

Non-isomorphy of morphological and phonological feet in Inari Saami

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Argument

- Inari Saami (Finno-Ugric, Northern Finland) has morphologically conditioned rhythmic Consonant Gradation that presupposes left-to-right syllabic trochees.
- Inari Saami also has partly morphologically conditioned Accent (word-final monosyllabic foot).
- Facts of stress, quantity and duration reveals mismatch between feet required by Consonant Gradation and phonological foot structure.
- Mismatch cannot be blamed on opacity because one and the same suffix may require conflicting CG and phonological footing.

Outline

- 1 A well-behaved system: North Saami
- 2 Inari Saami
- 3 Evolution of stress
 - Metrical Shift
 - Apocope
- 4 Evidence for phonological foot structure
 - Phonetic duration
 - Phonological quantity
- 5 Conclusions

A well-behaved system: North Saami

Stress assignment in North Saami

Pattern

[('σσ)]
[('σσ)σ]
[('σσ)(σσ)]
[('σσ)(σσ)σ]
[('σσ)(σσ)(σσ)]
[('σσ)(σσ)(σσ)σ]

Generalizations

- Syllabic trochees from left to right.
- Initial main stress.
- Final lapse in imparisyllabic words.

Stress assignment in North Saami

Some examples

('vuo.jeh)	'drive!'
('vuo.je).han	'I drive'
('vuo.je).(,heah:.pii)	'you two drive'
('vuo.je).(,hivh.tʃii).me	'we would drive'
('vuo.je).(,head:.tʃa).(,peeh.teh)	'you could drive'

Consonant Gradation

- Morphologically conditioned alternation between Strong and Weak Grade.
- Strong Grade = 1 extra association to μ .
- Associates to consonant immediately following head nucleus of rightmost foot.

Consonant Gradation (disyllables)

UR	WEAK (nom.pl)	STRONG (nom.sg)	
/nama/	(namaah)	(nammaa)	'name'
/maanaa/	(maanaah)	(maannaa)	'child'
/kuolii/	(kuoliih)	(kuollii)	'fish'
/viva/	(vivaah)	(vivvaa)	'son-in-law'

Rule

/C/ → /CC/ in Strong Grade

Consonant Gradation (disyllables)

UR	WEAK (nom.pl)	STRONG (nom.sg)	
/tsumma/	(tsummaah)	(tsum:ma)	'kiss'
/p ^h eanna/	(p ^h eannah)	(p ^h ean:na)	'pen'
/kollii/	(kolliih)	(kol:lii)	'gold'
/hearraa/	(hearraah)	(hear:raa)	'lord'

Rule

/CC/ → /C:C/ in Strong Grade

Consonant Gradation (C-stems)

UR	WEAK (nom.sg)	STRONG (ill.sg)	
/peanak/	(peana)	(peatna)ka	‘dog’
/luomiin/	(luomii)	(luopmaa)na	‘cloudberry’
/kieluum/	(kieluu)	(kiillo)ma	‘blood clot’

Consonant Gradation (polysyllables)

WEAK	STRONG	
(poarraa)(seappoh)	(poarraa)(seab:po)	‘older’
(muj:hta)(lusaah)	(muj:hta)(lussaan)	‘story’
(saapme)(latt:faah)	(saapme)(lad:tʃan)	‘Saami’
(poarraa)(seamos)	(poarraa)(seepmo)sa	‘oldest’

Consonant Gradation

	Singleton	Geminate	Overlong geminate
/C/			
/CC/			

Landmarks

- Äimä (1918): First phonetic study of Inari Saami.
- Itkonen (1946): Detailed systematic treatment of evolution of quantity systems of Inari, Skolt and Kildin Saami.
- Itkonen (1986–1991): 4 volume scholarly dictionary of Inari Saami.
- Sammallahti and Morottaja (1993): First pedagogical dictionary.
- Bye, Sagulin, and Toivonen (2008): First attempt to argue for phonological structure on basis of acoustic evidence.

Consonant Gradation (disyllables)

UR	WEAK (nom.pl)	STRONG (nom.sg)	
/kime/	{kimeeh}	{kimmee}	'rut'
/pino/	{pinooh}	{pinnoo}	'pile'
/jalu/	{jaaluh}	{jaallu}	'shame'
/tjorro/	{tjorooh}	{tjorroo}	'summit'

Rule

/C/ → /CC/ in Strong Grade

Consonant Gradation (disyllables)

UR	WEAK (nom.pl)	STRONG (nom.sg)	
/pamma/	{pammaah}	{pam:ma}	'teat'
/lanne/	{lanneeh}	{lan:ne}	'prison'
/kallu/	{kaalluh}	{kal:lu}	'forehead'
/pirra/	{pirraah}	{pir:ra}	'spinning top'

Rule

/CC/ → /C:C/ in Strong Grade

Consonant Gradation (C-stems)

UR	WEAK (nom.sg)	STRONG (ill.sg)	
/tsialus/	{tsialus}	{tsiallu}S _{AN}	'bark, rebuke'
/ores/	{orees}	{orraa}S _{AN}	'male'
/haanis/	{haanis}	{hannaa}S _{AN}	'miser'
/siamu/	{siamu}	{siammu}S _{AN}	'beard'

Consonant Gradation (polysyllables)

WEAK	STRONG	
{tilet}{temeeh}	{tilet}{tiamman}	'impatient'
{korra}{sumoos}	{korra}{summoo}seh	'hardest'

Non-isomorphy

- Feet necessary for Consonant Gradation and stress feet do not match.

CG feet	Stress feet
{korrΛ}{summo0}seh	(kórrΛ)(sù0m)(mò0seh)
{tsiallu}SΛN	(tsíal)(lùsΛN)

- Stress assignment reorganized as a result of
 - Metrical Shift
 - Apocope

Metrical Shift

Proto-Saami		Early IS
$[(\sigma\sigma)\sigma]$	>	$[(\sigma)(\sigma\sigma)]$
$[(\sigma\sigma)(\sigma\sigma)\sigma]$	>	$[(\sigma\sigma)(\sigma)(\sigma\sigma)]$
$[(\sigma\sigma)(\sigma\sigma)(\sigma\sigma)\sigma]$	>	$[(\sigma\sigma)(\sigma\sigma)(\sigma)(\sigma\sigma)]$

- Like North Saami, Proto-Saami had final lapses in imparisyllabic words.
- Final lapses eliminated in Inari Saami by introduction of maximal syllabic trochee at right edge of Wd.
- Exhaustive left-to-right parse of remainder.

Stress assignment in Inari Saami

Default pattern

$[('\sigma\sigma)]$
 $[('\sigma)(,\sigma\sigma)]$
 $[(\sigma\sigma)(,\sigma\sigma)]$
 $[(\sigma\sigma)(,\sigma)(,\sigma\sigma)]$
 $[(\sigma\sigma)(,\sigma\sigma)(,\sigma\sigma)]$
 $[(\sigma\sigma)(,\sigma\sigma)(,\sigma)(,\sigma\sigma)]$

Generalizations

- Main stress on initial syllable/foot.
- Word must end with maximal syllabic trochee.
- Syllabic trochees left to right over remainder.
- Exhaustive parsing \Rightarrow degenerate feet enforced in imparisyllabic words.
- Stress clash between antepenultimate and penultimate syllables.

Stress assignment in Inari Saami

Some examples

('o.room)	'I exist'
('oo).(,roo.tʃeh)	'those could exist'
('o.roo).(,tʃa.vaa)	'those two could exist'
('al:m).(,moo.tʰΛm)	'I impart'
('al.moot).(,tʰa.vaa)	'those two impart'
('al.moot).(,tʰitʃ).(,vit:tʰeð)	'you (pl) could impart'
('a.tee).(,lis.taam)	'I give a little'
('a.tee).(,lʌstʌtʃ).(,vit:tʰeð)	'you (pl) could give a little'

Apocope

Early IS		Post-Apocope IS
$[(\sigma)(\sigma\sigma_V)]$	>	$[(\sigma)(\sigma_C)]$
$[(\sigma\sigma)(\sigma\sigma_V)]$	>	$[(\sigma\sigma)(\sigma_C)]$
$[(\sigma\sigma)(\sigma)(\sigma\sigma_V)]$	>	$[(\sigma\sigma)(\sigma)(\sigma_C)]$
$[(\sigma\sigma)(\sigma\sigma)(\sigma\sigma_V)]$	>	$[(\sigma\sigma)(\sigma\sigma)(\sigma_C)]$
$[(\sigma\sigma)(\sigma\sigma)(\sigma)(\sigma\sigma_V)]$	>	$[(\sigma\sigma)(\sigma\sigma)(\sigma)(\sigma_C)]$

- Final open syllable was lost through apocope.
- Leaving word-final closed monosyllabic foot.

Word-final monosyllabic foot contrast

Minimal pairs

Post-Apocope IS		Legacy forms
$[(\sigma)(\sigma_C)]$	•	$[(\sigma\sigma_V)], [(\sigma\sigma_C)]$
$[(\sigma\sigma)(\sigma_C)]$	•	$[(\sigma)(\sigma\sigma_C)]$
$[(\sigma\sigma)(\sigma)(\sigma_C)]$	•	$[(\sigma\sigma)(\sigma\sigma_C)]$
$[(\sigma\sigma)(\sigma\sigma)(\sigma_C)]$	•	$[(\sigma\sigma)(\sigma)(\sigma\sigma_C)]$
$[(\sigma\sigma)(\sigma\sigma)(\sigma)(\sigma_C)]$	•	$[(\sigma\sigma)(\sigma\sigma)(\sigma\sigma_C)]$

Accent

Lexically/morphologically marked word-final monosyllabic foot.
(Hence, Accent)

Grade and Accent in the paradigm

Proto-Saami *pinɔɔ 'pile'

	SG	PL
NOM	* $(\text{pin}.\text{nɔɔ})$	* $(.\text{pi}.\text{nɔɔk})$
GEN	* $(\text{pi}.\text{nɔɔn})$	* $(.\text{pi}.\text{nɔj})$
ACC	* $(\text{pi}.\text{nɔɔm})$	* $(.\text{pi}.\text{nɔj}).\text{tee}$
ILL	* $(\text{pin}.\text{nɔ}'\text{ɔn})$	* $(.\text{pi}.\text{nɔj}).\text{ta}'\text{an}$
LOC	* $(\text{pi}.\text{nɔɔs}).\text{tee}$	* $(.\text{pi}.\text{nɔj}).\text{nee}$
ESS	* $(\text{pin}.\text{nɔɔ}).\text{nee}$	
PART	* $(\text{pin}.\text{nɔɔ}).\text{tee}$	

Proto-Saami $*(\sigma\sigma)\sigma > \text{IS } (\sigma)(\sigma)$.
(Proto-Saami trisyllables correspond to IS accented disyllables.)

Grade and Accent in the paradigm

Inari Saami /pino/ 'pile'

	SG	PL
NOM	$\{(\text{pin}'\text{o}')\}$	$\{(\text{pino}'\text{h})\}$
GEN	$\{(\text{pino}'\text{o}')\}$	$\{(\text{pino}'\text{jj})\}$
ACC	$\{(\text{pino}'\text{o}')\}$	$\{(\text{pino}'\text{jjt})\}$
ILL	$\{(\text{pin}'\text{o}'\text{n})\}$	$\{(\text{pii}'(\text{noo}'\text{jt}))\}$
LOC	$\{(\text{pii}'(\text{noo}'\text{st}))\}$	$\{(\text{pii}'(\text{noo}'\text{jn}))\}$
ESS	$\{(\text{pin}'(\text{noo}'\text{n}))\}$	
PART	$\{(\text{pin}'(\text{noo}'\text{n}))\}$	

- Proto-Saami $*(\sigma\sigma)\sigma > \text{IS } (\sigma)(\sigma)$.
- Paradigm displays every logically possible combination of Grade and Accent: Unaccented + Weak, Unaccented + Strong, Accented + Weak, Accented + Strong.

Grade and Accent in the paradigm

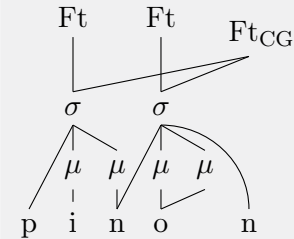
Inari Saami /pino/ 'pile'

	SG	PL
NOM	{{(pin'o*)}}	{{(pino'h)}
GEN	{{(pino*)}}	{{(pino:jj)}
ACC	{{(pino*)}}	{{(pinojtt)}
ILL	{{(pin'o:n)}	{{(pii')(noojt)}
LOC	{{(pii')(noo'st)}	{{(pii')(noo:jn)}
ESS	{{(pin')(noo'n)}	
PART	{{(pin')(noo'n)}	

- Both Grade and Accent independently determined by lexical properties of suffix.
- Mismatch between morphological feet and phonological feet cannot be resolved by appeal to opacity.
- Morphological and phonological foot structure must be projected simultaneously.

Parallel feet

CG feet and stress feet



Essive

/n/ + Strong Grade + Accent

Evidence for phonological feet

- Phonetic duration
 - Differential realization of long vowels and geminates foot-medially and at the juncture between feet.
- Phonological quantity
 - Foot-medial neutralization.
 - Foot-boundary neutralization.
 - Foot-minimality effects.

Long vowel duration

Nominative singular

/lassa/	(lása*)	'doorpost'
/tʃuððe/	(tʃúððe*)	'foe'
/manne/	(mánne*)	'egg'
/pinno/	(pínno*)	'pile'
/váʃfo/	(váʃfo*)	'sharp wind'

Generalization

- Nominative singular ⇒ Unaccented
- /VV/ is in weak branch of foot.
- /VV/ is phonetically half-long.

Long vowel duration

Essive

/lassa+`n/	(lás*)(sâa·n)	‘doorpost’
/tʃuððe+`n/	(tʃúð*)(ðèe·n)	‘foe’
/manne+`n/	(mán*)(nèe·n)	‘egg’
/pinno+`n/	(pín*)(nòo·n)	‘pile’
/vaʃʃo+`n/	(váʃ*)(ʃòo·n)	‘sharp wind’

Generalization

- Essive ⇒ Accented
- /VV/ is in strong branch of foot.
- /VV/ is phonetically long.

Geminate duration

Accusative singular

/lummo/	(lúm*o·)	‘pocket’
/lanne/	(lán*e·)	‘prison’
/millo/	(míl*o·)	‘mill’
/pirra/	(pír*a·)	‘spinning top’

Generalization

- Accusative singular ⇒ Unaccented + Weak Grade
- /CC/ is foot-medial.
- /CC/ is phonetically half-long.

Geminate duration

Locative singular

/lummo/	(lúm*)(mòo·st)	‘pocket’
/lanne/	(lán*)(nèe·st)	‘prison’
/millo/	(míl*)(lòo·st)	‘mill’
/pirra/	(pír*)(ràa·st)	‘spinning top’

Generalization

- Locative singular ⇒ Accent + Weak Grade
- /CC/ lies across a foot boundary.
- /CC/ is phonetically long.

Foot medial obstruents

Nominative singular

/kop ^h e/	(kóp ^h e·)	‘valley’
/pat ^h i/	(páa ^t h ⁱ)	‘pot’
/spak ^h a/	(spáha·)	‘saddlepack’
/lasa/	(lás*a·)	‘doorpost’
/ife/	(ífe·)	‘help’

Generalization

- Nominative singular ⇒ Unaccented + Strong Grade
- Singleton obstruents fail to geminate in the Strong Grade foot-medially.

Foot-junctural obstruents

Essive

/kopp ^h e+`n/	(kópʰ)(p ^h èe·n)	‘valley’
/patt ^h i+`n/	(páa·tʰ)(t ^h in)	‘pot’
/spakk ^h a+`n/	(spá·hʰ)(hàa·n)	‘saddlepack’
/lassa+`n/	(lásʰ)(sàa·n)	‘doorpost’
/iffje+`n/	(íʰʰ)(fèe·n)	‘help’

Generalization

- Essive ⇒ Accented + Strong Grade
- Singleton obstruents *do* geminate in the Strong Grade across a foot boundary.

Foot-minimality effects

Comitative singular

/ɲuolʌ/	(ɲú·o)(làajɲ)	‘arrow’
/nomʌ/	(nóo·)(màajɲ)	‘name’
/lajna/	(láa·)(ɲàajɲ)	‘young birch’
/kove/	(kúu·)(viijɲ)	‘picture’
/pat ^h i/	(páa·)(ðiiɲ)	‘pot’

Generalization

- Comitative singular ⇒ Accented + Weak Grade
- Open syllable lengthens under FOOT MINIMALITY.

Foot-junctural gemination I

Comitative singular

/kuosʌ/	(kuóz)(zàajɲ)	‘spruce’
/kiakk ^h a/	(kiá·lhʰ)(hàajɲ)	‘sledge’
/kusʌ/	(kúz)(zàajɲ)	‘cow’
/kasi/	(káz)(ziijɲ)	‘cat’

Generalization

Singleton obstruents geminate across foot boundary (obligatory after short vowel).

Foot-junctural gemination II

Locative singular

/kuosʌ/	(kú·oz)(zʌst)	‘spruce’
/kusʌ/	(kú·z)(zʌst)	‘cow’
/kasi/	(ká·z)(zʌst)	‘cat’

Generalization

Singleton obstruents geminate across foot boundary (optional after long vowel).

Conclusions

- Inari Saami counts syllables in different ways for morphological and phonological purposes.
- Consonant Gradation presupposes syllabic trochees from left to right and final lapse in imparisyllabic words.
- Default stress assignment enforces word-final maximal syllabic trochee and exhaustive left-to-right parse over remainder.
- Accent: Presence vs. absence of word-final monosyllabic foot is contrastive.

Conclusions

- Neither default nor morphologically assigned stress need match feet required by Consonant Gradation.
- Consonant Gradation cannot be attributed to an earlier stratum: Grade and Accent are both lexical properties of specific suffixes.
- Apparently, *both* foot structures must be projected simultaneously.

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