# Contrasting accounts of consonant gradation in northern Sámi

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**Abstract.** Nominals in Northern Sámi (Uralic) undergo a productive consonant gradation process, but it is not ubiquitous. One class in particular, odd-stemmed nominals, has a seemingly arbitrary 50/50 split in which nominals do and don't gradate. I present and defend two contrasting hypotheses to explain this dual patterning. The first is that whether a nominal undergoes gradation is completely arbitrary and each lexical entry is marked with a diacritic indicating whether it does. The second is that a ghost suffix from a final vowel in Proto-Sámi is present in the deep structure of certain nominals and blocks gradation.

**Keywords.** Phonology; Morphophonology; Morphology; Uralic; Sámi; Northern Sámi; Consonant Gradation

**1. Introduction.** There is an existing body of literature on mora-affixing morphology, whereby morphologically triggered quantity alternations are analyzed as the result of the underlying affixation of a floating mora. An example of this phenomenon in Quechua is shown in Table 1 (Trommer & Zimmermann 2014:464).

| Base | 1SG | 2SG | English |
|---|---|---|---|
| kuti | kuti: | kuti-jki | 'return' |
| alqu | alqu: | alqu-jki | 'dog' |
| ʈʂakra | ʈʂakra: | ʈʂakra-jki | 'field' |

Table 1. Vowel lengthening in Quechua

The alternation between the base and 1SG, where V → V:, has been analyzed as an example of mora-affixing morphology, and the 1SG ending can merely be analyzed as $\mu$, a floating mora which links to the preceding vowel, causing it to lengthen. Consonant gradation in Northern Sámi, another quantity-manipulating phenomenon where consonants undergo a strengthening or weakening process in certain morphologically defined contexts has been analyzed as another instance of mora-affixing morphology in Bals Baal et al. (2012). The analysis put forth here would predict that consonant gradation is a ubiquitous process in Northern Sámi, with it affecting all relevant lexical items. However, this is not the case, as roughly a third of the lexical items that could undergo consonant gradation do not. This paper explains why this is the case.

**2. Background.** Nouns and adjectives[1] in Northern Sámi (Uralic, henceforth Sámi) undergo a regular consonant gradation process according to the paradigms below. Most nouns are classed by the number of syllables in the GEN-ACC.SG, either even or odd. There is also a small class of nouns known as "contracted stems" that combine the gradation pattern found in odd-stemmed

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[1] Since both nouns and adjectives gradate identically, whenever I refer to "Sámi nouns," I also am referring to adjectives unless otherwise noted

nouns and the endings from even-stemmed nouns (Hedlund & Larsson 2021).[2] A sample paradigm for each class is shown in Table 2 (see §2.1 for an explanation of the different grades of consonants in Sámi). For clarity's sake, forms in the stronger of the two grades are in boldface. The gradation alternations in these paradigms are between word-medial *hčč* and *hč*; *dd* and *tt*; and *hcc* and *z* respectively.

| | **Even** | | **Odd** | | **Contracted** | |
|---|---|---|---|---|---|---|
| | **Sg** | **Pl** | **Sg** | **Pl** | **Sg** | **Pl** |
| **Nom** | **áhčči** | áhčit | duottar | **duoddarat** | boazu | **bohccot** |
| **Gen-Acc** | áhči | áhčiid | **duoddara** | **duoddariid** | **bohcco** | **bohccuid** |
| **Ill** | **áhččái** | áhčiide | **duoddarii** | **duoddariidda** | **bohccoi** | **bohccuide** |
| **Loc** | áhčis | áhčiin | **duoddaris** | **duoddariin** | **bohccos** | **bohccuin** |
| **Com** | áhčiin | áhčiiguin | **duoddariin** | **duoddariiguin** | **bohccuin** | **bohccuiguin** |
| **Ess** | **áhččin** | | duottarin | | boazun | |

Table 2. Declension of *áhčči* 'father' (even), *duottar* 'tundra' (odd), and *boazu* 'reindeer' (contracted)

Bals Baal et al. (2012) provide a comprehensive overview of the phonological processes behind gradation pertaining to alternations between the NOM.SG and GEN-ACC.SG of even-stem nouns.[3] They posit that endings that trigger the strong grade in nouns also contain a hidden mora (which they write as $\underline{\mu}$) that, through phonological processes, docks itself to the consonant(s) directly following the rightmost stressed syllable.[4] They note eight different patterns of gradation alternations. Each has its own unique derivation, but they all more or less derive their gradation alternations in a manner similar to that which is outlined in the figures below. These account for the gradation alternations in the NOM.SG and GEN-ACC.SG forms of the noun *guolli, guoli*, 'fish' (even, ll-l gradation):

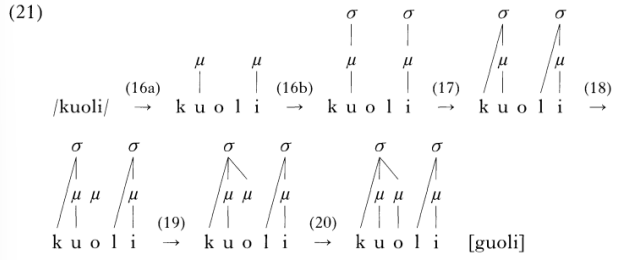



Figure 1. Phonological derivation of *guoli* (GEN-ACC.SG, weak grade) (Bals Baal et al. 2012:177)

[2] In Sámi, there are seven cases, but the genitive and accusative have almost entirely fallen together, save for a few minor exceptions. Additionally, there is no SG-PL distinction in the essive case, so 'áhččin' can be interpreted as either 'as a father' or 'as fathers.'

[3] Although it extends to the rest of the paradigms quite nicely

[4] Sámi assigns fixed primary stress to the initial syllable of the word. Every odd syllable (minus the final syllable) after that receives secondary stress (Hedlund & Larsson 2021:18).

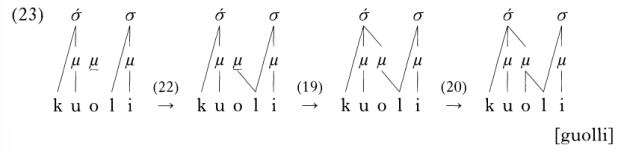



Figure 2. Phonological derivation of *guolli* (NOM.SG, strong grade) (Bals Baal et al. 2012:178)

In the case of the weak grade *guoli* (GEN-ACC.SG, Figure 1), following basic prosodification, we start with an input /guoli/.[5] The head of each syllable is assigned a mora (16a), which then gets projected into a full syllable (16b). In (17), the unassigned consonants *g* and *l* are assigned to the onset of each syllable. For the particular class of words to which *guolli* belongs (bisyllabic even-stem nouns), the syllable nucleus of the stressed syllable must be bimoraic for segmental reasons (Bals Baal et al. 2012:176). This is accomplished by having either a diphthong (as seen in *guolli*) or the vowel /á/, which by nature surfaces as [áː] in almost all environments (Hedlund & Larsson 2021:19).[6] Therefore, in (18-19), a second mora is parsed to the syllable and eventually attaches itself to the diphthong *uo* in (20).

The derivation of *guolli* (Figure 2) starts exactly the same as in (16-17), but differs in (18) because $\underline{\mu}$ docks to the consonant following the stress, which causes the consonant to be lengthened, as seen in (22) of Figure 2. This geminate consonant (also called a Q2 consonant, see §2.1) is said to be moraic and ambisyllabic, sharing a mora with the preceding syllable (Bals Baal et al. 2012:175). A simple (Q1) consonant contributes no morae. Overlong (Q3) consonants contribute an entire mora on their own. Through the process of mora docking, $\underline{\mu}$ causes *l* to become moraic and syllabify both as a part of the coda of the preceding syllable and a part of the onset of the following syllable, where it ultimately surfaces as a geminate.

This is just one example derivation, as Bals Baal et al. (2012) identifies seven other gradation patterns that can broadly be categorized into three subcategories:

1. Gemination of varying lengths
2. Preaspiration of varying lengths
3. Preglottalized (ʔn) and interrupted (nʔn) nasals

Additionally, an earlier paper, Bals et al. (2007), outlines further voicing alternations and separate gradation derivations for various consonant clusters, but they all have similar prosodifications as outlined in Figures 1 and 2.

While this paper explains the inner phonological workings of gradation for even-stem nouns well, it leaves lingering questions about the true nature of gradation unanswered. As noted in the two tables above, there are two main classes of nouns in Sámi: odd- and even-stem, which exhibit almost completely opposite gradation paradigms, but not all nouns undergo gradation. Why might this be? I posit two potential solutions that could provide an answer to this question. The first is that all nouns (and other items which undergo gradation) come with a diacritic attached,

[5] <g> in Sámi orthography represents /k/. However, to avoid confusion, I will still use <g> even though Baal uses <k> in her analysis (see footnote 8).

[6] Sámi has two contrastive low vowels: /a/ <á> and /ɑ/ <a> (Hedlund & Larsson 2021). See footnote 8 for a discussion on the use of IPA vs orthography in this paper.

which I will call +/−G, that determines whether or not it undergoes gradation. The second is that there is some sort of richer phonological representation somewhere in the lexicon that triggers or blocks gradation.

2.1. THE GRADES OF SÁMI CONSONANTS. Before we discuss the details behind the differences we see in gradation paradigms, I will first give a broad descriptive overview of the different "grades" of consonants in Sámi. Each consonant that is subject to gradation is said to exist in one of three grades, which have been assigned the names Q1, Q2, and Q3 respectively. Q1 is the weakest phonetically, often just a single consonant, while Q3 is the strongest, often surfacing as an overlong [C::] or a consonant with geminated preaspiration, preglottalization, etc. (Hedlund & Larsson 2021; Bartens 1989).[7] Some clusters only alternate between two grades, and, by convention, these alternations are said to be between Q2 and Q3.

In any given paradigm, consonants only alternate between two of the three grades. The term *strong* in this essay refers to the higher of the two grades between which the consonants alternate for any given paradigm, and vice versa for the term *weak*. All paradigms gradate between two adjacent grades, except for contracted stem nouns, which alternate between Q1 and Q3.

**3. Diacritics.** The easiest (and perhaps most obvious) solution here would be to merely propose that every word in the lexicon is accompanied by a diacritic, either +G or −G. After that, the proper gradation paradigm would occur as outlined in Bals Baal et al. (2012). For example, *guolli* would be listed in the lexicon as /guoli$_{+G}$/[8], and would surface as [guolli] once the NOM.SG ending $\underline{\mu}$ docks itself as seen in Figure 2. A noun like *láse* 'window' would therefore be stored in the lexicon as /láse$_{-G}$/. Since it comes with the −G diacritic attached, I posit that $\underline{\mu}$ undergoes stray erasure (see McCarthy (1979), a.o.) and is deleted, leaving surface NOM.SG form [láse] (as opposed to *[lásse], which would otherwise be expected).

This is comparable to what is observed cross linguistically for other commonly observed diacritic features, for example, gender in Romance Languages. In Spanish, almost every noun ends with either /-o/ or /-a/. Almost every word that ends with /-o/ is masculine and almost every word that ends with /-a/ is feminine. However gender is not fully transparent and must be flagged in the lexicon as a diacritic because

a. Not every noun in Spanish ends in either /-o/ or /-a/. Some nouns, e.g. *reloj* 'clock' must be memorized by the speaker as /reloj$_{+F}$/ as there is no way to tell that *reloj* would be feminine just by looking at it, and (more importantly)

b. Not every noun that ends in /-o/ is masculine and vice versa. Some nouns, such as *la mano* 'hand' and *el mapa* 'map,' just have to be learned by the speaker as exceptions to the generalization.

Although gender is a diacritic here, this doesn't mean that every single instance of gender must be memorized; there are obvious generalizations to be made. Therefore, speakers can regularly and reliably predict the gender of most new nouns they encounter.

[7] For a succinct summary of every single attested gradation pattern in Sámi (in English), please visit https://oahpa.no/sme/gramm/stadieveksling.eng.html

[8] While I take slashes (/.../) and brackets ([...]) to convey their usual function as indicating underlying and surface representations, it is important to note that these do NOT convey IPA unless strictly noted. I stick to the orthographies of the languages I mention as I feel they are sufficient to convey the information I desire to.

In contrast, a German speaker, for example, doesn't have as many helping hands when encountering gender in their language. German has a three-way (masculine, feminine, and neuter) gender distinction, but gender is nowhere near as transparent as it is in Spanish. While there are some tricks speakers can use (e.g. all words ending in /-ung/ are feminine; all words ending in /-chen/ are neuter; etc.), there are not as many generalizations that can be made about German gender. Therefore, it must be learned as a part of the lexicon.

Sámi would sit somewhere between these two. Because almost all even nouns do gradate, speakers can develop a generalization about even-stem nouns and know that they will almost certainly exhibit gradation when storing them in the lexicon. This is reminiscent of the Spanish case. However, much like in German, the gradation process is much more opaque for odd-stem nouns, and whether a noun gradates or not must be internalized.

This analysis ignores the fact that the gradation alternation paradigms we see are, save for the ILL.SG, opposite between even and odd nouns. Of course, this could just be chalked up to random chance, and the full paradigms could be set up as illustrated below in Table 3: Note that the final vowel and sometimes consonant get deleted in the NOM.SG of odd-stem and contracted nouns. See §4.1 for a discussion on the stems of nouns.

| | **Even** | | **Odd** | | **Contracted** | |
|---|---|---|---|---|---|---|
| | **Sg** | **Pl** | **Sg** | **Pl** | **Sg** | **Pl** |
| **Nom** | -$\underline{\mu}$Ø | -t | -Ø | -$\underline{\mu}$t | -Ø | -$\underline{\mu}$t |
| **Gen-Acc** | Ø | -id | -$\underline{\mu}$Ø | -$\underline{\mu}$id | -$\underline{\mu}$Ø | -$\underline{\mu}$id |
| **Ill** | -$\underline{\mu}$i | -ide | -$\underline{\mu}$i | -$\underline{\mu}$idda | -$\underline{\mu}$i | -$\underline{\mu}$ide |
| **Loc** | -s | -in | -$\underline{\mu}$s | -$\underline{\mu}$in | -$\underline{\mu}$s | -$\underline{\mu}$in |
| **Com** | -in | -iguin | -$\underline{\mu}$in | -$\underline{\mu}$iguin | -$\underline{\mu}$in | -$\underline{\mu}$iguin |
| **Ess** | -$\underline{\mu}$n | | -n | | -n | |

Table 3. Potential listings of the suffixes of each class of nouns with floating morae included

There is something to be said about the fact that the endings are almost entirely identical for all nouns. One set of endings could be chosen as the "underlying" endings (floating morae included), which then could be altered by some process of operations to derive both the surface form variations of the endings as well as the gradation differences. The morae attached to some of the endings would have to undergo an additional deletion process aside from the stray erasure induced by the $+/-$G. Also, the differences for which morae get deleted in the various classes of nouns would have to be spelt out. Some more complete explanation of this must be put forth should this hypothesis be the subject of further study, but for now I elect to leave this as an open question.

**4. A Richer Representation.** As discussed in §3, the diacritic hypothesis would accurately derive every single gradation pattern in Sámi. However, it ignores sweeping generalizations regarding which lexical items do and do not gradate. As stated in §1, almost all even-stem nouns gradate, while there is a (roughly) 50-50 split about which odd-stem nouns do. Moreover, the gradation alternations between verbs are much more distinct. All even-stemmed verbs and no odd-stemmed verbs exhibit gradation. This begs the question, if diacritics do not provide a sufficient answer to our problem, what else could there be?

I will tackle this problem in stages, looking at each class of nouns one-by-one and seeing what we find. I conducted a survey of 479 nouns and adjectives in Sámi, which breaks down into 342 even-stem nouns, 121 odd-stem nouns, and 16 contracted nouns. These nouns were taken from Hedlund & Larsson (2021). Of the 342 even-stem nouns, 30 forego gradation. Of the 121 odd-stem nouns, 67 forego gradation, and a lone contracted stem noun forgoes gradation.

4.1. THE STEM OF A NOUN. Before we begin our discussion of deeper representations of gradation, we first need to establish what actually constitutes the "stem" of a noun. Since Bals Baal et al. (2012) posits no mora deletion processes, we must pick a (preferably unaffixed) stem in the weak grade to which we add morae to get the declensions we expect. For even-stem and contracted stem nouns, this process is fairly trivial, with the GEN-ACC.SG and NOM.SG respectively fulfilling these parameters perfectly.

Odd-stem nouns present a slightly larger problem for this solution, as there is no surface form that satisfies these criteria. Therefore, I posit the abstract representation of the stem is equivalent to the GEN-ACC.SG, but in the weak grade (as opposed to the surface form being in the strong grade). We cannot select the NOM.SG to fulfill this role because there is a vowel (and sometimes consonant) loss associated with this ending. However, the GEN-ACC.SG (upon which all of the paradigm except for the NOM.SG and ESS is built) exists in the strong grade, so this does not work as a candidate either. This leaves us with *duottar*, *duoddara* 'tundra' as having stem *duottara*.

4.2. CONTRACTED STEM NOUNS. Contracted stem nouns are almost entirely unproblematic, save for the adjective *mohkkái* 'complicated.' It remains in the strongest grade, Q3, throughout the entire paradigm. We would expect NOM.SG and ESS *mogái(n) (where g is the Q1 alternation with hkk). I will address this later.

4.3. EVEN-STEM NOUNS. Even-stem nouns are also unproblematic for the large part, with only 30/342 foregoing gradation. There exist easy explanations for the majority of these as well.

First, some nouns stay in Q3 throughout the entire paradigm (e.g. *láhtti* 'floor' and *girku* 'church'). I posit that the stem of these nouns (GEN-ACC.SG) already exists in Q3, and therefore there is no phonological process by which $\underline{\mu}$ can dock itself as outlined in Bals Baal et al. (2012). In other words, there exists no "Q4" grade that a consonant/cluster that is in Q3 can strengthen to. In this case, $\underline{\mu}$ gets deleted via stray erasure. This also then allows us to derive *mohkkái*, as the stem (NOM.SG) already exists in Q3, therefore leaving no possibility for $\underline{\mu}$ to dock itself.

Agent nouns, such as *bargi* 'worker,' also undergo no gradation. However, these can be decomposed into a verb (in this case 'bargit,' to work/do) and the agentive suffix /-i/ (or its allomorphs [-eaddji] and [-u] (Sammallahti 1998:230)).[9] This suffix automatically triggers Q3 on the preceding syllable and blocks any gradation from occurring for reasons which I will outline in §4.4 (Svonni 2018:161).

Some loanwords, such as *kafea* 'café' and *radio* 'radio' (syllabified as /ka.fe.a/ and /ra.di.o/ respectively (Hedlund & Larsson 2021)) behave like even-stem nouns even though they actually have an odd number of syllables in the stem. Gradation alternations for this class of nouns always occurs between the last two syllables of the stem. No gradation occurs here simply because there is no gradation scale (as outlined in Hedlund & Larsson (2021) and Bartens (1989)) of which  is a

[9] /m/, /g/, and /ž/ surface as [n], [t], and [š] respectively word-finally due to restrictions on word-final consonants in Sámi (Hedlund & Larsson 2021:33)

part.

These explainations leave us with just five words unexplained: *láse* ‘window;’ *ruoná* ‘green;’ *somá* ‘fun, funny, nice;’ *spile* ‘a man’s wife’s sister’s husband;’ and *spire* ‘predator.’ These words have their consonants stay in Q1 throughout the entire paradigm, leaving us with the forms above in both the NOM.SG and GEN-ACC.SG. We do not see expected NOM.SG forms *lásse, *ruonná, etc. Unfortunately, for the time being, I have no explanation for this. There is the potential that something about the phonological shape of these words blocks gradation, but, as this is a corpus study, there is a limited amount of data to work with. A more thorough fieldwork investigation could help uncover the true nature of these (and potentially other) words that forego gradation.

4.4. ODD-STEM NOUNS. The obvious trouble with positing a deeper analysis of gradation lies in odd-stem nouns. Over half of them (67/121, i.e. 55%) forego gradation. Some of these are easily explainable by methods I have already employed, as outlined below:

Much like with even-stem nouns, we see certain morphologically complex words have a lack of gradation due to gradation blocking suffixes. All derivational suffixes in Sámi have the ability to strengthen the preceding consonant by up to two grades. This strengthening process can be seen in the following examples (all data sourced from Koponen et al. (2002-2008)). First, some suffixes such as the aforementioned agent suffix /-i/ always strengthen the root to Q3, regardless of the underlying grade of the stem, shown in (1).

(1) a. /jug$_{Q1}$-i/
drink-AGT
[juhkki] (Q3) ‘drinker’

b. /oahp$_{Q2}$-i/
teach-AGT
[oahppi] (Q3) ‘teacher’

Some suffixes strengthen by a single grade, which means that underlying Q1 stems surface in Q2, and underlying Q2 and Q3 stems surface in Q3. Examples of these suffixes (/-m/, which makes deverbal nouns, and /-odag/, an adjectivizer) are shown in (2).

(2) a. /eali$_{Q1}$-m/
live-DN
[eallin] (Q2) ‘life’

b. /guhk$_{Q2}$-odag/
long-ADJZ
[guhkkodat] (Q3) ‘length’

c. /bálkk-aš-uvvvo$_{Q3}$-m/
prize-RA-PASS-DN
[bálkkašuvvvon] (Q3) ‘prizewinner’

Lastly, some suffixes induce no change on the grade of the preceding consonants of the root. This means that roots in Q1 surface in Q2, those in Q2 surface in Q2, and those in Q3 surface in

Q3. The prime example of this is the suffix /-ž/, and is found in (3).[10]

(3) a. /guoli$_{Q1}$-ž/
fish-DIM
[guolaš] (Q1) ‘small fish’
b. /gohpu$_{Q2}$-ž/
cup-DIM
[gohpoš] (Q2) ‘small cup’

The hallmark property that unites all of these suffixes is that, regardless of what change the suffix induces on the root, there is no further consonant gradation that happens inside the root. Sample paradigms for suffixes of each type are given in Table 4.

| | **No Strengthening** | | **Str. by 1 Grade** | | **Str. by 2 Grades** | |
|---|---|---|---|---|---|---|
| | **Sg** | **Pl** | **Sg** | **Pl** | **Sg** | **Pl** |
| **Nom** | guoláš | guolážat | eallin | eallimat | juhkki | juhkkit |
| **Gen-Acc** | guoláža | guolážiid | eallima | eallimiid | juhkki | juhkkiid |
| **Ill** | guolážii | guolážiidda | eallimii | eallimiidda | juhkkái | juhkkiide |
| **Loc** | guolážis | guolážiin | eallimis | eallimiin | juhkkis | juhkkiin |
| **Com** | guolážiin | guolážiiguin | eallimiin | eallimiiguin | juhkkiin | juhkkiiguin |
| **Ess** | guolážin | | eallimin | | juhkkin | |

Table 4. Declension of *guoláš* ‘little fish’ (3a), *eallin* ‘life’ (2a), and *juhkki* ‘drinker’ (1a)

Given this, I posit that, similarly to Bals Baal et al. (2012)’s claim all of these suffixes come with up to two floating morae attached, one or both of which dock themselves to the relevant consonants in the exact same manner outlined in §1. If a stem is already in Q3, all additional morae cannot dock themselves, and undergo stray erasure as they cannot be parsed into a syllable.

However, this only accounts for a small percentage of odd-stem nouns. The majority are still unaccounted for. In order to gain a better understanding of this phenomenon, it is important to look at its diachronic history. Consonant gradation has been reconstructed as purely allophonic in Proto-Sámi (henceforth PS). Unlike in Modern Sámi, where even in its lexicalized form it can only occur in certain contexts, all intervocalic single consonants and clusters could undergo gradation. The triggering factor for this was the shape of the following syllable in a word: if it was closed, the weak grade would occur, and if it was open, the strong grade would (Sammallahti 1998:47). Non-gradating odd-stem nouns trace their roots to nouns that end in a vowel (e.g. NS *eahket*, *eahkeda* ‘evening’ > PS **eahkēntē* (Sammallahti 1998:240)), whereas gradating odd-stem nouns go back to Proto-Sámi nouns that ended in a consonant (e.g. NS *duottar*, *duoddara* > PS **tuontër* (Sammallahti 1998:240)).

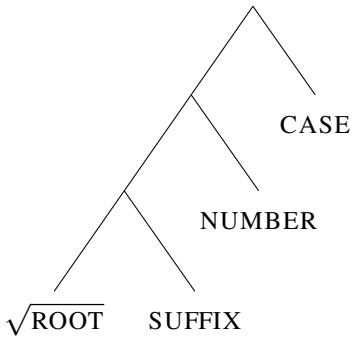
Tan (2023:129) posits the existence of a “ghost consonant” (henceforth written $Ø_c$) in the Amarasi language that is the direct descendant of the Proto-Malayo-Polynesian prefix **pa-*. This $Ø_c$ causes certain syllabic prefixes in modern Amarasi to occur where a non-syllabic prefix would

[10] /m/, /g/, and /ž/ surface as [n], [t], and [š] respectively word-finally due to restrictions on word-final consonants in Sámi (Hedlund & Larsson 2021:33)

otherwise be expected. Finnish, a related Uralic language, is also well known for its ghost consonant which impacts many (morpho)phonological processes in the language, including certain sandhi processes and consonant gradation (Kiparsky 2003:119).

I posit that something similar has come from the word-final vowels that have been lost in non-gradating odd-stem nouns. This Ø segment has been reanalyzed and acts as a gradation-blocking suffix as outlined above (in this case with no floating morae attached), which I have decided to write as $Ø_{SUF}$ to signify its behavior as a suffix and distinguish it from Tan (2023)'s $Ø_c$. To understand how this works, we will derive the strong grade form of for a two pairs of gradating and non-gradating nouns from their respective roots: one even-stem (*juhkki* 'drinker' and *áhčči*, *hč* 'father') and one odd-stem (*fanas*, *fatnasa* 'boat' and *eahket*, *eahkeda* 'evening'), using Distributed Morphology (DM, Halle & Marantz (1993), a.o.). I posit that every noun in Sámi can be decomposed into four heads: ROOT, SUFFIX, CASE, and NUMBER. This is illustrated in (4) below:

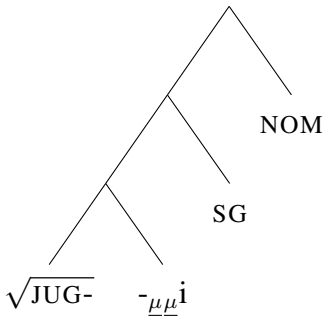
(4)




SUFFIX may be left empty or be filled by $Ø_{SUF}$ or any overt suffix (/-i/, /-ž/, etc.). CASE may have the value of one of the aforementioned seven cases, and NUMBER may be either SG or PL. Whenever the SUFFIX head is occupied by a non-Ø element, the process of gradation is blocked.

Using this model, the even noun *juhkki* (NOM.SG) 'drinker' is illustrated in (5):

(5)

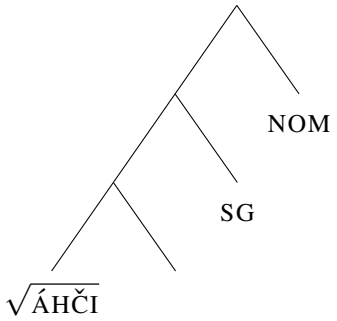


First, both floating morae from the suffix /-$\underline{\mu\mu}$i/ dock to the root $\sqrt{\text{JUG-}}$ and strengthen it to *juhkk*, from Q1 to Q3. NOM and SG combine to form the NOM.SG ending, which itself is a singular floating mora (see §3). However, due to the presence if /-$\underline{\mu\mu}$i/ in the SUFFIX head, any further strengthening processes are blocked, and the remaining floating mora is deleted via stray erasure. The step-by-step derivation is given in (6):

(6) /jug-$\underline{\mu\mu}$i-SG-NOM/ $\rightarrow$ juhkk-i-SG-NOM $\rightarrow$ juhkk-i-$\underline{\mu}$ $\rightarrow$ [juhkki]

A regular gradating even-stem noun, such as *áhčči* (NOM.SG) would then be represented as in (7):

(7)

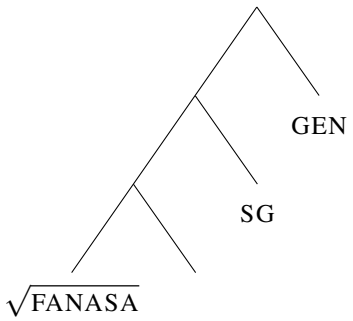



This time, there is nothing in the suffix head that is governing the shape of the stressed syllable. Therefore, the $\underline{\mu}$ which is added by the combination of NOM and SG is able to dock itself inside the root, thus providing us with surface NOM.SG form [áhčči] in Q3 from an underlying stem in Q2. The full derivation is given in (8):

(8) /áhči-Ø-SG-NOM/ $\rightarrow$ áhči-$\underline{\mu}$ $\rightarrow$ [áhčči]

Odd-stem nouns work similarly. First, the base tree for the noun *fanas*, *fatnasa* 'boat,' is represented in (9). This will derive the GEN-ACC.SG (the form in this paradigm whose ending is a bare $\underline{\mu}$).

(9)

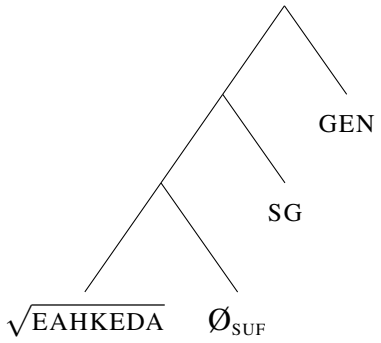


Much like with *áhčči*, GEN and SG combine to produce the ending $\underline{\mu}$, which, due to the lack of a suffix controlling the shape of the streessed syllable in the SUFFIX head, can dock itself inside the root /fan$^{\text{ʔ}}$asa/ to produce the strong GEN-ACC.SG form [faʔnasa] <fatnasa>.[11] The full derivation is given in (10):

(10) /fan$^{\text{ʔ}}$asa-Ø-SG-NOM/ → fan$^{\text{ʔ}}$asa-$\underline{\mu}$ → [faʔnasa]

Lastly, let's derive the non-gradating noun *eahket*, *eahkeda* 'evening.' We start with the underlying representation below in (11), in a similar vein to those we have seen in the past. However, note the presence of $Ø_{SUF}$ in the SUFFIX head.

(11)




Just like in the case with *juhkki*, there is something occupying the SUFFIX head, which prevents any further strengthening processes from happening to the stem. This gives us surface form *eahkeda* instead of **eahkkeda*, which would be otherwise expected if $Ø_{SUF}$ were not present and gradation proceeded as normal. The full derivation is given below in (12):

(12) /eahkeda-$Ø_{SUF}$-SG-GEN/ → eahkeda-$Ø_{SUF}$-SG-GEN → eahkeda-$Ø_{SUF}$-$\underline{\mu}$ → [eahkeda]

4.5. GRADATION IN LOANWORDS. Lastly, some loanwords gradate in ways that seem to defy the generalizations I have previously made. Some loanwords, such as *gohppu*, *hp*, 'cup' (from Swedish/Norwegian *kopp*) do gradate as expected, while others, such as *toga* 'train' (from Swedish/Norwegian *tåg*/*tog*) do not. I posit that loanwords also come with a hidden "loanword suffix," which ultimately also surfaces as Ø, that blocks gradation from occurring, much like $Ø_{SUF}$ that I posited earlier.

There are languages, such as Alabama (Muskogean), that make overt use of a loanword suffix (Lupardus 1982). There may be some prosodic restrictions that determine which loanwords can get this suffix (likely due to syllable structure/weight), but it is largely productive. For example, the word for 'school' is *school-ka*, which can be segmented as *school* (from English 'school')-*ka* (loanword suffix) (Sylestine et al. 1993). Names can even get this suffix, too, so the

[11] See (Bals Baal et al. 2012:192) for the prosodical derivation of preglottalized nasals and (199) for a discussion on their underlying representation.

name 'Jacob' is rendered in Alabama as *Jacobka*. However, some more integrated loanwords such as *Liwisti* 'Livingston' (a city in Texas near the Alabama-Coushatta reservation) forego this suffix.

I posit that as loanwords such as *gohppu* become more integrated into the language, they can lose this Ø suffix, which then allows for gradation to occur as expected. However, more recent loanwords, such as *toga*, *plakahta* 'license plate,' *universitehta* 'university,' etc. retain this suffix as they are not as integrated into the language. Therefore, they forego gradation.

**5. Summary.** Here I have presented two separate frameworks by which the consonant gradation system in Northern Sámi can be analyzed. The first claims that all nouns and adjectives have an attached diacritic, $+/-$G, that dictates whether or not they undergo gradation. This would derive every single instance of gradation that we see in Sámi, and is comparable to other diacritic phenomena we see cross linguistically (e.g. gender in Spanish and German). However, I claim a secondary analysis also accounts for these alternations without chalking it up to a mere diacritic that involves looking at this feature diachronically. A ghost suffix from a word-final vowel (which had triggered gradation allophonically in Proto-Sámi) occupies the SUFFIX head of the deep structure of all non-gradating nouns (aside from the ones which have easily offerable alternative explanations). There are still a handful of problematic even-stem nouns that prove problematic, but those lie outside the scope of this paper.

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