

SOUTHERN SAMI ABLAUT AS AN EMERGENT HARMONY*

Mikael Vinka
McGill University

1 Introduction

This paper will discuss some aspects of ablaut in Southern Sami, a Finno-Ugric language spoken in Sweden and Norway. In this language ablaut arises when phonological considerations prevent a morpheme from being realized by means of simple concatenation. In what follows, I will exclusively deal with ablaut as it occurs in the verbal system. If a verb stem ends in a vowel, then we find that singular present tense forms involve ablaut, as shown in (1). Here we can see that both vowels in the third person singular present tense forms are lowered, hence contrasting with the vowels of the stems.

(1)	<u>stem</u>	<u>3 sg prs</u>	
	bisse	bessa	'broil'
	bwete	bwata	'come'
	urre	orra	'live'

Since the examples in (1) are all bisyllabic words, they do not reveal whether we are dealing with ablauting, or with an unbounded harmonic effect. However, the examples in (2) involve words longer than two syllables, and here we can see that vowel lowering is restricted to a two-syllable window. Furthermore, (3) shows that it may never exceed this two-syllable window.

(2)	<u>stem</u>	<u>3 sg prs</u>	
a	ñijkestete	ñijkestata	'have hiccups'
b	ñijkestetegwete	ñijkestetegwata	'begin to have hiccups'
(3)	<u>stem</u>	<u>3 sg prs</u>	
a	ñijkestete	*ñejkastata	'have hiccups'
	ñijkestetegwete	*ñejkastatagwata	'begin to have hiccups'
b	ñijkestete	*ñijkestete	'have hiccups'
	ñijkestetegwete	*ñijkestetegwete	'begin to have hiccups'

However, the pattern shown in (1) and (2) is not present in all verbs. If the verb stem is consonant final, then ablaut never applies. Consider the example in (4), where we have the consonant final stem dwered 'follow,' (4a) and dyelmes 'to become full with water', (4b). Here, the present singular morpheme is expressed by the schwa, rather than by ablauting.

(4)	<u>stem</u>	<u>3 sg prs</u>	
a	dwered	dweredə	'follow'
		*dwarad	
b	dyelmes	djelməsə	'to become full with water'
		*djalmas	

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We also find instances of vowel variation with certain types of overt suffixation. The participle forms of verbs represent the prototypical case, however, unlike (1) and (2) only the vowel of the antepenult syllable is affected, as illustrated in (5). The stems in (5) are vowel final. The shape of the participle suffix is VCV. When we attach it to a vowel final stem, we have created a hiatus, which is not allowed in this language. In order to conform to the phonotactics of the language, the initial vowel of the suffix is deleted, as shown in the output column in (5).

(5)	<u>Input</u>	<u>Output</u>	
	bwete-ame	bwateme	'have come'
	bisse-ame	besseme	'have washed'
	ñjkeſtete-ame	ñjkeſtete-me	'have had hiccups'
	ñjkeſtete-gwete-ame	ñjkeſtete-gwateme	'have begun to have hiccups'

In (6), on the other hand, we have some examples of participles of consonant final stems. A crucial difference in comparison to vowel final stems, like those in (5), is the fact that hiatus does not arise when we attach the vowel initial suffix to the consonant final stem. Hence vowel deletion is not required in (6), and moreover, ablauting does not apply.

(6)	<u>Input</u>	<u>Output</u>	
	dwered-ame	dweredame	'have followed'
	djelmes-ame	djelmesame	'have become full with water'

In this paper, I will argue that the ablaut phenomenon in Southern Sámi is contingent on the deletion of a vowel of a suffix. The claim for singular present forms, is that the Singular present tense morpheme is the schwa-vowel that surfaces in C-final stems, as in (4) above. When a suffix consisting of a single vowel attaches to a vowel final stem, hiatus arises, and the vowel must delete. Hence we have a correlation between Singular Present forms and participles.

While this takes care of the triggering factor, it does not shed any light on the question why the vowel lowering in (1) and (2) is confined to a two-syllable window. Moreover, we must also seek an account for the antepenult effect in participles of V-final stems. The answer that I will provide here, is based on the harmony-foot hypothesis, which was put forward in Piggott (1996a,b). The essence of the proposal is that ablaut is an instantiation of feature-licensing by the Harmony-Foot, or H-Foot for short.

We shall now turn to the analysis. First of all, in Section 2, some general properties of Southern Sámi phonology will be introduced. Section 3 will be devoted to the Harmony Foot, and the its role in Ablaut. The analysis to be presented is couched in the OT framework (Prince & Smolensky, 1992), however, nothing essential should hinge on this particular choice.

2 Some General Properties of Southern Sámi Phonology

2.1 The Vowel Inventory

In this section we will quickly outline some general properties of Southern Sámi. The language has the approximate vowel inventory given (7a). As we can see in (7a), there are two series of front vowels, rounded and unrounded ones. Roundedness is distinctive, (7b), in contrast to the set of [±ATR] mid vowels (7c). Hence, the set of actual mid-vowels is unspecified for [ATR], as shown (7d).

(7) a

Front		Back
-rnd	+rnd	
i	y	u
e	œ	o
ɛ	ø	ɔ
		a

- | | | |
|---|----------------------|---------------------------|
| b | gyrredid 'curse' | girredid 'to inquire' |
| | göörjed 'lie down' | geerjedh 'to enthuse' |
| c | orre 'new' | *orre (≠ 'new') |
| | orra 'male reindeer' | *orra (≠ 'male reindeer') |
| | erpye 'heir' | *erpye (≠ 'heir') |
| d | Mid Vowels {E, Ø, O} | |

In what follows, we will be concerned with the back vowels and the unrounded front vowels

Turning to the process of vowel lowering, we can see in (8) that it targets a vowels and makes it one step lower That is, if a high vowel is targeted, it changes into a mid vowel, and if mid vowels are the targets, then they become low

(8)	<u>stem</u>	<u>3 sg prs</u>		
	bisse →	bessa	i → E, e → a	('broil')
	bwete →	bwata	E → a, e → a	('come')
	utne →	ɔtna	u → O, e → a	('use')
	jotke →	jatka	O → a, e → a	('take care of')

We will now continue to section 2.2 and the issue of Hiatus

2.2 The Resolution of Hiatus and Vowel Lowering

Let us now consider what the trigger of ablaut may be To begin with, we have noticed that in the singular present forms, ablaut is restricted to vowel final stems, as is further illustrated in (9) and (10), where the complete paradigms for vowel final and consonant final verbs are given ¹

¹In northern dialects of Southern Sámi (Vilhelmina, Ume), ablaut is restricted to forms where the agreement suffix is zero, as in second and third person singular (see Mankok 1975, 1976)

	<u>Sing</u>
1	bissem
2	bessa
3	bessa

Lule and Northern Sami lack the ablaut phenomenon altogether (see Spuk 1989 and Nickel 1994)

(9) *Vowel Final Stem*

Present Tense Paradigm

stem = /bisse/ 'broil'

	<u>Sing</u>	<u>Dual</u>	<u>Plur</u>
1	bessam	bissen	bissebe
2	bessah	bisseden	bissede
3	bessa	bissejegan	bisseh

(10) *Consonant Final Stem*

Present Tense Paradigm

/dwered/ 'follow'

	<u>Sing</u>	<u>Dual</u>	<u>Plur</u>
1	dweredam	dwereden	dweredibe
2	dweredah	dwerediden	dweredide
3	dwereda	dweredegan	dweredeh

As mentioned earlier, I analyze the present tense third person singular morpheme as the schwa (see next page and footnote 2), which surfaces in (10), but not in (9). This means that the morphological concatenation of the third person present tense singular form of a vowel final stem, would be something like what is shown in (11)

(11)	<u>Input</u>	<u>Output</u>
	bisse-a	bessa
	broil -3sS Prs	

The point I wish to make is that a general ban on hiatus is partially responsible for the actual output, which involves ablaut. This should then be the case of both Singular Present forms and Participles

Now, in order to see this point, it is informative to first consider a case that does not involve ablaut. Gerunds provide a good example. Gerunds are obtained by suffixation of the gerund morpheme /ime/ onto the verb, as shown in (12). In (12a) it is added to a consonant final stem. When the suffix occurs on a consonant final stem, we get a perfectly well formed sequence, where the final consonant of the stem becomes the onset of the first vowel of the suffix. In (12b), however, it has been suffixed onto a vowel final stem. In this case, hiatus arises, and consequently, the initial vowel of the suffix deletes. Notice that the well formed output in (12b) does not involve ablaut,

(12)	a	dwered-ime	→	deredime
		follow-ing		following
	b	bisse-ime	→	bisseme / *besseme / *bisseime / *bisseyme
		broil-ing		broiling

Now, the gerund suffix /ime/ is interesting since its phonological shape differs minimally from the suffix that forms participles, namely /ame/. Recall from the introduction that the participle forms involve vowel lowering in vowel final stems, but not in consonant final stems, as illustrated in (13)

- (13)
- | | | | |
|---|-------------------|---|----------------------------------|
| | <u>INPUT</u> | | <u>OUTPUT</u> |
| a | dwered-ame | → | dweredame |
| | <i>follow-Ptc</i> | | <i>(have) followed</i> |
| b | bisse-ame | → | besseme / *bisseame / *bisseyame |
| | <i>broil-Ptc</i> | | <i>(have) broiled</i> |

In the case of participles of vowel final stems, as in (13b), we see that again hiatus is resolved by deletion of the initial vowel of the suffix. However, if mere vowel deletion is all that takes place in (13b), then it is hard to see why vowel lowering would occur at all. In fact, the expected form would be identical to the gerund in (12b). Therefore, it cannot be the case that all content of the vowel is deleted in (13b). The claim I make, is that there is a feature that escapes deletion. I will call this feature [LO], and I assume that it is this feature that's responsible for vowel lowering. Consider (14), which schematically illustrates such a scenario. The initial vowel of the suffix bears the feature. The feature survives the deletion of the vowel, and is reassociated with a vowel belonging to the stem.

- (14)
- | | | | | |
|-----------------------------|---|-----------------------|---|------------------------------|
| <u>Suffixation (hiatus)</u> | | <u>Vowel Deletion</u> | | <u>Reassociation of [LO]</u> |
| bisse-ame | → | bisse - me | → | besse me |
| | | | | \ |
| [LO] | | [LO] | | [LO] |

Let us now return to Present Singular forms of verbs, in (9) and (10). If we assume that the third person present singular morpheme is the schwa, then these forms are in principle parallel to participles. Example (15) illustrates suffixation of the morpheme onto a consonant final stem. Here, hiatus does not arise, and consequently no repair strategies need to apply. And notice that I assume that the third person present tense morpheme has a feature [LO]².

- (15)
- | | | |
|----------------|---|---------|
| dwered - ə | → | dweredə |
| | | |
| [LO] | | [LO] |
| follow 3sS Prs | | |

Now, turning to (16), we can see that when the third person present tense morpheme attaches to a vowel final verb stem, a heterosyllabic V-V sequence is created, and therefore some repair strategy must be applied. The schwa deletes, but not the feature [LO]. Rather, the feature ends up being associated with the two vowels of the verb.

- (16)
- | | | | | |
|--------------|---|-------|---|-------|
| bwete - ə | → | bwete | → | bwata |
| | | | | \ \ |
| [LO] | | [LO] | | [LO] |
| come 3sS Prs | | | | |

In this section, we have shown the basic vowel inventory of Southern Sami. We have also provided a descriptive outline of the ablaut phenomenon. In Section 3, we will address the issue of why

²The schwa itself is not a low vowel, however, nothing prevents it from being the phonetic realization of a low vowel. In fact, the schwa could in principle be any vowel. The morpheme might be analyzed as /a/, which reduces to /ə/ in unstressed contexts. For expository reasons we will nevertheless refer to it as the schwa. This is an issue for further research.

ablaut, or vowel lowering in Southern Sámi is constrained to span maximally over two syllables, and why only the antepenult vowel of participles undergo lowering

3 Southern Sámi Ablaut

3.1 The Harmony Foot and its Alignment

Piggott (1996a, b) argues at length that harmonies may be analyzed as special cases of feature licensing. Drawing on ideas expressed in Itô (1988) and Goldsmith (1990), Piggott (1996a, b) elaborates on the idea that segments are not the sole feature licensers available in natural languages. In addition to segments, syllables as well as feet are possible feature licensers. In the theory of harmony developed in Piggott (1996a, b), the nature of the harmony depends on the licenser of the harmonic feature. The group of constraints responsible for this variability is referred to as Designated Feature Licensers, is formulated in (17) below. The claim of this paper, is that Southern Sámi ablaut is a case where a feature is licensed by the Harmony Foot, (18). This is to say, in order for the feature [LO] to surface, there must be a foot

- (17) Designated Feature Licenser (DFL)
 DFL(X)/{Seg, Syll, Foot}
 The licenser of the feature X is either a segment, or a syllable or a foot
 (Piggott 1996b: 151)
- (18) DFL(LO)/Ft

However, it is important to keep the notions of the stress-foot and the harmony-foot apart. In Southern Sámi, stress occurs on every odd syllable, with main stress invariably on the initial syllable, as shown in (19) (cf. Vinka 1997). Here we can see that foot construction is iterative, proceeding from the left to the right. Moreover, feet must be strictly binary.

- | | | | |
|------|------------------|---------------|----------------|
| (19) | bwa ta | (σ σ) | 'come 3sS Prs' |
| | nýj se nèj ja | (σ σ) (σ σ) | 'woman nom' |
| | gá.me.ge | (σ σ) σ | 'shoe nom' |
| | nýj se nèj je se | (σ σ) (σ σ) σ | 'woman dat' |

Harmony Feet, on the other hand, are constructed from the right to the left, non-iteratively, as seen in (20).

- | | | |
|------|-----------------|---------------------------------------|
| (20) | Stem krikketete | 'help a child relieve itself 3sS Prs' |
| | krikketata | σ σ (σ σ) |
| | *krekkatata | (σ σ) (σ σ) |
| | *krekkatete | (σ σ) σ σ |

In Optimality Theoretic terms, this means that some Alignment Constraint outranks Parse Syllable, as in (21).

- (21) AlignRight (Wd, H-Ft) >> ParseSyll

However, the ranking in (21) does not suffice to account for participles. Consider the tableau (22). The result of the constraint ranking in (21) is that candidate (a) wins over candidate (b). However, this is exactly the opposite of what the facts are.

(22)

	bwete-ame	AlignRight	ParseSyll
a	bwe (ta me)		*
b	(bwa te) me	*	*

Moreover, the participle in (23a) clearly shows that ranking of the Alignment and Parse constraints cannot be identical to the ranking determining the distribution of Stress feet. However, if we consider the morphological structure of words, then we find that the left edge of an H-Foot is aligned with a morphological category, as in (23b).

- (23) a Stem Participle
 krikkete krikke (ta te) me *(krekke)teteme
 b krikke | tete
 krikke | (tate) | me

At the same time, the foot strives to be as far to the right as possible. This means that we have two alignment constraints that determine the position of the H-Foot. These are given in (24a) and (24b). Their ranking with respect to each other is given in (24c).

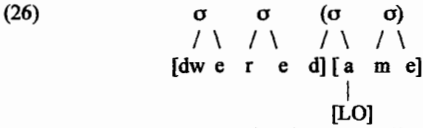
- (24) a AlignLeft (H-Foot, Mcat)
 b AlignRight (PrWd, H-Ft)
 c AlignLeft (H-Foot, Mcat) >> AlignRight (PrWd, H-Ft)

Let us now see how this applies to a participle like (25a). Consider the tableau (25b). The winning candidate (a), as well as candidate (c) both pass Align Left. However, candidate (a) has the foot aligned with an intermediate boundary, while (c) does not. This has the effect that candidate (a) only induces one violation of AlignRight, whereas candidate (c) violates this constraint more than once. Hence (a) is the optimal candidate. Finally, candidate (b) is out since the foot is not left aligned with any morphological category.

- (25) a krikketateme
 b

	krikke tate -ame	AlignLeft (Ft, Mcat)	AlignRight (Wd, Ft)	ParseSyll
a	krik ke (ta te) me		*	***
b	krik ke te (ta me)	*		***
c	(krek ke) te te me		**	***

Let us now turn our attention to participial forms of consonant-final stems. Here we have a tension in that AlignLeft may be violated, depending on the morphological structure of the word. (26) shows that the foot within which the feature [LO] is licensed is not aligned with a morphological category (given in square brackets).



However, representations like (26) are well formed in consonant final stems, since the segment dominating the feature in the input is also the segment that dominates the feature in the output

3.2 Singular Present and Participles

In section 2 we argued that vowel-deletion in Present Singular forms and participles did not amount to the deletion of the feature [LO]. Rather, this feature was taken to be re-associated with another vowel, which then underwent lowering. This approach suggests that the feature [LO] must be obligatorily parsed, as stated in (27a). Moreover, this is a highly ranked constraint, (27b).

- (27) a Parse[LO]
 The harmonic feature [LO] must be parsed
 b Parse[LO] >> AlignRight (Wd, H-Ft) >> ParseSyll

Furthermore, since the Foot is the Designated Feature Licensor in Southern Sámi, and since the Foot is a trochee, it should be natural that the feature must end up being associated with the head syllable of the Foot. This is stated as Head Identity (28) (Piggott 1996a).

- (28) Head-Identity (HdIdent)
 The head syllable of the H-Foot *must be associated with* the H-Feature F

The constraints introduced so far, enables us to account for when ablaut occurs, and to some extent where the affected vowels are to be found. Consider now the tableau in (29). Candidate (a) involves hiatus, hence violating Onset (a requirement that all syllables have onsets, cf Prince & Smolensky 1992), which is fatal. Candidate (b) involves a violation of Parse [LO], and in candidate (c) the feature is associated only with the dependent syllable of the foot, and therefore it violates HdIdent. Candidate (d) violates AlignLeft. However, there is a tie between candidates (c) and (e).

(29)

	<u>INPUT</u> bwete-ə Sg Prs [LO]	<u>Ons</u>	<u>Parse</u> [LO]	<u>HdIdent</u>	<u>AlignLeft</u> (Ft, Mcat)	<u>AlignRight</u> (Wd, Ft)
a	bwe te (ə) [LO]	*!				
b	(bwe te)		*!			
c	(bwa ta) \ / [LO]					
d	bwe (ta) [LO]				*!	
e	(bwa ta) [LO]					
f	(bwe ta) [LO]			*!		

Since we have claimed that the Singular Present suffix is a vowel, and since this vowel is deleted, the feature [LO] is the sole exponent of this morpheme. Furthermore, since it is a suffix, it should occur at the right periphery of the stem it has attached to. We can express this by assuming that the reason why the feature is associated with the dependent syllable in (29c) is due to the constraint *Align-in-Stem*, (McCarthy & Prince 1993), given in (30). This constraint states that the right edge of the suffix must be aligned with the right edge of the stem.

(30) *Align-in-Stem(Sfx) (A1S)*
 Align (Sfx, Right, Stem, Right)

Consider tableau (31). The candidate (31c) satisfies the morphological Alignment constraint (30), but candidate (31d) does not.

(31)

	INPUT	Ons	Parse [LO]	AsS	HdIdent	AlignLeft (Ft, Mcat)	AlignRight (Wd, Ft)
	bwete-a Sg Prs [LO]						
a	bwe te (ə) [LO]	*1					
b	(bwe te)		*1	*			
c	(bwa ta) \ / [LO]						
d	(bwa ta) [LO]			*1			
e	(bwe ta) [LO]				*1		
f	bwe (ta) [LO]					*1	

But now, in participles the result is exactly the opposite, as illustrated in (32)

(32)	Sg Prs	Participle
	bwata	*bwatame
	*bwate	bwateme

That is, the optimal candidate is the one where only the vowel of the head syllable of the foot has undergone lowering. It is presumably not correct to say that association of the feature with the dependent syllable is impossible. However, we may contend that feature licensing in a Foot may come at a cost, since it involves a change in the feature specification of the affected vowels. Such a constraint is proposed by McCarthy & Prince (1995: 264), namely Ident(F), given in (33)

(33) Ident(F)

Let α be a segment in S_1 and β be any correspondent of α in S_2 . If α is $[\gamma F]$, then β is $[\gamma F]$

(Corresponding segments are identical in feature F)

(McCarthy & Prince, 1995: 264)

As a consequence, satisfaction of the highly ranked Parse[LO] entails that Ident[F] must be violated in vowel final stems. Moreover, Align-in-Stem must also be ranked higher than Ident[F]. With this in mind, consider the tableaux in (34) and (35). Hence, the winning candidate (a) in (34) induces two violations of Ident(F), in contrast to the losing candidate (b), which only violates this constraint once. However, (b) violates Align-in-Stem.

(34) Present Singular

	INPUT	Parse	AiS	HdIdent	AlignLeft	AlignRight	Ident(F)
	bwete-a [LO]	[LO]			(Ft.Mcat)	(Wd. Ft)	
a	(bwa ta) [LO]						**
b	(bwa ta) [LO]		*1				*

In participles, as in (35), on the other hand, the feature need not be associated with the dependent syllable of the Foot, since Align-in-Stem is trivially satisfied by the segmental remnants of the participle suffix. It is here that Ident (F) breaks the tie. Association of the feature [LO] with both the head syllable of the foot and the dependent syllable induces two violations of Ident (F). Hence candidate (b) is the winner, where Ident (F) is violated only once.

(35) Participles

	INPUT	Parse	AiS	HdIdent	AlignLeft	AlignRight	Ident(F)
	bwete-ame [LO]	[LO]			(Ft.Mcat)	(Wd. Ft)	
a	(bwa ta) me [LO]					*	**1
b	(bwa te) me [LO]					*	*

Let us now turn to consonant final stems. These fall out from the constraints and the ranking of these constraints that we have proposed so far. The relevant fact for singular present forms is that they do not involve ablaut. With this in mind, let us turn to tableau (36). As we can see in (36), the winning candidate (a) violates AlignLeft, as well as Foot Binarity (the requirement that Feet be binary, cf. Prince & Smolensky 1992). The closest competing candidate is (b). (b) also violates AlignLeft, but not FtBin. Candidate (b), however, involves ablaut, which means that Ident(F) is violated.

Let us now also consider candidate (c), (d) and (e). In candidate (c), a binary H-Foot has been constructed, and both vowels in the Foot have undergone lowering. However, even though the feature [LO] is associated with the dependent syllable in (c), Align-in-Stem is not satisfied. This is so for the simple reason that the right edge of the stem is a consonant, and the vocalic feature [LO] must be associated with a vowel. This is a very important difference between consonant final and vowel final stems. Candidate (e) also fails to satisfy Align-in-stem, as does candidate (e).

(36) C-Final Stems, Sg Prs

	INPUT	Parse	AiS	HdIdent	AlgnLeft (Ft.Mcat)	AlgnRight (Wd. Ft)	Ident(F)	FtBin
	dwere-d-ə [LO]	[LO]						
a ^{win}	dwere(d-ə) [LO]				*			*
b	dwe(rad-ə) [LO]				*		*!	
c	(dwarad) [LO]		*!				**	
d	(dward)		*!				*	
e	(dwerad) [LO]		*!	*			*	

Now, let us finally consider participles of consonant final stem, which are shown in tableau (37) In fact, nothing special need to be said about these As before, the optimal candidate, that is (a), violates AlgnLeft The losing candidates (b) and (c) also violate AlgnLeft, but unlike the winner, candidates (b) and (c) also involve violations of Ident(F)

(37) Participles

	INPUT	Ons	Parse	AiS	HdIdent	AlgnLeft (Ft.Mcat)	AlgnRight (Wd. Ft)	Ident(F)
	dwere-d-ame [LO]		[LO]					
a ^{win}	dwere(dame) [LO]					*		
b	dwere(dama) [LO]					*		*!
c	dwe(radme) [LO]					*		*!

4 Concluding Remarks

In this paper, I have argued that ablaut, or vowel lowering, in Southern Sámi is straightforwardly captured if we adopt the view that the feature which is responsible for the effect is licensed by a foot. This idea provides an attractive account for the fact that the Southern Sámi ablaut is restricted to a two-syllable window. Moreover, I have shown that ablaut arises when suffixation creates phonological strings that are ill formed for language particular reasons.

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