

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:t:fan) | ‘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 | $\{(\text{pino}'\text{o}')\}$ | $\{(\text{pino}'\text{o}'\text{jj})\}$ |
| ACC | $\{(\text{pino}'\text{o}')\}$ | $\{(\text{pino}'\text{o}'\text{jjt})\}$ |
| ILL | $\{(\text{pin}'\text{o}'\text{n})\}$ | $\{(\text{pii}'\text{o}'(\text{noo}'\text{jt}))\}$ |
| LOC | $\{(\text{pii}'\text{o}'(\text{noo}'\text{st}))\}$ | $\{(\text{pii}'\text{o}'(\text{noo}'\text{jn}))\}$ |
| ESS | $\{(\text{pin}'\text{o}'(\text{noo}'\text{n}))\}$ | |
| PART | $\{(\text{pin}'\text{o}'(\text{noo}'\text{n}))\}$ | |

- 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

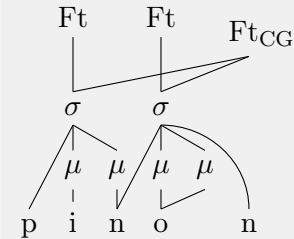
Inari Saami /pino/ 'pile'

| | 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/ | (tʃúúð•)(ðèe•n) | ‘foe’ |
| /manne+`n/ | (mán•)(nèe•n) | ‘egg’ |
| /pinno+`n/ | (pín•)(nòo•n) | ‘pile’ |
| /vɑfffo+`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/ | (lása•) | ‘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·lh)(hàajɲ) | ‘sledge’ |
| /kusʌ/ | (kúz)(zàajɲ) | ‘cow’ |
| /kasi/ | (ká·z)(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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