’
- h. c^haf ɾi-xik-roχ mir- (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] | *prijs lijst ⁸ | ‘price list’ |
| e. | lachlust | [xl] | *laylust | ‘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. | t ^h itɲis | | (SL1: 42) |
| | | ‘roof’ | | |
| | b. | t ^h omo xutik-ux | | (SL2: 24) |
| | | skylight hole-LOC | | |
| | | ‘in the skylight’ | | |
| | c. | t ^h ut-ux | | (SL1: 12) |
| | | fire-LOC | | |
| | | ‘on the fire’ | | |
| | d. | k ^h isk ɲaqr | | (SL2: 4) |
| | | cat one | | |
| | | ‘one cat’ | | |
| | e. | mackilk oyla-yu | | (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^hxiv jiv-ra (< c^hxif) (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 j-ŋamac ye- (< if) (SL1: 29)
 3SG 1SG-slough take
 ‘She took my slough away.’

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

- a. ...ŋicy niŋaq... (< ŋicx) (SL2: 57)
 foot for_a_while
 ‘(She dried her) feet for a while.’
- b. nav j-oyla oyla... (< naf) (SL3: 58)
 now 3SG-child child
 ‘Now, her grandchild...’
- c. iv jaŋgur ni- (< 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^ho konserf] ‘fish can (Russian *konservy* ‘can’)’ *[c^ho xonserf]. In contrast, FFV may apply to recent loanwords: [caz-ux] ‘hour-LOC’ (Russian *čas* ‘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. | k ^h eq vo- | ‘catch a fox’ | (SL2: 14) |
| | b. | ŋajq zif | ‘trace of a puppy’ | (SL2: 25) |
| | c. | k ^h eq za- | ‘beat a fox’ | (SL2: 35) |
| | d. | j-acik ye- | ‘took her younger sister away’ | (SL2: 40) |
| | e. | micik 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. | kilmr̥ | ‘fin’ | kilmr maṛk | ‘a ventral fin’ |
| c. | pos | ‘cloth’ | poz uski | ‘price of cloth’ |
| d. | wax | ‘grip of knife’ | way-ŋany- | ‘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. | uᵛ | ‘island’ | uᵛ mif | ‘island’ |
| c. | cas | (Russian <i>chas</i> ‘hour’) | cas upᵛ | ‘watch band’ |
| d. | wax | ‘moss’ | wax ŋany- | ‘find moss’ |
| e. | alχ | ‘a species of seal’ | alχ ŋavᵛki | ‘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. liys ‘wolf’ liys-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. if ‘beard’
 c. ves ‘crow’

- d. lix '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: /if/ 'beard' and /ɲaf/ '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. tif 'house' tiv-ux 'from the house'
 b. tux 'hatchet' tuy-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. lix 'weather/sky' liy iki- 'The weather is bad' (SL1: 20)
 b. liyɣ 'wolf' liyr-liyr¹³ 'wolf, wolf (repeated)' (SL1: 17)

Next, I prepared sentences with words which are reported to have non-alternating final fricatives: /ves/ 'crow', /paχ/ 'stone', /p^haχ/ 'window' and /if/ '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 /liyɣ/ is [ɣ] or [s].

- (46) a. liy-ux vez neqr pij-
sky-LOC crow one fly
'There was a crow flying in the sky.'
- b. ɲ-ikin vez meqr ɲiɲ-
1SG-brother crow two catch
'My brother caught two crows.'
- c. ɲ-ikin paʁ neqr po-
1SG-brother stone one take
'My brother took a stone.'
- d. ɲ-itik p^haʁ neqr lit-
1SG-father window one make
'My father made a window.'
- e. ɲaŋk neqr 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 /liys/ 'wolf' is transcribed as voiced when preceding a nasal: [liyz nonk] 'a wolf cub'. Similarly, Jakobson (1957: 83) gives the example [caz-ux] 'hour-LOC' from the Russian *čas* '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': *tiv laɤaf* (S&T 1970: 366) and *tif laɤaf* (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).

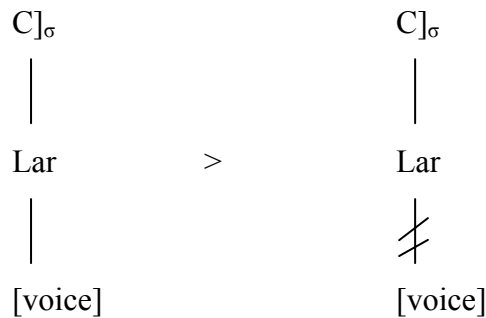
¹⁴ Voicing of final fricatives is also transcribed inconsistently in the spelling of Nivkh as practiced in school textbooks. While most textbooks used to write a voiced fricative for final fricatives before suffixes which begin with vowels or sonorants (e.g. *tiv-ux* 'house-LOC'), recent textbooks tend 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 ɣazaqr-* '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.

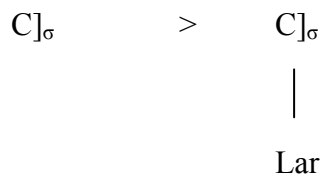
(48) Delinking of [voice]



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 *hartzээр* [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. | tiy̥r̥ | ‘tree’ |
| | d. | t ^h uy̥r̥ | ‘fire’ |
| | e. | lavs | ‘mat’ |
| | f. | hays | ‘cloth’ |
| | g. | ɲivx | ‘man’ |
| | h. | muyf | ‘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. xiz-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-ȳr (< i-ȳir)
 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 fortis 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^hxiv lij-]_I c^hxif /.../
 bear kill
 ‘kill a bear’
- c. [alz ɲa-]_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)(tɔn) ‘to take courage’
- (57) a. /hud/ ‘hat’
 b. (hut)
 c. (hu)(dɔn) ‘hats’
 d. (ɔn)(hu)(tɔp)(sɛ)(tɔn) ‘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 prevocally in a sentence context, the syllable-final [\pm 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.

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 Shiraiishi (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'.

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. | ayri | ‘spit’ |
| | b. | iyrit | ‘together with him/her/it’ |
| | c. | ɲiryir | ‘breast’ |
| | d. | erɣap- | ‘touch’ |
| | e. | iyzi- | ‘doesn’t know’ |
| | f. | iyriki | ‘once upon a time’ |
| | g. | oyri | ‘back of head’ |
| | h. | eryali | ‘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 fortis and lenis 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.