

The acquisition of grade alternation in North Saami

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1. Introduction

This is a descriptive study of the acquisition of grade alternation in North Saami. Grade alternation is a morphophonological process, in which consonants in foot-medial position alternate between two or three grades in the conjugation of verbs and the declension of nouns. Nothing in the phonological environment triggers this alternation. The alternations are connected to morphology. In linguistic descriptions, this phenomenon is often described from a diachronic perspective. Sound changes in the history of North Saami have contributed to connecting the phonological alternations to morphology. However, children do not know the history of their ambient language, and the diachronic explanation linguists resort to cannot guide them in the acquisition process. Children must rely solely on their input. Due to the complicated nature of this process, one might expect the alternations to be fully mastered relatively late in the development.

The focus of this article is the order in which the different phonological alternations are acquired, the child's mapping between morphology and phonology and the types of errors children make in the acquisition process. There are two areas where one might expect to find errors. One is in connecting phonology and morphology, such as assigning strong grade consonants to weak grade environments, and vice versa. The other is in the phonological alternations themselves. I will show that the mapping between phonology and morphology is in place early on, and that all the errors in the data are purely phonological.

In the language acquisition literature it is assumed that the first structures to be acquired by children are the least marked ones (Jakobson 1972, Gnanadesikan 1995). In accordance with that, the alternation patterns which are acquired first should be the least marked ones, and the ones acquired last, should be more marked. As we will see, the complicated alternations, which involve more than one phonological change, or marked consonant clusters, are indeed late acquisitions, whereas the less complicated patterns, with only one phonological change, or unmarked consonants, are acquired early. We can say that the degree of markedness can be determined by how many alternations a pattern has or by the complexity of the consonants and consonant clusters involved in the alternations.

The data for this study come mainly from one child speaking the Kautokeino dialect of North Saami, Marja. The description in this article

therefore only applies to the Kautokeino dialect. Data were collected from her from age 2;7.20 till age 2;11.17. Some of her data will be compared to data of other children acquiring North Saami; child I and child II. Child II is 2;5 and child I is 2. The development of phonologically complex patterns in Marja's language, will also be compared to the data from a six year old child; child III, and an eight year old child; child IV. All these children were recorded in a naturalistic setting.

The article is structured as follows. Section 2 gives a brief description of the North Saami grade alternation. This description focuses on the present adult system, and on consonant and vowel length. In section 3, Marja's development is described as proceeding through several stages. At the first stage, quantitative alternations are acquired. Then follow qualitative changes, and finally alternations with both quantitative and qualitative changes. There is also a fourth stage, in which she has partial alternation, but still has not acquired the adult pattern. The delay in these alternations is due to the marked structures in the consonant center. Section 3 also discusses the different types of errors that we find in child language. In section 4, I conclude my findings.

2. What is grade alternation?

In present North Saami, grade alternation is a process which involves both phonology and morphology. The consonants in a certain position of a word, alternate between two grades in the conjugation of verbs and the declension of nouns. This alternation happens in the consonant center, which means the consonants between the two syllables of a disyllabic word. The phonological alternations can involve consonant quantity, consonant quality, and sometimes both quantity and quality. Often, the gradation also has an impact on the vowels preceding the consonants in question. Some examples are given in (1) below.

- | | |
|-------------------------|--|
| (1) a. maannaa : maanaa | <i>child.nom.sg. – child.acc./gen.sg.</i> |
| b. lohkah : logaan | <i>read.inf. – read.1sg.pres.</i> |
| c. eanʔni : ẽaʔni | <i>mother.nom.sg. – mother.acc/gen.sg.</i> |

Here we see three types of alternation in the consonant center. The first one is degemination, which is an alternation involving consonant quantity. The next one is deaspiration, which is an alternation involving the quality of the consonants. The last one is glottal shift, which involves changes in the quality of the consonant center and changes in the diphthong preceding the consonant center. In this case the diphthong shortens, or the stress shifts (see Sammallahti 1998).

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In the case of the length alternations in (1a), the longer quantity in the alternation is called the strong grade of the word, whereas the shorter quantity is the weak grade. In this case, /nn/ is the strong grade and /n/ is the weak grade. In some words, /nn/ can be the weak grade. North Saami has three consonant lengths: short, long and overlong. These quantities are often called Quantity I, Quantity II, and Quantity III, respectively. Examples of the different quantities are given in (2).

- | | | |
|--------|----------|----------------------------------|
| (2) a. | tsum:maa | <i>kiss.nom.sg.</i> |
| b. | tsummaa | <i>kiss.acc.sg.</i> ¹ |
| c. | somaa | <i>fun</i> |

In (2a), we have the overlong consonant, which is preceded by a short vowel. In (2b), we have the intermediate length on the consonant, and the preceding vowel is long. Only short vowels can appear in front of a QIII consonant. When a QII consonant alternates with a QI consonant, the QII is the strong grade, as in 1a. If it alternates with a QIII consonant, QII is the weak grade, as in (2a-b). In (2c), we have the short consonant preceded by a short vowel. Naturally, the QI consonant can also be preceded by a long vowel.

Diphthong quantity in North Saami is described as a complicated matter in the literature. In this article, I distinguish between short and long diphthongs. The vowel /a/ has three lengths; short, intermediate, and long. Only short and long /a/ will be distinguished in the transcriptions.

In other types of alternations, we also have one strong and one weak grade form. In the examples in (1), /hk/ and /nʔn/ are the strong grades, and /g/ and /ʔn/ are the weak grades. However, /hk/ can sometimes be the weak grade, whereas /ʔn/ can be the strong grade. These qualitative consonant grades can also be divided into QIII, QII, and QI. We see this in (3).

- | | | | |
|-----|------------|-----------|----------|
| (3) | QIII | QII | QI |
| | <i>hhk</i> | <i>hk</i> | <i>g</i> |
| | <i>nʔn</i> | <i>ʔn</i> | <i>n</i> |
| | <i>n:n</i> | <i>nn</i> | <i>n</i> |

Historically, grade alternation was a phonological process, namely the “weakening” of intervocalic posttonic stops in closed syllables (Korhonen 1988). The strong grade appeared before open syllables, and it was weakened before closed syllables. The two grades of the consonants were

¹ This form could also be the gen.sg. Gen.sg. and acc.sg. have the same form in North Saami. Most examples in this article will be labelled as acc.sg.

thus allophones of the same phoneme. Because of various changes, as contraction and apocope, this generalization no longer holds in North Saami. Formerly closed syllables became open, and some open syllables became closed, without this affecting grade alternation (Sammallahti 1998). The different grades of the consonants now represent separate phonemes. Somewhere along the lines of history, speakers of North Saami reanalyzed grade alternation in such a way that it allowed the phenomenon itself to survive, even though the conditioning environment disappeared. The original phonological condition for grade alternation is gone, but the alternation persists.

In order to master the North Saami grade alternation system, children must connect the phonological alternations to morphology. They have to learn three basic noun paradigms and one verb paradigm². In addition to the various suffixes, they also have to learn all the different phonological alternations, and there are more than ten types of alternations.

In disyllabic nouns, the nominative singular has the strong grade consonant center whereas the accusative singular has the weak grade. We have seen this in (1a) and (1c), and (2a-b). In verbs, the infinitive and the 3. person singular, present tense have the strong grade consonant center, while for example 1. person singular, present tense, has the weak grade. This is shown in (1b). In other words, children must learn which cases and which persons have the strong grade consonant center and which persons and cases have the weak grade. This all seems very complicated, since there is nothing in the phonological environment that can give us any clues as to which grade the consonant center should have. As we will see in the next section, children acquire this system relatively quickly, and they master most of it around the age of three. In Bals (2002), all noun declension paradigms are considered. In this article, the focus will be on gradation in disyllabic nouns and verbs.

3. The acquisition of the various alternations

Marja's development is here described in four stages; quantitative alternations, qualitative alternations, a combination of alternations, and finally, alternations involving complex consonant clusters. These stages are a simplification of the actual development. The patterns in each stage are not all acquired simultaneously. As we will see, some quantitative changes occur later than others, and even later than some qualitative changes. However, the development does go from quantitative changes to qualitative changes, and after that, more complicated alternations occur. At the outset

² They actually have to learn three verb paradigms, but only one of these has grade alternation, namely the paradigm which I have called disyllabic verbs.

of this study, Marja had already acquired four alternations, all of which can be seen as quantitative alternations.

3.1. Stage I: Quantitative alternations

When the data collection began, Marja had already acquired these patterns; degemination from QII to QI, deglottalization, some types of lengthening and alternation from /tʃ/ to /j/. At that time Marja was aged 2;7.20. All these alternations have to do with consonant length. It seems that length alternations are the first type of alternations to be acquired. They should therefore be the least marked alternations.

It is difficult to say which of these patterns is acquired first, but data from the other children suggest that the first pattern to be acquired is degemination from QII to QI. This is the only pattern that they all master to some extent. The youngest child has also overgeneralized this pattern to stops and affricates, as we will see in the next section. The alternations acquired at this stage, apply mainly to fricatives and sonorants. Alternations which apply to stops and affricates are acquired at the next stage. Marja's data are given in (4). Examples (4a-c) show degemination, examples (4d-e) show deglottalization, examples (4f-g) show the simplification of a voiceless geminate affricate to a glide, and (4h) is an example of lengthening. The first word in the pairs is in the strong grade, and the second one is in the weak grade.

(4) Marja	adult	gloss
a. viessu : viesuh	viessu : viesuh	<i>house.nom.sg. – house.nom.pl.</i>
b. dallaa : daalaan	ballaah : balaan	<i>fear.inf. – fear.1sg.pres.</i>
c. mannaa : manaan	mannaa : manaan	<i>go.3sg.pres. – go.1sg.pres.</i>
d. baaʔni : baani	baaʔni : baani	<i>tooth.nom.sg. – tooth.acc.sg.</i>
e. naaʔmaan : naami	jaaʔmaan : jaami	<i>die.past.prt. – die.3sg.past.</i>
f. bitʃaa : bijaan	bitʃaa : bijaan	<i>put.3sg.pres. – put.1sg.pres.</i>
g. vüotʃi : vüojaah	vüotʃih : vüojaah	<i>drive.inf. – drive.2sg.pres.</i>
h. dæβri : dæβrris	diβri : diβrris	<i>insect.nom.sg. – insect.loc.sg.</i>

It is important to note that the preglottalized nasals, which we have in the deglottalization pattern in (4d) and (4e), occur as the strong grade of single nasals only in words that do not begin with nasal consonants. If the word *does* begin with a nasal consonant, then the strong grade of a single nasal is a geminate nasal consonant, as in (4c), and the alternation is degemination from QII to QI. Deglottalization and degemination from QII to QI are similar patterns, see example (3). Both of these patterns can be seen as degeminations or differences in consonant length. Marja has the right

consonant length in both the strong and the weak grade of the degemination pattern. Her only problem seems to be vowel length. In (4b), she has a long vowel in the weak grade before the short consonant. In the adult language, vowel length does not change in this particular word. However, the strong grade consonant center *is* often preceded by a short vowel, which is then long in the weak grade. This word, however, has a short vowel underlyingly. The vowel has not been shortened in the strong grade, and therefore it is also not long in the weak grade in the adult language. Marja must have analyzed the vowel as long underlyingly, and has shortened it in front of the strong grade consonant center. After all, she has the correct vowel length in example (4c).

The alternation from /tʃ/ to /j/ in (4f-g), is a geminate affricate alternating with a short glide. It looks like degemination since the consonant center is shortened. In the lengthening pattern in (4h), the consonant center is obviously lengthened. This alternation is lengthening of /r/ in a cluster with the bilabial /β/. No other changes occur in the alternation. Vowel length stays the same in both the weak and the strong grade, and the vowel does not become consonant-like. The only difference between Marja's word form and the adult form is that the high vowel /i/ has adopted the feature [labial] from the fricative and is thus articulated with lip rounding. Notice that the adult language only has /ʉ/ in some recent Norwegian loanwords.

The data from Marja's first recording sessions indicate that the morphology part of grade alternation is already in place at a very early age, before or around 2;5. The only thing that needs to be acquired after that, are the different phonological patterns. In the first recording sessions, we do find a lot of mistakes where a strong grade environment has a weak grade consonant, and vice versa. However, these types of errors are only found in some alternation patterns. In the four patterns mentioned in this section, we do not find any such errors. She always has strong grade consonants in strong grade environments, and weak grade consonants in weak grade environments. Another interesting thing about these "mismatches" is their lack of variability. In some alternations, *only* the strong grade consonants appear, and in others only the weak grade consonants. This means that in some alternation patterns we find strong grade consonants in weak grade environments, but never weak grade consonants in weak grade or strong grade environments. In these alternations, Marja only uses one grade of the consonant in all cases. Therefore, I do not think that it is a matter of mismatch between morphology and phonology. It is more likely that she just hasn't acquired the relevant phonological alternation, and therefore has the strategy of no alternation in those cases. She then chooses either the

strong grade or the weak grade form as the basic form of the word. In what follows, we will look at several errors that look like mismatches, and I will show that they are just strategies used by children before they acquire a phonological alternation.

3.2. Stage II: Qualitative alternations

At age 2;8.12, Marja has acquired deaspiration, aspiration shortening, cluster shortening and devoicing. Aspiration shortening and cluster shortening are alternations in consonant length. Deaspiration and devoicing involve qualitative changes in the consonant center. These are the first patterns with qualitative changes to be acquired. Most of the patterns acquired at this age apply to stops and affricates. The basic alternation for fricatives and sonorants is degemination, i.e. shortening. The basic alternation for stops and affricates is devoicing, which is a change in feature value. Deaspiration can be seen as voicing. Single voiceless obstruents are preaspirated word internally in North Saami. When the voiceless obstruents are voiced, the aspiration disappears. This means that devoicing and deaspiration are both alternations in which the voicing of the stops and affricates alternates. In what follows, we will treat the aspiration processes together, and cluster shortening and devoicing separately.

3.2.1. Aspiration processes

Aspiration shortening is an alternation that involves degemination of preaspirated stops and affricates in the weak grade, or rather degemination of the long aspiration. In the strong grade we have the long aspiration, and in the weak grade we have the short aspiration. In deaspiration, the stops and affricates are voiced in the weak grade, and the aspiration disappears. In the strong grade, we have the preaspirated form. The strong grade of deaspiration and the weak grade of aspiration shortening both consist of preaspirated consonants. They are the QII consonant of preaspirated stops and affricates (see (3)). In (5), we see examples of these alternations in Marja's data. Examples (5a-b) show deaspiration, and examples (5c-d) show aspiration shortening. The first word in the pair is in the strong grade, and the second word is in the weak grade. Notice that the consonant centers of the first word in (5b), and the second word in (5d), are similar.

(5) Marja	adult	gloss
a. tʃaahtsi : tʃaadzi	tʃaahtsi : tʃaadzi	<i>water.nom.sg. – water.acc.sg.</i>
b. diehtaa : diere	diehtaa : dieðe	<i>know.3sg.pres. – know.neg.</i>
c. aahhku : aahku	aahhku : aahku	<i>granny.nom.sg. – granny.acc.sg.</i>
d. maahhtaa : maahte	maahhtaa : maahte	<i>know.3sg.pres. – know.neg.</i>

In deaspiration, Marja correctly alternates between preaspirated voiceless stops in the strong grade and their voiced, unaspirated counterparts in the weak grade. Preaspirated /ht/ alternates with /ð/. Sometimes the /ht/ alternates with /r/, as in (5b). This is not unusual. Children acquiring other languages, frequently replace /ð/ with other consonants. According to Macken (1995), in the acquisition of Spanish and Greek, /ð/ is replaced by /l/. In Spanish, it is sometimes replaced by /r/. In the acquisition of English, /ð/ is replaced by /d/.

In aspiration shortening, Marja does not only master the shortening of the aspiration. She also knows that the long aspiration can only be preceded by short vowels or diphthongs. The /a/ in these examples has the intermediate length in the strong grade.

Before she mastered these patterns, she used the *weak* grade form in both the nominative and the accusative in deaspiration. In aspiration shortening, she used the *strong* grade form also in the accusative and genitive, which have the weak grade in adult language. This means that she had acquired long aspiration and unaspirated, voiced stops. She did not use preaspirated voiceless stops in the environments where one might expect them to occur. In Marja's data from the two first recordings, I cannot find any nouns or verbs from the deaspiration pattern that are in the strong grade. The only words with preaspiration in that corpus, are the ones from the aspiration shortening pattern. And even these words come with the long aspiration only. For some reason, Marja does not use the short aspiration. In the Kautokeino dialect, the short aspiration in the strong grade is sometimes lengthened, so that we have long aspiration alternating with unaspirated voiced stops. This means that it is possible that the long aspiration is more frequent in Marja's input than the short one. An example is given in (6).

(6) Standard North Saami	Kautokeino dialect	Gloss
jahki : jagi	jahhki : jagi	<i>year.nom.sg. – year.acc.sg.</i>

However, Marja used the long aspiration also in the weak grade, which does not happen in adult language. In the deaspiration pattern, she used the voiced stop/affricate both in the strong and the weak grade. This means that she did not have alternation at all. It would be wrong to say that she did not know that the nominative singular has strong grade, since she has correct alternation in patterns that she has already acquired, such as degemination. It is also not the case that she sometimes gets the adult alternation correct, and sometimes she does not, because then we would expect to find these mismatches in the degemination pattern, as well. As mentioned, there are

no such mismatches in that pattern. In full sentences it is clear which case Marja intends to express, even though she might be getting the consonant center wrong. Some examples of errors are given in (7).

(7) Marja	adult
a. die le reaga	die le reahka
<i>that is sled.nom.sg.</i>	
‘That is a sled.’	
b. diesse ³ reaga	diesse reahka
<i>it has sled.nom.sg.</i>	
‘It has a sled.’	
c. gussaa duo le	gussaa duo le
<i>cow.nom.sg. that is</i>	
‘That is a cow.’	
d. mu ahhku viessu	mu aahku viessu
<i>my grandmother.gen.sg. house.nom.sg.</i>	
‘My grandmother’s house.’	

In (7a-b), we see that in sentences where the noun must be in the nominative case, Marja uses the weak grade consonant center in the deaspiration pattern. In (7c), we have the same type of sentence, with a noun that undergoes degemination. This is a pattern she has already acquired. In that sentence, the noun is in the nominative case with the correct strong grade consonant center. See also example (9) below, where the noun in a similar sentence is in the strong grade in the nominative, and also in the strong grade in genitive singular. In that pattern, the strong grade form is the only form that Marja uses. It is therefore likely that the nouns in (7a-b) are also in the nominative case. However, Marja has not acquired the pattern of deaspiration yet and she prefers the weak grade form of the noun. In (7d), we see that Marja has the strong grade long aspiration in the genitive singular, preceded by short /a/. In other words, she has chosen the strategy of no alternation. In deaspiration, she prefers the weak grade form, and in aspiration shortening she prefers the strong grade form.

3.2.2. Cluster shortening

In cluster shortening, a cluster of geminate /s/ + stop is shortened in the weak grade. Marja also masters the shortening of the preceding vowel in the strong grade. She makes no mistakes. In this pattern, the /a/ has the shortest length in the strong grade, just as in the adult language. In the

³ The word *diesse* in (7b) actually consists of two words; the pronoun *dies*, the locative of ‘it’ and *lea*, the copula.

weak grade, /a/ has the longest length. In the strong grade, we have a long cluster preceded by a short vowel. In the weak grade, we have a shortened cluster, preceded by a long vowel. Data are given in (8). Again, the first word in the pair is in the strong grade, and the second word is in the weak grade.

(8) Marja	adult	gloss
a. dasste : daaste	basste : baaste	<i>spoon.nom.sg. – spoon.acc.sg.</i>
b. ossten : oosti	ossten : oosti	<i>buy.1sg.past. – buy.3sg.past.</i>

Before Marja acquired cluster shortening, she only used the form with the long cluster, namely the strong grade form. When the first short cluster appears, she correctly uses this form in the accusative singular and in plural forms. Examples of errors are given in (9). These were uttered when Marja was 2;7.25.

(9) Marja	adult
a. daa dasste <i>here spoon.nom.sg.</i> 'This is a spoon.'	daa le basste
b. musse güokte dasste <i>l.loc.+have two spoon.gen.sg.</i> 'I have two spoons.'	musseh güokte baaste
c. dooʔma guoli <i>three fish.gen.sg.</i> 'three fish'	golãʔma guoli

After numerals, the noun is always in the genitive singular case. This case has the weak grade in disyllabic nouns. In (9b), we see that Marja has this case with the strong grade form in cluster shortening. It is not the case that she does not know the genitive rule for nouns following numerals. She also counts nouns which have alternation patterns that she masters, and in those cases, the noun in the genitive case has the weak grade form. This is shown in (9c), with degemination. In cluster shortening, Marja has the strategy of no alternation before she masters the pattern, and she prefers the strong grade form of the word.

3.2.3. Devoicing

Voiced geminate stops and affricates undergo devoicing, never degemination. Devoicing is the least complicated alternation that occurs in these consonants, as degemination is the least complicated alternation in

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the other consonants. In the strong grade, we have a voiced geminate stop, or a voiced geminate affricate. In the weak grade the geminate has been devoiced, but not shortened. Examples are given in (10). The first word in a pair is in the strong grade, and the second word is in the weak grade.

(10) Marja	adult	gloss
a. vaad dz aa : vaatt ʃ i	vaad dz aa : vaatt ʃ i	<i>walk.3sg.pres. – walk.3sg.past.</i>
b. addih : atte	addih : atte	<i>give.inf. – give.neg.</i>

At age 2;8.12, Marja masters this alternation perfectly. Before acquiring the pattern, she preferred the weak grade form and used the voiceless consonants in the nominative. In other words, she has the strategy of no alternation. An example of the no alternation strategy with this pattern is given in (11). This sentence was uttered when Marja was 2;7.25. In this example, Marja uses the weak grade, devoiced form in the nominative case.

(11) Marja	adult
die le muohtatt ʃ aa	die le muohtadd ʒ aa
<i>that is snowman.nom.sg.</i>	
‘That is a snowman.’	

The sentence above was uttered while Marja was looking at a picture of a snowman. She was pointing at the actual snowman, and not at something that could belong to him. We have seen in (7c) and (9a), that she knows which case the noun in these constructions should have, and we have seen that she knows which grade that case form comes with. In other words, although the form looks like the genitive case, it is the nominative case, with the weak grade form. Marja just hasn’t acquired devoicing yet, and she uses only the voiceless affricate.

As already mentioned, in the adult language, voiced geminate stops or affricates *never* undergo degemination. They are always devoiced. The youngest child, Child I, overgeneralizes the degemination pattern of sonorants and fricatives to stops. In adult language, geminate stops are always devoiced in the weak grade. In child I’s grammar, the geminate stops of the strong grade are shortened to single stops in the weak grade. Child I does not master the devoicing. She knows that an alternation is supposed to occur, she just doesn’t know what type of alternation. This is shown in (12) below.

(12) Child I	adult
a. daa baabba	daa le spaabba
<i>this ball.nom.sg.</i>	
‘This is a ball.’	
b. muɲɲe baaba	muɲɲe spaappa
<i>I.ball acc.sg.</i>	
‘Give me the ball.’	

Child I obviously masters the pattern of degemination. In her grammar, degemination applies not only to fricatives, nasals and liquids but also to stops. Interestingly, she starts out with the voiced consonants. Instead of the strategy with no alternation, that Marja has, she has degemination, or overgeneralization.

3.3. Stage III: Combination of qualitative and quantitative changes

Most of the patterns that are acquired after this stage have two alternations. These are for example aspiration fortition, deglottalization with nasal lengthening and coda weakening. There is one pattern, however, which seemingly only involves one alternation. This is degemination from QIII to QII. This pattern is acquired at least two months after the degemination from QII to QI. In addition to these, some lengthening processes are acquired. In most of these patterns, children have to combine alternations they have already acquired. This combination of alternations is an extra complication, which obviously delays the mastery of these patterns. In coda weakening, there is an additional complication with the consonants involved in the alternation. In this pattern, the child must learn the lenition of /k/ to a fricative. This fricative is in many instances a marked segment, which the child has not yet acquired. This is what delays the mastery of this particular pattern. In what follows, we will treat degemination and lengthening together, and aspiration fortition, deglottalization with nasal lengthening and coda weakening separately.

3.3.1. Degemination from QIII to QII and lengthening

We will begin with the quantitative changes. The shortening of the consonant in degemination from QIII to QII is not quite as audible as the change in vowel length in the same alternation. In the adult language, the strong grade of the word has a QIII consonant preceded by a short vowel or diphthong. The weak grade has a QII consonant preceded by a long vowel or diphthong. So, two things happen in this pattern too; the shortening of the consonant in the weak grade, and the shortening of the vowel in the strong grade. At this stage, Marja masters this pattern completely. She has

also acquired the lengthening of clusters of /β/ + another consonant. For this particular pattern, she also knows the shortening of the vowel/diphthong in the weak grade. Examples are given in (13). Degemination is given in (13a-b), while lengthening is given in (13c-d).

(13) Marja	adult	gloss
a. gūos:si : guossi	gūos:si : guossi	<i>guest.nom.sg. – guest.acc.sg.</i>
b. būs:se : būusse	būs:se : būusse	<i>bus.nom.sg. – bus.acc.sg.</i>
c. deaβdi : dēaβdd alde	beaβdi : bēaβdd alde	<i>table.nom.sg. – table.gen.sg.</i>
d. skuula : skuβllas	skuula : skuβllas	<i>school.nom.sg. – school.loc.sg.</i>

In lengthening, we have the short cluster in the strong grade, preceded by a long vowel or diphthong. In the weak grade, the cluster lengthens and the vowel is shortened accordingly. The word for ‘school’ in (13d), has the same type of pattern as the word for ‘insect,’ which is one of the first lengthening alternations that Marja acquires (see (4h)). The only difference is that the fricative in (13d) does not appear in the nominative for the word *skuula*. This could be why this pattern takes longer to acquire. Interestingly, Marja acquires the fortition and shortening of long /u/ in the weak grade, but she doesn’t acquire the same process for long /i/, during the data collection.

Before Marja acquired these patterns, she had no alternation at all. In degemination from QIII to QII, she only used the form with the overlong consonant, i.e. the strong grade. At that time, Marja *can* produce the QII length of the consonants, and she is familiar with the pattern of shortening. Because the change in vowel length in these forms is more audible than the change in consonant length, I think it is possible that Marja did not realize that there was grade alternation in these forms at all. Before she mastered the lengthening pattern, she used the weak grade form of the word. Examples of errors are given in (14). Examples (14a-c), show degemination patterns and examples (14d-e) show lengthening patterns.

(14) Marja	adult
a. duo le dūs:se <i>that is bus.nom.sg.</i> ‘That is a bus.’	duo le būs:se
b. nanaan dūs:se niende <i>go.1sg.pres. bus.gen.sg. with</i> ‘I take the bus.’	manaan būusse mielde

- c. mun nanaan du niende mun manaan du mielde
I.nom. go.1sg.pres. you.gen. with
 ‘I go with you.’
- d. naannaa nannaa ʦuulii maannaa mannaa skuulii
child.nom.sg. go.3sg.pres. school.ill.sg.
 ‘The child goes to school.’
- e. ʦuula lusaa skuβlla lusaa
school.gen.sg. to
 ‘to the school’

This degemination pattern is acquired much later than degemination from QII to QI. In these examples, we can see that Marja only used the overlong form in all cases. We have also seen that she uses the QII length in degemination from QII to QI. That means that Marja at the age of 2;7.20 had acquired all the possible consonant lengths. What she had not acquired, was the alternation between the longest quantity and the intermediate quantity. As with aspiration shortening, she seems to prefer the strong grade form in this alternation. As already mentioned, degemination from QIII to QII is not as audible for the untrained ear as the alternation from QII to QI.

Nouns followed by postpositions are always in the genitive form. In sentences (14b) and (14e), the noun in Marja’s utterance is in the strong grade, even though the genitive form of the noun should be in the weak grade. It is not the case that Marja does not know this rule. In (14c), we have a similar sentence. In that sentence, the pronoun preceding the postposition is in the genitive case, and not the nominative case. Marja knows the rule, but she does not master the alternation. What looks like nominative in these utterances, is in fact genitive, and we have seen that she knows which grade the genitive comes with. This error lies in the phonology, and not in the morphology.

3.3.2. Aspiration fortition

In aspiration fortition, the short aspiration in the strong grade alternates with the long aspiration, which has become consonant like in the weak grade. In this pattern, lengthening is combined with fortition. Before age 2;9, Marja had only used the weak grade form of the nouns that undergo aspiration fortition. However, the words are uttered in isolation and that makes it impossible to determine which case Marja has intended. With the other patterns, the words have been uttered in sentences and thus it has been easy to see which case the child intends and whether she gets the consonant center correct for that particular case. The verb forms that she

utters with this pattern are the 3sg. past tense and the 1sg. present tense, both of which are in the weak grade in the adult language. At 2;9, nouns which undergo aspiration fortition appear for the first time in both grades in Marja's data. This time the words are uttered in full sentences. It is possible that she has acquired this pattern much earlier. Since there are no examples of words with this pattern in the earlier recordings where it is possible to determine the case she intends, I can only say that at the age of 2;9, she has reached full mastery of aspiration fortition. If we compare this pattern with the other patterns that she has acquired, we see that for long periods she only uses one form of the consonants, either the strong grade or the weak grade. When she finally masters the phonological alternation, both the strong grade and the weak grade forms appear. It is therefore likely that Marja did not master this alternation before 2;9.

At 2;9, however, she masters the pattern completely. She even knows what kind of vowels/diphthongs can be long before the long aspiration. Notice that in this pattern, the /a/ has the intermediate length before the long aspiration in both the adult language and Marja's language. Other vowels and diphthongs are short before the long aspiration. Examples are given in (15). The first word in the pair is in the strong grade, and the second one is in the weak grade.

(15) Marja	adult	gloss
a. aajhti : aaççti	aajhti : aaççti	<i>shed.nom.sg. – shed.acc.sg.</i>
b. vujhten : vüoççtaan	vujhten : vüoççtaan	<i>win.1sg.past. – win.1sg.pres.</i>

In the strong grade, the consonant center consists of the glide /j/ and a preaspirated stop. It can be preceded by a long or a short vowel. In the weak grade, the aspiration is lengthened. The glide together with the long aspiration become the geminate fricative /ç/. Marja masters this alternation completely.

3.3.3. Deglottalization with nasal lengthening

In deglottalization with nasal lengthening, the strong grade preglottalized nasal alternates with the weak grade non-glottalized geminate nasal. This pattern involves lengthening and deglottalization, two alternations that the child has already acquired. In the strong grade, the consonant center has a glottal stop followed by a nasal. In the weak grade, the glottal stop is missing and the nasal is lengthened. In (16) below, we see that Marja masters this alternation almost completely. The only thing that she doesn't master is the fortition of long /i/ in the weak grade. However, she knows

that the vowel sounds shorter before the long nasal. We see this in (16b). When data collection ended, Marja still did not master fortition of /i/.

(16) Marja	adult	gloss
a. oajʔnih : oajnna	oajʔnih : oajnnah	<i>see.inf. – see.2sg.pres.</i>
b. diiʔmu : dimmu	diiʔmu : dijmmu	<i>clock.nom.sg. – clock.acc.sg.</i>
c. ruuʔno : ruuβnno	ruuʔno : ruuβnno	<i>kroner.nom.sg. – kroner.acc.sg.</i>
d. voβʔnaa : voβnnaa	voβʔnaa : voβnnaa	<i>wagon.nom.sg. – wagon.acc.sg.</i>

At the outset of this study (age 2;7.20), Marja did not produce the structure /glottal stop+nasal/ in these constructions at all. Instead, she only produced the glottal stop. We see this in (17). Interestingly, Marja *can* produce the glottalized nasals that undergo deglottalization in the weak grade, see example (4).

(17) Marja	adult	gloss
a. heaβʔi	heaβʔni	<i>spider.nom.sg.</i>
b. liiʔi	liiʔni	<i>shawl.nom.sg.</i>

In this pattern, Marja used the no-alternation strategy before she learnt to produce the glottalized nasals. Both the nominative and the accusative had the strong grade form of the word, namely the form with the glottal stop. Example (17a) is different from the examples in (4) in that the glottal stop follows a consonant. This long of a cluster is understandably difficult for the child to pronounce. Marja has chosen to simplify the cluster by leaving out the nasal. In example (17b), on the other hand, the cluster is not longer than in the examples in (4). It is possible that children analyze the last part of long /i/ as a consonant, even though they do not master the fortition of the vowel. In that case, this cluster would be as long as the one in (17a), and therefore one of the consonants must be left out. In Marja's case, that consonant is the nasal. When the nasal is left out, it is impossible to manage the lengthening in the weak grade, and the solution is no alternation in these constructions. In 3.4.1., we see that partial alternation is possible when the consonant which is not part of the alternation is deleted.

3.3.4. Coda weakening

In some instances of coda weakening, the strong grade cluster of /ks/ alternates with the weak grade cluster /βss/. The pattern involves lengthening and lenition. The /k/ in other strong grade clusters lenites to /ϕ/ or /f/ in the weak grade. In this pattern, there is the difficulty of producing the voiceless bilabial fricative /ϕ/. This fricative is acquired late,

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and this delays the acquisition of this pattern. The other fricative, namely /β/, has been acquired earlier. In the patterns where /k/ alternates with the voiced fricative, there is also lengthening of the following consonant. The combination of lenition and lengthening delays the acquisition of that pattern. Marja does not use many words with this particular pattern. Most of the words that she does use, lenite /k/ to /ϕ/ or /f/. In the cases where adults can use either /ϕ/ or /f/, Marja prefers the former option with the long vowel length. However, she never uses /ϕ/ where adults only can use /f/. This is when the consonant center is preceded by a short vowel or diphthong, as in (18b).

(18) Marja	adult	gloss
a. daakti : daaϕti	gaakti : gaaϕti	<i>costume.nom.sg. – costume.acc.sg.</i>
b. rofftus	rüofftus	<i>home.loc.sg.</i>

For this pattern, it is not only the grade alternation that is problematic. Before she acquired this pattern, Marja had problems with the cluster /kt/. Instead of this cluster she sometimes used geminate /pp/ in the strong grade, see example (19a). The /pp/ consonant center is taken from the second recording session. At that time, Marja could not pronounce the cluster /kt/ in this word at all. Interestingly, she did not have any problems with the same cluster in the numerals *okta*, ‘one,’ and *guokte*, ‘two.’ She also has difficulties with the weak grade cluster /ϕt/. Sometimes she uses preaspirated /ht/ in the weak grade. This is shown in (19b).

(19) Marja	adult	gloss	age
a. daappi	gaakti	<i>costume.nom.sg.</i>	2;7.25
b. daahti	gaaϕti/gaafti	<i>costume.acc.sg.</i>	2;10.28

The /ht/ in (19b) can not be seen as the alternation of /pp/ in (19a), since these sentences are not uttered during the same recording session. The /ht/ in (19b) is actually the weak grade form of /kt/, but without the lip rounding. In (20), we see the sentences in which she used this particular alternation. Notice that her strong grade form in (20a) is correct.

(20) Marja	adult
a. daakti duo	gaakti lea duo
<i>costume.nom.sg. there</i>	
‘That is a costume.’	

b. duo dõarro daahti duoh gõarro gaaϕti
that.nom.sg. sew.3sg.pres. costume.acc.sg.
 ‘She sews a costume.’

She does not get the weak grade consonants right. Odden, Rice and Bals (2002) suggest that /ϕ/ is /h/ with lip rounding. When the airflow is forced through the narrow lip rounding, this causes frication. Since the stricture is narrowest at the lips, this gives us a bilabial fricative. Marja’s weak grade cluster is basically the same as the adult cluster. Adults have lip rounding in their articulation of the cluster, and Marja does not. Less than a month later, Marja has acquired the lip rounding for this cluster. After that, she masters the alternation completely.

3.4. Stage IV: Complex foot medial clusters

The patterns she does not acquire during the study period, are probably the most complicated patterns for children. These are the glottal shift pattern, and the alternations with epenthesis in the strong grade. The glottal shift pattern is a late acquisition because Marja has to acquire interrupted nasals. When the data collection ended, she had not yet acquired these consonants. This section is structured as follows; we will begin with alternations with epenthesis, and then move on to glottal shift. In the treatment of that alternation, we will compare Marja’s data to the data from older children.

3.4.1. Alternations with epenthesis

In Bals (2002), these types of alternations were divided into two groups: alternations with epenthesis and lengthening. They are in fact the same alternation. The reason behind this division is that there seems to be a lot of variability in the Kautokeino dialect when it comes to epenthesizing vowels into consonant clusters. Some people epenthesize in all liquid+obstruent clusters, and glide+obstruent clusters. Marja’s immediate family did not seem to epenthesize in /l+d/ clusters, or in /j+obstruent/ clusters. Therefore, these alternations were labelled lengthening. However, they are treated similarly by Marja, so they will all be treated together in this article.

In these patterns, Marja has partial alternation. She masters the lengthening part of the pattern, but not the epenthesis. This is not surprising, as length alternations are early acquisitions. In adult forms, the foot medial cluster is broken up by epenthesis in the strong grade, and the last part of the cluster is lengthened in the weak grade. There is no epenthesis in the weak grade. Examples of the adult structures are given in (21). The first word in the pair is in the strong grade and the second one is in the weak grade.

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(21) adult	gloss
a. vuoləgih : vuolggään	<i>leave.inf. – leave.1sg.pres.</i>
b. barăgah : barggan	<i>work.inf. – work.1sg.pres.</i>
c. juojăgah : juojggan	<i>joik.inf. – joik.1sg.pres.</i>

The clusters /lg/, /rg/, and /jg/ are all broken up by epenthesis in the strong grade, but not in the weak grade. As mentioned, some people would not have an epenthesis vowel between /j/ and /g/ in (21c). In Sammallahti (1998), the transcription of the geminates in the weak grade indicates that they are voiceless in these constructions. The voicing in geminates in North Saami does not stay the same during the articulation. Instead, the voicing diminishes towards the end of production. This means that the last part of the voiced geminate loses its voicing in the weak grade.

In Marja’s system, the strong grade only consists of the least sonorous consonant of the cluster, which also happens to be the consonant which is lengthened in the weak grade. This allows for partial alternation. In Marja’s weak grade, this consonant is lengthened and devoiced. When adults have short vowels in the strong grade, the vowel in Marja’s form is long. This is compensatory lengthening. Examples of Marja’s productions are given in (22). The first word in the pair is in the strong grade, and the second one is in the weak grade.

(22) Marja	adult	gloss
a. gaga : gakkā	galăga : galgga	<i>shall.3sg.pres. – shall.neg.</i>
b. oogun : ookkos	olögun : olggos	<i>outdoors.loc – out.ill.</i>
c. daadi : daattes	gaarədi : gaard d es	<i>garden.nom.sg. – garden.loc.sg.</i>
d. eegu : ejggon ⁴	ajgu : ajggon ejgu : ejggon	<i>want.3sg.pres. – want.1sg.pres.</i>
e. vaadaa : vaattan	vaaldae : vaalddan	<i>take.3sg.pres. – take.1sg.pres.</i>

Marja has simplified the /liquid+obstruent/ cluster in the strong grade, leaving only the voiced obstruent. In the weak grade, that consonant is lengthened and devoiced. The alternation in her system is thus lengthening and devoicing in the weak grade, which is an alternation that does not exist in the adult language at all. However, there is devoicing in this pattern, namely in the last part of the geminate. It might be this devoicing that Marja has captured with her pattern.

⁴ The Kautokeino dialect belongs to the western branch of North Saami. One characteristic of western dialects is that words like /ajguh/ can be pronounced [ejguh]. The standard form is also possible in this dialect.

In both Marja's forms and the adult forms, one consonant is lengthened in the weak grade. In the adult forms, this consonant is part of a cluster. These clusters are difficult to pronounce, even for adults, and Marja has resolved this by deleting the liquid. This is not particularly astonishing, as children often simplify clusters, see for example Barlow (1997) and Gnanadesikan (1995). While epenthesis is a common cluster simplification strategy in second language acquisition, it is not as common in first language acquisition (Barlow 1997, Smit 1993). When children are faced with clusters that are illicit in their grammars, they employ other strategies, like deletion or coalescence (Gnanadesikan 1995). In Smit (1993) some children did have epenthesis as a strategy to avoid illicit clusters and at the same time preserve both consonants. These children were older than 2;6. Marja is nearly 3 and she still does not use epenthesis. Epenthesis is not chosen as a strategy, even though *adults* employ this strategy. Epenthesis is actually a part of Marja's input. Marja still reduces all these clusters, whether they are realized as clusters in the adult language or not.

The lengthened cluster in the weak grade is never broken up by epenthesis in the adult language. In Marja's language, the long cluster is treated the same way as the short cluster; it is reduced. So, it is not just the case that Marja dislikes epenthesis. She probably hasn't acquired the clusters of liquids and obstruents, and clusters of glides and obstruents. Notice also that Marja does not have any problems with clusters of /s/ and some other obstruent, or with clusters of /k/ and some other obstruent at this age.

Of the other children in this study, Child II masters epenthesis completely, as shown in (23). However, his epenthetic vowel was not quite as short as in adult language. It was more audible, but still shorter than other vowels in the word. This means that the epenthetic vowel did not add another syllable to the word, even though it was more pronounced than in adult language. Both words are in the strong grade.

(23) Child II	adult	gloss
a. dearāhpali	dearāhpali	<i>hit.3sg.past.</i>
b. gearāgan	gearāgan	<i>finish.past.part.</i>

The example in a. is actually an example of a trisyllabic verb, and they do not undergo gradation. The example is included to show that this child has mastered epenthesis throughout the system, and not only in gradation.

3.4.2. Glottal shift

In the adult system, the strong grade consonant center consists of interrupted nasals. That means, a nasal followed by a glottal stop which in turn is followed by yet another nasal. The nasals always have the same place of articulation. This consonant center can be preceded by long or short vowels/diphthongs. In the weak grade, the consonant center consists of a preglottalized nasal, which means a glottal stop followed by a single nasal. This consonant center can also be preceded by either long or short vowels, but in many instances the vowels actually shorten before the preglottalized nasal in this structure.

In this pattern, Marja also has partial alternation. In other words, she masters the alternation itself, but not the segments involved in the alternation. She has not acquired interrupted nasals yet. Instead, she uses only preglottalized nasals. To differentiate between the strong and the weak grades, she uses vowel length. As mentioned, many interrupted nasals are preceded by long vowels, which are short before the glottalized nasal. In her system, the strong grade always has long vowels and the weak grade always has short vowels. This is shown in (24), with several case forms of the word for *mother*. The examples in (24e) and (24g) are in the weak grade. The rest are in the strong grade. The examples in (24a-d) are all nominative case, and the adult form is only given in (24a).

(24) Marja	adult	gloss	age
a. eaʔi	eanʔni	<i>mother.nom.sg.</i>	2;7.25
b. eaʔni			2;8.12
c. eaʔi			2;9.1
d. eaʔni			2;9.22
e. ẽaʔnis	ẽaʔnis	<i>mother.loc.sg.</i>	2;10.28
f. eaʔnaai	eanʔnaai	<i>mother.ill.sg.</i>	2;11.17
g. ẽaʔnis	ẽaʔnis	<i>mother.loc.sg.</i>	2;11.17

The system that Marja employs, is based on the length of the first diphthong. Otherwise, the nasal, if there is one, is always preceded by a glottal stop, but it is never interrupted by one. A long diphthong preceding a preglottalized nasal corresponds to adult interrupted nasals, which is the strong grade. We see this in (24a-d) and (24f). A short diphthong in front of a preglottalized nasal corresponds to adult preglottalized nasals, or the weak grade. This is shown in (24e) and (24g). For the word ‘mother,’ this system certainly seems to be right. The strong grade interrupted nasals are always preceded by a long diphthong, whereas the weak grade

preglottalized nasals always are preceded by a short diphthong in the adult language.

The other children in this study use the short diphthong like Marja does, except the youngest one. Child I has a geminate nasal instead of an interrupted nasal in this pattern. Unfortunately, I could not find any examples of the weak grade form of the word in her corpus. An example is given in (25).

(25) Child I	adult	gloss
eanni	eanʔni	<i>mother.nom.sg.</i>

The only pattern in disyllabic nouns the six year old child III does not master fully, is glottal shift. He uses the same strategy as Marja to avoid interrupted nasals. However, he does pronounce interrupted nasals occasionally. Marja never does. In child III's system, the strong grade form varies between an interrupted nasal with long vowel/diphthong and a preglottalized nasal with a long vowel/diphthong. The first option is the correct adult form. In both child III and Marja's system, the weak grade always has a short vowel/diphthong before preglottalized nasals.

So far, I have discussed only the length differences in vowels and diphthongs in this alternation. The system is more complicated than that. Diphthongs are monophthongized in the comitative singular, locative plural, illative plural and comitative plural, which is the weak grade. The diphthong becomes a long vowel. Child III does not master the monophthongization, as we see in example (26g) below. This part of the pattern is learnt very late. The 8 year-old, child IV, masters the glottal shift pattern almost completely. The only thing she does not master is the monophthongization of the diphthong.

(26) Child III	adult	gloss
a. biemʔmu : bĭeʔmu	biemʔmu : bĭeʔmu	<i>food.nom.sg. – food.acc.sg.</i>
b. eanʔni	eanʔni	<i>mother.nom.sg.</i>
c. eaʔni	eanʔni	<i>mother.nom.sg.</i>
d. eanʔnaai	eanʔnaai	<i>mother.ill.sg.</i>
e. eaʔnaai	eanʔnaai	<i>mother.ill.sg.</i>
f. ěaʔnis	ěaʔnis	<i>mother.loc.sg.</i>
g. ěaʔniin	eeʔniin	<i>mother.com.sg.</i>

In (26a), the first word in the pair is in the strong grade, and the second one is in the weak grade. The examples (26b-e) are in the strong grade, and the rest are in the weak grade. We see that in (26a, b, d) child III has the

correct adult strong grade with interrupted nasals. In (26c, e) he has the preglottalized nasal preceded by long diphthong. The weak grade always has a short vowel in his system. For these particular words, the alternation of vowel length between the strong and the weak grades is the correct system. Interrupted nasals are always preceded by the long diphthong, and the preglottalized nasals are always preceded by the short diphthong or the monophthong. However, this does not work quite as well in other words. Preglottalized nasals *can* follow long vowels. Child III shortens the vowel even in words that have long vowels with preglottalized nasals. In his system there cannot be a long vowel in front of the preglottalized nasal in the weak grade. This is shown in (27).

(27) Child III	adult	gloss
a. ʈsaaʔmiht	ʈsaamʔmiht	<i>beat.inf.</i>
b. ʈsaʔmaan	ʈsaaʔmaan	<i>beat.1sg.pres.</i>

In this word, adults have a long vowel in both the strong and the weak grades. Child III has a long vowel in the strong grade, followed by a preglottalized nasal. In the weak grade, the preglottalized nasal is preceded by a short vowel. The /a/ is actually in its shortest possible length, and not the intermediate length, as one might expect. The difference between child III's form and the adult form is therefore very audible. This is not the case with the words in (26).

In this pattern, children have shifted the alternation from the consonant center to the vowel center. I have called this partial alternation, because in many words there is a shortening of the vowel/diphthong in the weak grade. In the Kautokeino dialect, most of the grade alternation happens in the consonant center. However, there are dialects of North Saami in which much of the gradation has shifted to the vowel center, like in these children. This is, in other words, not a novel approach to grade alternation.

3.5. *The types of errors*

As mentioned in the introduction, there are two areas where one might expect to find errors; in the mapping between phonology and morphology and in the phonological alternations themselves. It seems that the mapping between morphology and phonology happens very early, before or around 2;5. We do see something like mismatches in the data, where either the genitive singular has a strong grade consonant, or the nominative singular has a weak grade consonant. However, I have shown that this is connected to the second type of errors we might expect to find, namely the acquisition of the phonological alternations.

With the already acquired phonological alternations, the child always has correct mapping between morphology and phonology. In degemination, she always has weak grade in the correct environments and strong grade in the correct strong grade environments. This is also the case in the three other alternation patterns that the child had acquired at the outset of data collection. Once children realize that there is alternation, and they know when to use strong grade and when to use weak grade, they try to keep the alternation in their utterances. If the alternations are complicated, or there are difficult segments involved, children have different strategies to avoid them. These are overgeneralization of alternations they do master, no alternation at all, or partial alternation.

Child I masters only one alternation; degemination, and has overgeneralized this to cover also devoicing in the adult language. This child is two years old, so one can say that grade alternation as a process is already acquired at that age. The child just hasn't realized that there are different types of phonological alternations. In her grammar, the alternation is shortening of all geminates, even geminates that are not shortened in the adult language.

Overgeneralization is not an option for children who have realized that there are several types of alternations. For them, one possibility is no alternation, where they choose either the strong grade consonant or the weak grade consonant in all case forms of the word. This is how nominative singular can have the weak grade form. No alternation is a possibility used with patterns with only one alternation. If that alternation is difficult for some reason, children just leave it out.

In patterns which have two alternations, another possibility presents itself; to keep just one of the alternations, and skip the other. In some alternations there is a consonant or cluster the child does not master. If a consonant which is involved in the alternation is deleted, there can be no alternation. This means that no alternation is a strategy that can be used in patterns with two alternations, as well. We see this in the case of deglottalization and nasal lengthening in 3.3.3. In a cluster of glottal stop and nasal, the nasal is deleted. In the weak grade, the nasal is supposed to lengthen. Since it is already deleted, we have no alternation instead. If the consonant which is involved in the alternation is not deleted, we have partial alternation. We see this in epenthesis, in 3.4.1. A consonant cluster is simplified through deletion. The consonant which is not part of the alternation is deleted, and therefore we can have the lengthening of the remaining consonant in the weak grade. An adult cluster which lengthens in the weak grade, is reduced to a singleton consonant which is lengthened. The cluster in adult language is broken up through epenthesis in the strong

grade, and this epenthesis is a part of the alternation pattern. However, if you don't have a cluster in the first place, there is no need for epenthesis. Epenthesis and deletion are just two separate ways of dealing with complex clusters.

There is also another type of partial alternation. It is actually possible to have partial alternation, even if the *consonants* that are involved are not represented in the utterances. We see this in glottal shift, in 3.4.2. Here we have the shifting of alternation from the consonant center to the vowel center. Instead of the complicated consonant cluster, with interrupted nasals in the strong grade, children have the weak grade consonants preceded by long vowels. In the weak grade, we have still the weak grade consonants, but they are always preceded by short vowels. The alternation is thus between long and short vowels. In many adult words we see that the vowels often shorten in the weak grade, but not always. This is therefore a generalization that children draw from their input. If their input does not present this possibility, then this shift of alternations to vowels does not happen. Otherwise, we would expect this to occur for example in the devoicing pattern. In the adult language, there is not much going on in the vowels in that alternation, and therefore children do not have the possibility of alternation shift. One might ask why this shift does not happen in aspiration shortening and in degemination from QIII to QII. In both these patterns, underlyingly long vowels are short in front of the QIII consonant, which means the strong grade consonants. In both these patterns, Marja has no alternation and she prefers the strong grade form, namely the QIII consonant preceded by the short vowel. I have suggested that since the shortening from QIII to QII is not as audible as the shortening from QII to QI, it is possible that the child does not realize that there should be an alternation there. After all, she does master the QII consonants in other alternation patterns where they are involved.

To sum up, we have three strategies: overgeneralization, no alternation and partial alternation. Overgeneralization is possible when the child has not realized that there are different phonological alternations involved in the process of grade alternation. When the child does realize this, she will want to keep the alternation. If the alternation is complicated, she will have to skip it and choose either the strong grade or the weak grade as a base form. However, if there is a possibility of keeping some of the alternation, she will do that, and the result is partial alternation.

4. Conclusion

In this article I have described the acquisition of grade alternation in North Saami, based on data from mainly one child. Grade alternation is a complicated morphophonological process, in which foot-medial consonants alternate between two forms, depending on the morphological environment of the word. There are more than ten different phonological alternations. The task with which the child is faced, is to connect the phonological alternations to noun declension and verb conjugation. The focus of this article has been the order in which these phonological alternations are acquired, and the kinds of errors children make before they acquire the system.

I have shown that children acquire quantitative alternations before qualitative alternations. Some grade alternation patterns combine two phonological alternations. This combination is an extra complication which delays the acquisition of these patterns. In the patterns that are acquired last, the complication lies in the fact that the child has not acquired either some consonant or consonant cluster that is part of the alternation. In other words, both the complexity of the consonants involved in the alternation, and the complexity of the alternation itself can delay acquisition.

We have seen three types of errors in the child language data; overgeneralization, no alternation, and partial alternation. I have argued that these errors are connected to the phonology part of the system, and not to the mapping between morphology and phonology. The apparent mismatches between phonology and morphology in the child language data are a consequence of the fact, that the child has chosen no alternation as a strategy for dealing with alternation patterns she does not yet master. The mapping between morphology and phonology happens very early, before or around 2;5. Once that is in place, children make no mistakes. This means that the mapping between morphology and phonology is in place long before the mastery of the various phonological alternations.

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