The prosody of Swedish underived nouns: No lexical tones required

Bruce Morén-Duolljá
University of Tromsø

Abstract

This paper provides a detailed representational analysis of the morpho-prosodic system of underived nouns in a dialect of Swedish. It shows that the morphology, stress and tonal patterns are not as complex as they first appear once the data are looked at in sufficient detail. Further, it shows that the renowned Swedish "lexical pitch accent" is not the result of lexical tones/tonemes. Rather, Swedish is like all other languages and uses tones to mark the edges of prosodic constituents on the surface. "Accent 2" occurs when tones mark the edge of a structural uneven trochee (i.e. recursive foot) and "accent 1" occurs elsewhere. This analysis is counter all other treatments of North Germanic[1] tones and denies the almost unquestioned assumption that there is an underlying tone specification on roots and/or affixes in many North Germanic varieties. At the same time, it unifies the intuitions behind the three previous approaches found in the literature.

1. Introduction

Swedish has a relatively complex nominal inflection system, and although this paper is ultimately about prosodic structure and tone distribution (i.e. stress and pitch accent), an understanding of the morphological system is crucial to an adequate understanding of the prosody of the language. This is because the morphological structure of the language influences the prosodic system in intricate ways that are often hinted at in the literature on Swedish, but not given a full treatment. For example, Swedish is often described as having over 300 minimal pairs[2] differing only in "pitch accent" (e.g. Elert 1972), thus motivating an analysis making use of lexical tones/tonemes, i.e. "lexical pitch accents" or "contrastive pitch accent". A typical example used in the literature to illustrate pitch accent minimal pairs and thus to argue for a lexical tone/toneme contrast in Swedish is given in (1). Here, the superscript [1] and [2] indicate different pitch contours - to be discussed more fully in section 2. These are usually called "accent 1" and "accent 2", respectively.

(1) *Typical Swedish pitch accent "minimal pair" found in the literature*
a. [ˈ[1]anden]
anden
'the duck'
b. [ˈ[2]anden]
anden
'the spirit'

Traditionally, minimal pairs are conceived of as pairs of words that differ minimally in form and meaning, and where the minimal difference in form indicates a phonologically relevant phonemic and/or

[1] The term "North Germanic" is used here instead of "Scandinavian" because it better specifies the type of languages being discussed. Although "Scandinavian" is often used synonymously with "North Germanic", there are non-Germanic Scandinavian languages that are usually overlooked in discussions of the languages of Scandinavia (Morén-Duolljá 2012).
[2] Over 1500 by some counts in Norwegian (Kloster-Jensen 1958).

 Nordlyd 40.1: 196-248, special issue 'A Festschrift on the Occasion of X Years of CASTL Phonology and Curt Rice's L[th] Birthday' ed. by Sylvia Blaho, Martin Krämer and Bruce Morén-Duolljá. University of Tromsø. http://www.ub.uit.no/baser/nordlyd/

lexical contrast. If (1a) and (1b) differ minimally in form (i.e. pitch accent) and meaning (i.e. encyclopedic information), then one can argue that pitch accent plays a phonologically contrastive role in this language. This is, in fact, the claim found in the North Germanic pitch accent literature.

However, upon closer inspection, we find that many of these so-called "minimal pairs" differ in phonological form, meaning *and* morphological form - thus they are near-minimal pairs, not true minimal pairs. As near-minimal pairs, they cannot be used to argue directly for a contrastive phonological feature (i.e. pitch accent). When using near-minimal pairs as evidence for a phonologically contrastive feature, it is necessary to show that *only one* of the differences in form is relevant to distinguishing the proposed contrast.

When comparing the data in (1) and (2), we see that stripping off the definite clitic reveals a more profound difference between (1a) and (1b) than just pitch accent. (1a) and (2a) have a monosyllabic root, while (1b) and (2b) have a disyllabic root.

(2) *The "minimal pair" from (1) presented without the definite clitic*

a. ['[1]and]
   and
   'duck'

b. ['[2]ande]
   ande
   'spirit'

Further, in looking at the language as a whole, one sees that the addition of the definite clitic never has an effect on pitch accent. When it attaches to a base that has accent 1, the word remains accent 1, and when it attaches to a base that is accent 2, the word remains accent 2. This means that the near-minimal pair in (1) does not tell us anything definitive about a lexical tone/pitch accent contrast. It could just as easily be telling us about underlying root structure and/or surface prosodic structure.

In fact, when morphology is taken into consideration and controlled for, we find that the functional load of the supposed lexical tone contrast among North Germanic dialects approaches null. The distribution of accent 1 and accent 2 in nominal inflection is by and large predictable on the basis of the segmental shape of the root and any attached inflectional[3] suffixes and clitics.

For example, when a root and suffix are concatenated and the resulting complex has a single underlying vowel, it will *always* surface with accent 1 - even if epenthesis results in more than one vowel on the surface. An example is given in (3). Note that epenthetic vowels are presented in this paper as "[***e***]", and arguments that the final syllable vowel in (3b) is epenthetic (i.e. not underlying) will be given in section 3.

(3) *Root-suffix complex with one underlying vowel and accent 1*

a. ['[1]slɒ:v]
   slav
   'Slav'

b. ['[1]slɒ:v***e***r]
   slaver
   'Slavs'

In contrast, a monosyllabic root-suffix complex with two underlying vowels will *usually* surface with accent 2. In fact, most bare roots with two underlying vowels surface with penultimate stress and accent 2, as in (1b) and (2b), and most root-suffix complexes with two underlying vowels also surface with penultimate stress and accent 2, as in (4).

[3] As might be expected, the relationship between derivational morphology and pitch accent is more complicated since the effects of derivational morphemes on surface prosodic structures is often more complicated.

(4) *Root-suffix complex with two underlying vowels and accent 2*
a. ['1svɒ:n]
svan
'swan'
b. ['2 svɒ:nar]
svanar
'swans'

This seeming correlation between underlying phonological shape and surface pitch accent suggests that one might be derivable from the other - one underlying vowel leads to accent 1 and two underlying vowels typically leads to accent 2.

This observation about a very tight connection between morphophonology (i.e. morpho-prosodic shape) and pitch accent is not new. It was the core of the structuralists' and earlier generativists' work on North Germanic pitch accent (e.g. Elert 1965, Haugen 1967, Bruce 1977, Witting 1977, Hellberg 1978). In fact, the work of the 1960s and 1970s was remarkable in accounting for the majority of North Germanic tones via rule. It was able to predict with a high degree of certainty what pitch accent a particular word would have based on morphophonological shape.

However, there were some cases that proved to be impossible for the structuralists and early generativists to analyze by rule because of their limited theoretical tools. For example, although the majority of disyllabic monomorphemes have accent 2, there are a number that have accent 1. These are relatively few and typically (but not always) fall into four classes: proper names, loan words, a subset of forms ending in *-en, -el* or *-er*, and lexicalized historic polymorphemes[4]. Some examples are given in (5) through (8).

(5) *Proper name*
['1han:es]
Hannes
'Hannes'

(6) *Loan word*
['1konjak]
konjak
'cognac'

(7) *en/el/er*
['1hʉm:er]
hummer
'lobster'

(8) *Lexicalized historic polymorpheme*
['1murmur]
mormor
'mother's mother'

What is interesting about these "exceptions to the rule" is that they are unexpectedly accent 1. This is curious because the predictability of accent 2 on the majority of disyllabic monomorphemic words suggests that accent 2 on disyllabic monomorphemes is the result of rule application. Thus, any exceptional accent 1 might be expected to be due to a special marking of some sort.

However, most analyses of North Germanic pitch accent claim that either both accents are lexically specified or accent 1 is the default/predictable/unmarked case and accent 2 is lexically marked (e.g.

[4] Many of these are synchronic compounds for some speakers, in which case they retain predictable compound accent 2.

Kristoffersen 1990, Lorentz 1995, Riad 1996, Gussenhoven and Bruce 1999, Riad 2000, Bye 2004). From a structuralist and generative perspective, this is somewhat unintuitive[5]. If lexical marking means adding an extra characteristic to the lexical representation of an exception, then one might expect analyses of North Germanic pitch accent to make use of lexical accent 1 (the exception), not lexical accent 2 (the rule). However, most current analyses of accent 2 claim that accent 2 is lexically marked. The notable exception is the work of Lahiri *et al* (2005), who claim lexical accent 1.

Finally, another important and otherwise puzzling observation about pitch accent "minimal pairs" in Swedish is that they *always* involve disyllables. This fact is quite difficult to explain in synchronic analyzes of Swedish accent 2 that rely on an accent 2 lexical prespecification. Restricting a tone/toneme to disyllablic environments not only requires underlying tonal prespecification, but it also requires restrictions that eliminate a large number of potential underlying tonemes from inappropriate surface prosodic contexts. While this might be possible, it is vital to explore the possibility that those needed surface prosodic restrictions (rather than lexical specification) are actually the cause of/motivation for the surface tones in the first place. This is perhaps especially true when a proposed lexical distinction has a vanishingly small functional load in the language - as is the case in North Germanic varieties.

So, if most cases of both accent 1 and accent 2 are surface derivable, is it possible that all cases are surface derivable and that those "exceptions" are either not exceptional at all or are exceptional in some way that does not involve underlying tones?

The main goal of this paper is to show that the answer is yes. This paper explores the crucial role that morphology plays in the description and ultimately the explanation of the stress and tone distribution of Swedish. It is organized as follows:

I begin by describing the underived nominal inflectional system. This provides a relatively theory-neutral depiction of the morphophonology of the data under investigation and a detailed description of the distribution of tones.

Next, I present a preliminary representational analysis of those forms that have default prosodification and predictable tone placement - i.e. do not involve lexical specification of "pitch accent". When prosody-building results in a structural uneven trochee (i.e. recursive foot), pitch accent 2 arises. Otherwise, only accent 1 is found.

Finally, an analysis of "exceptional" stress and exceptional pitch accent 1 is given. The conclusion is that the same strategy needed to account for exceptional final and antepenultimate stress (i.e. underlying prosodic structure) not only results in accent 1 on these words, but also in accent 1 on words with "exceptional" penultimate stress.

The conclusion is that all tones are predictable in Swedish underived nouns. Those cases that are truly exceptional are exceptional by way of underlying prosodic structure (i.e. lexical stress) and not underlying tones. This conclusion is in line with recent work on Franconian pitch accent (Köhnlein 2011) and captures some of the insights of the lexical accent 1 hypothesis of Lahiri *et al* (2005).

[5] It is intuitive from a phonetic perspective for a subset of dialects because those particular dialects have an accent 2 with a more complex pitch contour than accent 1 (i.e. double peak versus single peak). One might hypothesize that this corresponds to a more complex phonological representation and thus that accent 2 has a more complex lexical structure. However, such an account runs into problems accounting for examples of accent-shift that is dependent on syllable count, as well as the many North Germanic varieties which have single peak accent 1 and single peak accent 2 - neither of which can be said to be obviously more tonally complex than the other. It also misses the robust generalization that the vast majority of tonal assignments are, in fact, predictable - including *all* accent 2s.

2. A note about transcriptions

Before describing and analyzing the data, I must be clear about the transcription system I am using.[6] First, there is significant disagreement in the literature regarding the nature of North Germanic laryngeal specifications - particularly among Swedish varieties. Some recent literature claims that Swedish has a spread glottis distinction, not a voicing distinction, among stops (e.g. Iverson and Salmons 1995). Other literature claims that voicing is distinctive either in addition to spread glottis or instead of spread glottis (e.g. Petrova *et al* 2006, Helgason and Ringen 2008). Since tones are used in very similar ways among some of the North Germanic languages despite their having different distributions and realizations of non-tonal laryngeal features, I ignore the spread glottis versus voicing debate in my transcriptions. Thus, I use "p, t, k" for "voiceless" stops and "b, d, g" for "voiced" stops, and I ignore the details regarding glottal aperture settings and voice onset time. There may be phonetic interactions between the tonal and non-tonal laryngeal features in Swedish, but there do not seem to be synchronic phonological interactions.

Second, it is quite common in the literature on North Germanic pitch accent that tonal distributions referred to as accent 1 and accent 2 are indicated with either a superscript [1] or [2] before the form, as in [[1]anden] 'the duck' and [[2]anden] 'the spirit', or with different accent diacritics on the stressed syllable, as in [ánden] and [ànden]. There are two main advantages of this type of abstract notation. First, it allows for a broad characterization of the pitch accent patterns at a glance - thus it is more readable than transcriptions with all the tones aligned with segmental material. If one is not interested in the particulars of pitch contours, this is often convenient. Second, it allows for an easy comparison of pitch accent patterns across dialects that realize those accents in quite different ways. For example, Stockholm Swedish, General Götaland Swedish, Bergen Norwegian and Oslo Norwegian all have the classic pitch accent pattern described in the literature, but they realize that pattern in very different ways, as shown in (9) through (12). In fact, we sometimes see similar pitch contours corresponding to opposite pitch accents - e.g. compare (9a) accent 1 with (11b) accent 2.

(9) *Stockholm Swedish*

a. [1]tanken
   [ˈtaŋ́keǹ]
   tanken
   'the tank'

b. [2]tanken
   [ˈtáŋ̀kéǹ]
   tanken
   'the thought'

[6] A minor issue brought up by an anonymous reviewer is the use of [ɒː] instead of [ɑː]. My informant clearly had lip rounding on the long low back vowel, which matches other descriptions found in the literature (e.g. Walshe 1965, Andreasson 2001).

(10) *General Götaland Swedish*
a. [1]tanken
[ˈtaŋkéǹ]
tanken
'the tank'
b. [2]tanken
[ˈtáŋ̀kéǹ]
tanken
'the thought'

(11) *Bergen Norwegian*
a. [1]tanken
[ˈtáŋ̀ken]
tanken
'the tank'
b. [2]tanken
[ˈtaŋ́keǹ]
tanken
'the thought'

(12) *Oslo Norwegian*
a. [1]tanken
[ˈtaŋ̀keń]
tanken
'the tank'
b. [2]tanken
[ˈtáŋ̀keń]
tanken
'the thought'

In comparing these dialects, the similarities in the presence of a contrast and in the distribution of the two accents are immediately obvious using the shorthand notation. However, those similarities are less obvious if one looks only at the pitch peaks and troughs.

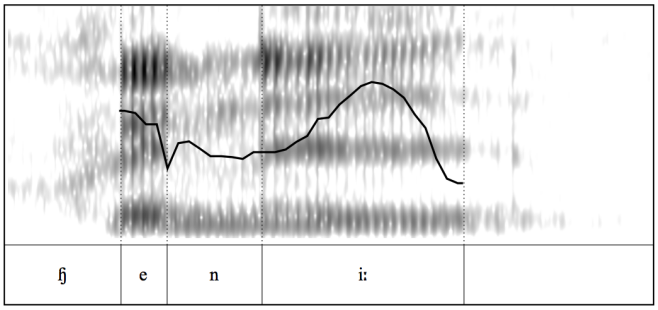
Despite a long tradition of using abbreviated/shorthand notation for pitch accent, I will present the data using tones aligned with segmental material. The reason for this is three-fold. First, I am concentrating on a single dialect[7] and thus do not need to make quick comparisons across dialects. Second and more importantly, one of my goals is to show that the shorthand notation actually masks important facts about tonal distribution that are vital to a full understanding and analysis of pitch accent *per dialect*. Third, the shorthand notation gives the false impression that accent 1 and accent 2 are phonological entities that can be manipulated independently. It also gives the mistaken impression that the pitch contours are internally consistent across contexts within dialects. All too often one encounters statements such as "the default tone is accent 1" or "accent 1 is prespecified on prefixes" or "some prefixes suppress lexical accent 2". Although these types of statements might be in some sense descriptively accurate, they imply a phonological analysis that is inconsistent with an autosegmental analysis of tones (e.g. Hyman 2009). Specifically, they treat accent 1 and accent 2 as tones/tonemes

[7] This is type 2B of the Gårding-Lindblad typology (Gårding and Lindblad 1973), which means that accent 1 in disyllables has a single pitch peak on the post-stressed syllable and accent 2 has two pitch peaks - one on the stressed syllable and one on a post-stressed syllable. My informant was raised on Öland, and his pitch accent pattern resembles that described in the literature as typical of Götaland. An example is given in (10).

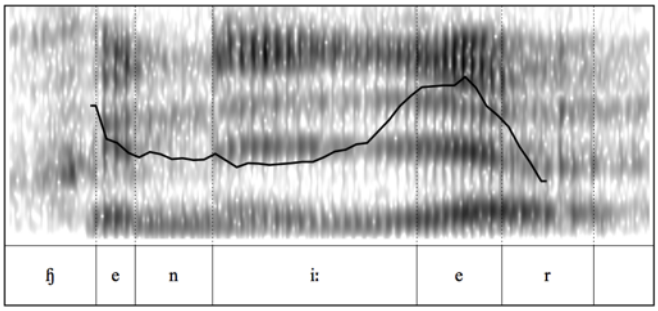
proper - which they are not. Even Gårding (1977:7) is uncomfortable with labeling North Germanic pitch contours. She purposefully uses "accent" specifically because "it is vague, general and non-committal". As we will see, presenting the data such that one actually sees the alignment of pitch peaks and troughs leads to different conclusions than those using shorthand notation. Specifically, we see that pitch accents are not monolithic abstract phonological entities, and they vary non-trivially in different contexts even within a dialect.

Finally, the marking of tones on segmental material in this paper is based on an interplay of phonetic and phonological considerations. In those cases where there is only voiced material in the syllable rhyme, there is a straightforward relationship between the phonetic peak/trough and the phonological segment. In which case, tones are transcribed unproblematically. However, when there is voiceless material in the rhyme, one must make a decision as to where to mark tone. On the one hand, relying only on phonetics rules out possible phonological tonal association to voiceless segments, which cannot realize pitch. On the other hand, transcribing voiceless consonants with phonological tones is potentially problematic since it seems to claim phonological representations for which there is no direct phonetic evidence. However, comparisons of several types and tokens of voiced and voiceless contexts in the data that I collected suggests that tones should be transcribed on voiceless segments when that is appropriate given the rest of the tonal system. Pitch tracks sometimes suggest the presence of a phonological tone that is incompletely realized due to phonetic voicelessness or glottalization. In other words, the phonetics of voiceless environments sometimes suggests phonological association of tones even if the phonetic evidence is not robust in all tokens. Example spectrograms, pitch tracks and transcriptions are given in (13) through (18) (see also (113) and (120).

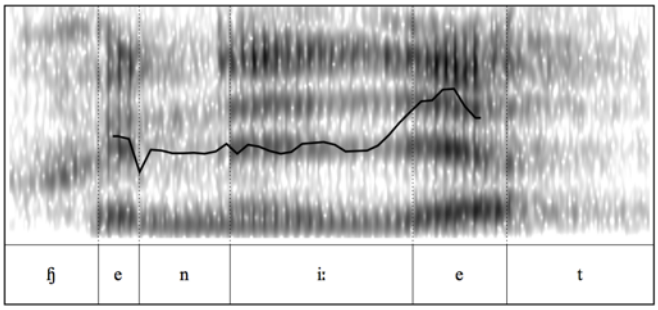
(13) *General Götaland Swedish accent 1*
[ɧeˈníː] geni ‘genius’



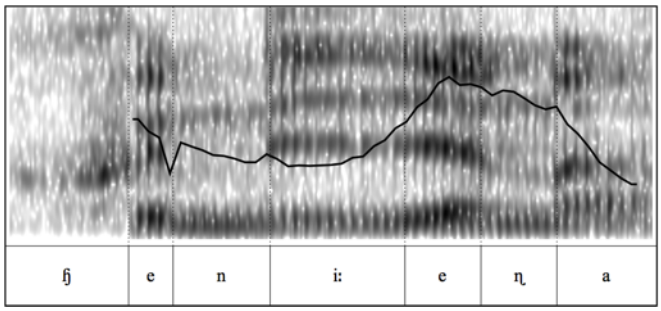
(14) *General Götaland Swedish accent 1*
[ɧeˈniːér] genier ‘geniuses’



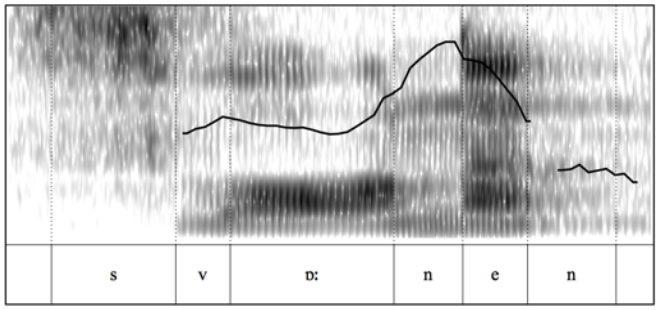
(15) *General Götaland Swedish accent 1*
[ɧeˈniːéˀt] geniet ‘the genius’



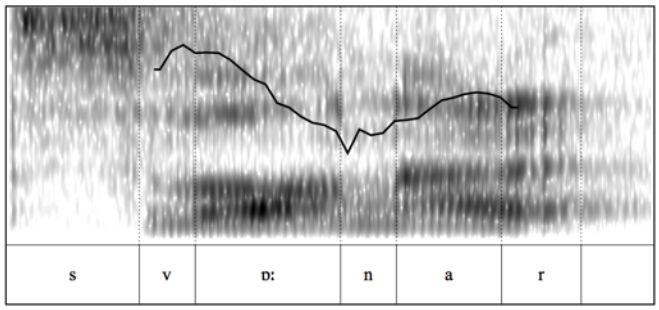
(16) *General Götaland Swedish accent 1*
[ɧeˈniːéɳâ] genierna ‘the geniuses’



(17) *General Götaland Swedish accent 1*
[ˈsvɒːnéǹ] svanen ‘the svan’



(18) *General Götaland Swedish accent 2*
[ˈsvɒ̂ːnárˋ] svanar ‘svans’



3. Nominal Inflection[8], Stress and Tone

3.1 Introduction - Gender, Weak/Strong, Declension, en/el/er

Before looking at the interaction of several variables involved in Swedish nominal morphophonology (including pitch accent, stress, epenthesis, retroflection, etc.), there are some relevant morphological basics that must be discussed - specifically, gender, weak/strong, declension and *en/el/er* roots.

First, this language has traditionally been described as having two grammatical genders - non-neuter and neuter.[9] These two grammatical genders are visible in the form of the indefinite and definite articles and their effect in adjective agreement as shown in (19) and (20). Note that the subscripts in the following examples are used descriptively and not as an indication of grammatical features.

(19) *Non-neuter gender*
a. en fisk
a$_{\text{non-neut.}}$ fish
'a fish'
b. fisken
fish-the$_{\text{non-neut.}}$
'the fish'
c. fisken är blå
fish-the$_{\text{non-neut.}}$ is blue$_{\text{non-neut.}}$
'the fish is blue'

(20) *Neuter gender*
a. ett hus
a$_{\text{neut.}}$ house
'a house'
b. huset
house-the$_{\text{neut.}}$
'the house'
c. huset är blått
house-the$_{\text{neut.}}$ is blue$_{\text{neut.}}$
'the house is blue'

In (19), we see a non-neuter noun that selects a non-neuter indefinite article (19a) and a non-neuter definite clitic (19b), and it triggers the appearance of a non-neuter morphology on the adjective (19c). In contrast, (20) has a neuter noun that selects a neuter indefinite article and neuter definite clitic, and it triggers the appearance of neuter morphology on the adjective.

The assignment of a given root to one or the other gender is at least quasi-predictable based on a complex interaction of semantic gender, animacy, and a variety of other semantic and phonological characteristics (e.g. see Rice 2006a for an account of gender assignment in Norwegian). However, since the purpose of this paper is not to motivate the gender assignment for particular lexical items, I will simply assume that a given speaker knows the grammatical gender of known roots, and that these roots are stored in the lexicon with a gender feature.

Swedish is also often described as having a division between strong and weak nouns. Strong nouns do not change their shape under compounding, while weak nouns do. For this paper, I will focus the discussion on the most productive subclass of weak nouns - those that end in *a* in isolation but without *a*

[8] Although interesting and important, some characteristics of nouns such as count versus non-count are not discussed here.

[9] Sometimes called "common" and "neuter" or "-n/en words" and "-t/ett words".

when the non-head member of a compound.[10] Thus, *mat* is strong, while *flicka* is weak, as shown in (21a) and (21b), respectively.

(21)

Nom.sing.	*Compound*
a. mat 'food'	matbord 'food table'
b. flicka 'girl'	flickbok 'girl book'

Following the work of Dahlsted (1965), Kiefer (1970), Holmberg (1992) and Josefsson (1997), I will assume that the vowel at the end of *flicka* is a suffix. However, I will remain somewhat agnostic about its morpho-syntactic characterization. While Kiefer claims it is purely derivational and Josefsson claims it is purely inflection, I will simply state that it surfaces when a particular class of roots (to be discussed) is in a particular type of syntactic position. As we will see below, this suffix is derivational-like in marking a declension class, which is lexically determined in many cases, but it is inflectional-like in being driven by a syntactic requirement that nouns in certain positions belong to a declension class. Since the non-head of a compound is not a syntactic head on the surface, it does not need to be marked with declension. Hence, *flickbok* does not have the *-a* suffix in (21).

The most complex aspect of Swedish nouns is that of declension.[11] This language is usually described as having five declensions corresponding to five ways of expressing the indefinite plural, as shown in table (22). Each of these classes can come in either of the two genders, except for first declension, which can only be non-neuter.[12]

(22) *Traditional declension description (to be revised below)*

Declension class	Indefinite plural ending	Common gender	Neuter gender
1	or	yes	no
2	ar	yes	yes
3	er/r	yes	yes
4	en/n	yes	yes
5	---	yes	yes

While I suggest that this traditional depiction of Swedish declension is essentially correct, it is not quite complete. As shown in (23) and (24), Swedish has at least 12 types of roots relevant to nominal inflection. The major split is between neuter and non-neuter roots. Neuter roots come in five flavors as demonstrated by the different plural suffixes and/or definite clitics they take. As (24) shows, there are two additional types of non-neuter roots. The first declension non-neuter roots can be weak or strong. The weak roots have no underlying declension prespecified, while the strong are underlyingly first declension. In addition, what is traditionally called the third declension is actually two distinct declensions. To keep some correspondence with the traditional labels (for expositional purposes), these

[10] There are other patterns described as "strong" versus "weak", but it is unclear how many of them are morphophonologically principled and how many involve lexicalized compounds.

[11] The assignment of declension to a given lexical item is complex in a way similar to gender assignment and will not be discussed in detail here. I simply assume that known roots for a given speaker are stored with a specific declension in the lexicon (or not - to be discussed).

[12] Interestingly and probably not accidentally, first declension nouns in Swedish correspond to a high degree with feminine nouns in those dialects with three genders (masculine, feminine, neuter). My intuition is that first declension is reserved for underlyingly genderless and underlyingly feminine roots. Although Standard Swedish has lost a three-way gender distinction in the agreement system as it applies to determiners and adjective agreement, there are still some vestiges of it in pronominal use. There is a set of first declension nouns (e.g. *människa* 'human being' and *klocka* 'time') that are necessarily referred to with the feminine pronoun *hon*, rather than the otherwise expected non-neuter *den*. This seems to indicate that they are feminine.

are called declension 3a and 3b throughout this paper. Finally, there is a distinctive "en" definite plural clitic used on fifth declension nouns that is often not discussed in the literature but plays an important role in the morphophonological analysis of nouns, as will be demonstrated below.

(23) *Neuter declension*

Root underlying declension	Root surface declension	Suffix in indefinite singular	Suffix in indefinite plural	Clitic in definite singular	Clitic in definite plural
2	2	---	+ar	++et	++na
3a	3a	---	+er	++et	++na
3b	3b	---	+r	++et	++na
4	4	---	+n	++et	++na
5	5	---	---	++et	++en

(24) *Non-neuter declension*

Root underlying declension	Root surface declension	Suffix in indefinite singular	Suffix in indefinite plural	Clitic in definite singular	Clitic in definite plural
---	1a	+a	+ur	++n	++na
1	1b	---	+ur	++n	++na
2	2	---	+ar	++n	++na
3a	3a	---	+er	++n	++na
3b	3b	---	+r	++n	++na
4	4	---	---	++n	++na
5	5	---	---	++n	++en

Finally, a set of North Germanic nouns that has caused a great deal of discussion in the literature are those ending in *en, el* and *er*. In a subset of these words, the “e” surfaces or not depending on the absence or presence of a following vowel. Two examples are given in (25).

(25) En/el/er *words*

		‘bolt’		‘rule’	
a.	indef. sing.	*regel*	ˈréːgél̀	*regel*	ˈreːgél̀
b.	indef. plur.	*reglar*	ˈréːglár̀	*regler*	ˈreːglér̀
c.	def. sing.	*regeln*	ˈréːgélǹ	*regeln*	ˈreːgélǹ
d.	def. plur.	*reglarna*	ˈréːglaɳâ	*reglerna*	ˈreːgléɳâ

A part of what makes these interesting when discussing pitch accent is not only do they show different distributions of tones - some accent 1 and some accent 2, but also that some of these form what look on the surface to be minimal pairs differing only in pitch accent (e.g. [ˈréːgél̀] ‘bolt-indef.sg.’ and [ˈreːgél̀] ‘rule-indef.sg.’). It is in no small part due to these types of "minimal pairs" that lexical pitch accent analyses have been proposed.

However, we will see that the differences seen in (25) are actually due to an interaction of lexical vowel specification, vowel epenthesis due to phonotactic restrictions, differences in surface prosodification above the level of the foot, and differences in tone assignment and alignment in different prosodic contexts. That is, the "minimal pairs" are not quite as minimal as they first appear.

3.2 Nominal Clitics and Inflectional Suffixes

With the very basics of gender, strong/weak, declension and underlying root-final sonority reversals in place, we can now look at their interactions. In the following discussion, I will make use of the suffixes and clitics listed in (26) and (27).

(26)

	Suffixes	*Orthography*	*Meaning*
a.	/+a$_{_N1}$/	*a*	first declension
b.	/+ur$_{_N1_plur}$/	*or*	first declension plural
c.	/+ar$_{_N2_plur}$ /	*ar*	second declension plural
d.	/+er$_{_N3a_plur}$/	*er*	third a declension plural
e.	/+r$_{_N3b_plur}$/	*r/er*	third b declension plural
f.	/+n$_{_N4_neut_plur}$/	*n/en*	fourth declension neuter plural

(27)

	Clitics	*Orthography*	*Meaning*
a.	/++n$_{__def}$/	*n/en*	definite
b.	/++et$_{_neut_def}$/	*t/et*	neuter definite
c.	/++t$_{_N4_neut_def}$/	*t/et*	fourth declension neuter definite
d.	/++na$_{_def_plur}$/	*na*	definite plural
e.	/++en$_{_N5_neut_def_plur}$/	*en*	fifth declension neuter definite plural

3.3 First Declension - Non-neuter

As mentioned above, first declension nouns are always non-neuter.

3.3.1 Monosyllables

(28) shows a typical paradigm for first declension strong monosyllabic roots.

(28) *First declension strong monosyllabic root*

		'wave'	/UR/	[SR]
a.	compound	*våg*	vog $_{N1}$	ˌvoːg̀
b.	indef. sing.	*våg*	vog $_{N1}$	ˈvóːg̀
c.	def. sing.	*vågen*	vog $_{N1}$++n $_{def}$	ˈvoːg̀é̲ǹ
d.	indef. plur.	*vågor*	vog $_{N1}$+ur $_{N1\_plur}$	ˈvóːg̀úr̀
e.	def. plur.	*vågorna*	vog $_{N1}$+ur $_{N1\_plur}$++na $_{def\_plur}$	ˈvóːg̀uɳâ

This type of root needs no declension class ending because it is already specified with a declension class. Thus, it surfaces as monosyllabic when the non-head of a compound (28a) and when indefinite singular (28b). The definite singular (28c) involves the addition of a clitic composed of a single nasal consonant. This surfaces with an epenthetic vowel to break up an illicit consonant cluster - i.e. *gn#. Note that this epenthetic vowel does not appear when a licit cluster is formed - see (30) for further discussion. The indefinite plural (28d) involves a suffix with an underlying vowel, while the definite plural (28e) has an additional definite plural clitic. Note that there is coalescence and retroflexion of the adjacent "r" and "n" in the definite plural. This is an automatic, post-lexical process that will not be commented on further.[13] With respect to pitch accent, an important observation is that the singular has one underlying vowel and accent 1, while the plural has two underlying vowels and accent 2.

[13] Phonotactics suggest that the coalesced retroflex is ambisyllablic. This is not discussed further here or represented in the examples because a full discussion is beyond the scope of the present paper.

As far as tone alignment is concerned, the accent 1 has a high tone followed by a low tone, and it is on the stressed syllable in monosyllables (28b) but the post-stressed syllable in disyllables (28c) in this dialect. Accent 2 has two high-low peaks, where the first is invariably on the stressed syllable. However, the second peak is on the post-stressed syllable in disyllables (28d) and the final syllable in trisyllables (28e). In these data and all data to follow, pitch peaks and troughs align phonetically as far right as possible within the syllable rhyme when alone, but they disperse phonetically to the opposite ends of the rhyme when there is more than one tone per rhyme. Finally, note that the similarity in the mobility of the high-low tone sequence in accent one and the second peak of accent two is important and will play a crucial role in the analysis.

3.3.1.1 Monosyllable - en/el/er

There are also first declension strong nouns that have only one underlying vowel but that surface with an epenthetic vowel in the singular. Examples are given in (29) and (30). These are of the *en/el/er* group mentioned above.

(29) *First declension strong* en/el/er *monosyllabic root*

		'vein'	/UR/	[SR]
a.	compound	*åder/ådr*	odr $_{N1}$	ˌoːdɛ̲rˌoːdr
b.	indef. sing.	*åder*	odr $_{N1}$	ˈoːdɛ̲́r̀
c.	def. sing.	*ådern*	odr $_{N1}$++n $_{def}$	ˈoːdɛ̲́ǹ̩
d.	indef. plur.	*ådror*	odr $_{N1}$+ur $_{N1\ plur}$	ˈóːdrúr̀
e.	def. plur.	*ådrorna*	odr $_{N1}$+ur $_{N1\ plur}$++na $_{def\ plur}$	ˈóːdruɳ̩̂

(30) *First declension strong* en/el/er *monosyllabic root*

		'slipper'	/UR/	[SR]
a.	compound	*toffel/tofful*	tof^{m}l $_{N1}$	ˌtofːɛ̲lˌtofːl
b.	indef.sing.	*toffel*	tof^{m}l $_{N1}$	ˈtofːɛ̲́l̀
c.	def. sing.	*toffeln*	tof^{m}l $_{N1}$++n $_{def}$	ˈtofːɛ̲́l̀n̩
d.	indef.plur.	*tofflor*	tof^{m}l $_{N1}$+ur $_{N1\ plur}$	ˈtófl̀úr̀
e.	def. plur.	*tofflorna*	tof^{m}l $_{N1}$+ur $_{N1\ plur}$++na $_{def\ plur}$	ˈtófl̀uɳ̩̂

When attached to a vowel-initial morpheme, the root has only one vowel (e.g. (d) and (e)). However, when the root is word-final or followed by a consonant, then a vowel is epenthesized to break up the reversed-sonority consonant sequence (e.g. (b) and (c)). This is in contrast with both (28c), where phonotactics results in epenthesis in a different position, and (52d), where the definite clitic has an underlying vowel. It is important to note that the singular has accent 1 and one underlying vowel while the plural has accent 2 and two underlying vowels.

3.3.2 Disyllables

First declension nouns may also be weak, in which case they usually have no final vowel when the non-head of a compound, but they have a final "a" in the singular. An example is given in (31). First declension weak nouns are analyzed here as underlyingly declensionless.

(31) *First declension weak monosyllabic root that surfaces as a disyllable in non-compounds*

		'school'	/UR/	[SR]
a.	compound	*skol*	skul	ˌsku:l
b.	indef. sing.	*skola*	skul+a $_{N1}$	ˈskú:̀lâ
c.	def. sing.	*skolan*	skul+a $_{N1}$++n $_{def}$	ˈskú:̀láǹ
d.	indef. plur.	*skolor*	skul+ur $_{N1\ plur}$	ˈskú:̀lúr̀
e.	def. plur.	*skolorna*	skul+ur $_{N1\ plur}$++na $_{def\ plur}$	ˈskú:̀luŋ̀â

In (31), we see that the root /skul/ surfaces without a final vowel and without a declension class specification when it is a non-head of a compound. However, when in a syntactically salient position, it must belong to a declension class and thus receives a declension class suffix. This is what makes weak nouns different from strong nouns, and it accounts for the presence of a separate first declension suffix in the singular. Note that these words have two underlying vowels in the root-suffix complex and they have accent 2 in both the singular and the plural.

3.3.2.1 Disyllable - en/el/er

In (32), we see that underlyingly declensionless nouns can also exhibit vowel epenthesis when phonotactics requires it. Because the declension class morphology for underlyingly declensionless roots has underlying vowels, the only environment where epenthesis may be seen is in compounds of the appropriate type. Note that (b) through (e) have accent 2 and no "e" in the second syllable. However, compounds such as *nässelsoppa* 'nettle soup' have an epenthetic vowel between the last two consonants of the root.

(32) *First declension weak* en/el/er *monosyllable root that surfaces as a disyllable*

		'nettle'	/UR/	[SR]
a.	compound	*nässel/nässl*	nes^{m}l	nes:e̲l/nes:l
b.	indef. sing.	*nässla*	nes^{m}l+a $_{N1}$	ˈnés̀lâ
c.	def. sing.	*nässlan*	nes^{m}l+a $_{N1}$++n $_{def}$	ˈnés̀láǹ
d.	indef. plur.	*nässlor*	nes^{m}l+ur $_{N1\ plur}$	ˈnés̀lúr̀
e.	def. plur.	*nässlorna*	nes^{m}l+ur $_{N1\ plur}$++na $_{def\ plur}$	ˈnés̀luŋ̀â

3.3.3 Polysyllables

The majority of polysyllabic roots in Swedish are borrowings. Although the majority of borrowings seem to fall into third declension, there are some that are underlyingly declensionless. An example is shown in (33).

(33) *First declension quadrisyllabic root*

		'hacienda'	/UR/	[SR]
a.	indef. sing.	*hacienda*	hasiend+a $_{N1}$	ˌhasiˈénd̀â
b.	def. sing.	*haciendan*	hasiend+a $_{N1}$++n $_{def}$	ˌhasiˈénd̀áǹ
c.	indef. plur.	*haciendor*	hasiend+ur $_{N1\ plur}$	ˌhasiˈénd̀úr̀
d.	def. plur.	*haciendorna*	hasiend+ur $_{N1\ plur}$++na $_{def\ plur}$	ˌhasiˈénd̀uŋ̀â

Note that there is accent 2 throughout the paradigm and there are two prosodic feet. The first two syllables form a disyllabic foot with secondary stress on the initial syllable. This observation about footing will be important below.

3.3.4 "Exceptional" Accent 1

First declension borrowings with three syllables *all* have antepenultimate stress and accent 1 throughout the paradigm. An example is given in (34).

(34) *First declension trisyllabic root*

		'camera'[14]	/UR/	[SR]
a.	indef. sing.	*kamera*	kamer+a $_{N1}$	ˈkɒːmérâ
b.	def. sing.	*kameran*	kamer+a $_{N1}$++n $_{def}$	ˈkɒːmérâǹ
c.	indef. plur.	*kameror*	kamer+ur $_{N1\_plur}$	ˈkɒːmérúr̀
d.	def. plur.	*kamerorna*	kamer+ur $_{N1\_plur}$++na $_{def\_plur}$	ˈkɒːmérún̰â

It is the appearance of accent 1 and the impossibility of accent 2 here that starts to suggest 1) neither the declension ending nor the plural suffix introduce a lexical tone, and/or 2) there is something "marked" about these words that blocks the appearance of accent 2. It is in part on the strength of this type of word that Lahiri *et al* (2005) reject the lexical accent 2 analysis and propose a lexical accent 1 approach.

3.4 Second Declension - non-neuter

3.4.1 Closed Monosyllables

(35) shows a typical paradigm for second declension monosyllabic roots. As was the case with strong first declension words, the singular forms have accent 1 and the plural forms have accent 2. In addition, the tones associated with accent 1 and accent 2 are mobile and their position depends at least in part on the syllable count.

(35) *Second declension non-neuter closed monosyllabic root*

		'chair'	/UR/	[SR]
a.	indef. sing.	*stol*	stul $_{N2}$	ˈstúːl̀
b.	def. sing.	*stolen*	stul $_{N2}$++n $_{def}$	ˈstuːléǹ
c.	indef. plur.	*stolar*	stul $_{N2}$+ar $_{N2\_plur}$	ˈstúːlár̀
d.	def. plur.	*stolarna*	stul $_{N2}$+ar $_{N2\_plur}$++na $_{def\_plur}$	ˈstúːlan̰â

3.4.2 Disyllables

In (36), we see a case of a root with two underlying vowels and a final underlying vowel that deletes due to hiatus. In this example, the low vowel from the plural morpheme takes precedence over the root vowel. We also see accent 2 throughout the paradigm - even in the singular.

(36) *Second declension non-neuter disyllabic root*

		'hero'	/UR/	[SR]
a.	indef. sing.	*hjälte*	ielte $_{N2}$	ˈjélt̀ê
b.	def. sing.	*hjälten*	ielte $_{N2}$++n $_{def}$	ˈjélt̀éǹ
c.	indef. plur.	*hjältar*	ielt*e* $_{N2}$+ar $_{N2\_plur}$	ˈjélt̀ár̀
d.	def. plur.	*hjältarna*	ielt*e* $_{N2}$+ar $_{N2\_plur}$++na $_{def\_plur}$	ˈjélt̀an̰â

[14] Some speakers only have one underlying vowel in this noun - /kamr/ --> [ˈkɒːmrâ], [ˈkɒːmráǹ], [ˈkɒːmrúr̀] and [ˈkɒːmrún̰â].

3.4.3 Open Monosyllables

In (37), there is a somewhat unexpected lack of vowel deletion and the presence of surface hiatus. When we compare this with the deletion in (36), we see that stressed root vowels and suffix vowels cannot delete, but unstressed root vowels can.

(37) *Second declension non-neuter open monosyllabic root*

		'bridge'	/UR/	[SR]
a.	indef. sing.	*bro*	bru $_{N2}$	ˈbrúː
b.	def. sing.	*bron*	bru $_{N2}$++n $_{def}$	ˈbrúːǹ
c.	indef. plur.	*broar*	bru $_{N2}$+ar $_{N2\_plur}$	ˈbrúːár̀
d.	def. plur.	*broarna*	bru $_{N2}$+ar $_{N2\_plur}$++na $_{def\_plur}$	ˈbrúːaɳâ

3.4.4 en/el/er

(38) shows a second declension *en/el/er* root with one underlying vowel. These behave like the first declension *en/el/er* roots in having accent 1 and an epenthetic vowel in the singular, and accent 2 in the plural. Note that there is an important difference between the accent 1 disyllable and the accent 2 disyllable. The former has an epenthetic vowel, while the latter has two underlying vowels.

(38) *Second declension non-neuter* en/el/er *monosyllabic root*

		'bird'	/UR/	[SR]
a.	indef. sing.	*fågel*	fogl $_{N2}$	ˈfoːge̲l̀
b.	def. sing.	*fågeln*	fogl $_{N2}$++n $_{def}$	ˈfoːge̲lǹ
c.	indef. plur.	*fåglar*	fogl $_{N2}$+ar $_{N2\_plur}$	ˈfóːglár̀
d.	def. plur.	*fåglarna*	fogl $_{N2}$+ar $_{N2\_plur}$++na $_{def\_plur}$	ˈfóːglaɳâ

3.5 Second Declension - neuter

3.5.1 en/el/er

In (39), we see the only neuter second declension noun that I could find.[15] It takes an *ar* plural and an *et* definite marker. Under the assumption that neuter gender is an inherent property of roots in Swedish, not the result of a surface syntactic requirement, then the fact that the definite marker must also be specified as neuter is a result of the agreement system of the language. Note that like (38a), (39a) has an epenthetic vowel, but unlike (38b), (39b) does not. This is because the non-neuter definite article does not have an underlying vowel, but the neuter definite article does. Note also that the singular forms both have accent 1 and the plural forms have accent 2. The difference in the behavior of the accent 2 forms with two underlying vowels (39c and 39d) and the accent 1 form with two underlying vowels (39b) is that the latter involves a clitic. This will be discussed further below.

[15] There is dialectal variation for this word. The root has two underlying vowels for some speakers. Thus, they have "e" and accent 2 throughout the paradigm - [fíŋ́ér̀], [fíŋ́erét̀], [fíŋ́erár̀], [fíŋ́eráɳâ].

(39) *Second declension neuter* en/el/er *monosyllabic root*

		'finger'	/UR/	[SR]
a.	indef. sing.	*finger*	fingr $_{N2\_neut}$	ˈfiŋ*e*̲̀r
b.	def. sing.	*fingret*	fingr $_{N2\_neut}$++et $_{neut\_def}$	ˈfiŋrét̀
c.	indef. plur.	*fingrar*	fingr $_{N2\_neut}$+ar $_{N2\_plur}$	ˈfíŋ̀rár̀
d.	def. plur.	*fingrarna*	fingr $_{N2\_neut}$+ar $_{N2\_plur}$++na $_{def\_plur}$	ˈfíŋ̀raŋ̀â

3.6 Second Declension - exceptional prosody

3.6.1 Disyllables

Some second declension roots have more than one underlying vowel. These are borrowings or lexicalized compounds, and many of these have accent 1 throughout the paradigm. In anticipation of the analysis to be discussed, I mark the stressed syllable with a superscript "^{M}" in the underlying form. The reason for this will become clear below.

(40) *Second declension non-neuter disyllabic roots with exceptional prosody*

	'2nd lieutenant'		/UR/	[SR]
a.	indef. sing.	*fänrik*	fæ^{M}nrik $_{N2}$	ˈfænríḳ̀
b.	def. sing.	*fänriken*	fæ^{M}nrik $_{N2}$++n $_{def}$	ˈfænrík*e*̲̀n̄
c.	indef. plur.	*fänrikar*	fæ^{M}nrik $_{N2}$+ar $_{N2\_plur}$	ˈfænríkár̀
d.	def. plur.	*fänrikarna*	fæ^{M}nrik $_{N2}$+ar $_{N2\_plur}$++na $_{def\_plur}$	ˈfænríkáŋ̀â

There are a few things that make this example stand out as fundamentally different from most of the previous examples. First, the main stress is antepenultimate in the indefinite plural. Most of the other examples had penultimate stress. Second, the second declension plural ending usually coincides with accent 2. This is one of the reasons some have claimed that the plural ending is underlyingly prespecified with accent 2. However, words like *fänrik* have accent 1 throughout the paradigm despite having several underlying vowels in the root-suffix complex. This lack of accent 2 is hard to reconcile with a lexical accent 2 analysis, and it is one of the reasons that Lahiri *et al* (2005) propose a lexical accent 1 account.

Finally, the alignment of the peaks and troughs is very different compared to most previous examples. In (40b) and (40c), we see that the low tone is on the final syllable, not the post-stressed syllable. Thus, it is also one syllable away from the stressed syllable. In (40d), the low tone is two syllables from the stress. In (40c) and (40d), there are actually multiple high tones associated with accent 1. There is a high tone on the post-stressed syllable and every following syllable. The presence of multiple high tones on accent 1 and the spread of the tones across several syllables is hidden by standard shorthand transcriptions but must be accounted for.

3.6.2 Polysyllables

An example of a second declension noun with more than two underlying syllables is given in (41). In this example, the stress is consistently on the root penult and there is accent 1 throughout the paradigm. As was the case in (40), the number and distribution of tones is somewhat unexpected and perhaps difficult to reconcile with a standard lexical accent 2 account if that account assumes that the plural morpheme is prespecified with accent 2.

(41) *Second declension non-neuter polysyllabic root*

		'potato'	/UR/	[SR]
a.	indef. sing.	*potatis*	puta^{M}tis $_{N2}$	puˈtɒːtís̀
b.	def. sing.	*potatisen*	puta^{M}tis $_{N2}$++n $_{def}$	puˈtɒːtísè̲ǹ
c.	indef. plur.	*potatisar*	puta^{M}tis $_{N2}$+ar $_{N2\ plur}$	puˈtɒːtísár̀
d.	def. plur.	*potatisarna*	puta^{M}tis $_{N2}$+ar $_{N2\ plur}$++na $_{def\ plur}$	puˈtɒːtísán̰â

3.7 Fourth Declension - neuter

3.7.1 Monosyllables

Fourth declension nouns are mostly neuter, and most end in a vowel. This implies that monosyllables are likely to be open in the singular indefinite. (42) shows a typical paradigm for fourth declension monosyllabic roots. Note that a sequence of two coronal nasals is not allowed, and when such a sequence occurs due to morpheme concatenation, one of the coronals deletes[16]. For the sake of convenience, I delete the inflectional segment, not the clitic segment.

(42) *Fourth declension neuter monosyllabic root*

		'knee'	/UR/	[SR]
a.	indef. sing.	*knä*	knæ $_{N4\ neut}$	ˈknæ̂ː
b.	def. sing.	*knäet*	knæ $_{N4\ neut}$++t $_{def\ neut\ N4}$	ˈknǽːt̀
c.	indef. plur.	*knän*	knæ $_{N4\ neut}$+n $_{plur\ N4\ neut}$	ˈknǽːǹ
d.	def. plur.	*knäna*	knæ $_{N4\ neut}$+***n*** $_{plur\ N4\ neut}$++na $_{def\ plur}$	ˈknæːnâ

3.7.2 Disyllables

Fourth declension nouns with disyllablic roots are unsurprising. Note that they have accent 2 throughout the paradigm.

(43) *Fourth declension neuter disyllabic root*

		'theme'	/UR/	[SR]
a.	indef.sing.	*tema*	tema $_{N4\ neut}$	ˈté̗ːmâ
b.	def. sing.	*temaet*	tema $_{N4\ neut}$++t $_{def\ neut\ N4}$	ˈté̗ːmát̀
c.	indef.plur.	*teman*	tema $_{N4\ neut}$+n $_{plur\ N4\ neut}$	ˈté̗ːmáǹ
d.	def. plur.	*temana*	tema $_{N4\ neut}$+***n*** $_{plur\ N4\ neut}$++na $_{def\ plur}$	ˈté̗ːmanâ

The word in (44) is interesting because it is sometimes claimed to belong to the *en/el/er* group and to have an epenthetic vowel because of comparisons of the non-compound form *äpple* 'apple' with common compounds like *äppelträd* 'apple tree' and *äppelmos* 'apple sauce'.

However, there are three things suggesting that the "e" in the non-compound and the common compounds are lexical, not epenthetic. First, less common compounds that seem to be the result of active compounding rather than lexicalization, like *äppleskrott* 'apple core', do not have the "e" between the labial and the lateral. Second, the non-compound forms always have the same shape "äpple" throughout the paradigm. This is unlike other *en/er/el* words which sometimes have epenthesis and sometimes not depending on the context. Third, the non-compound forms have the vowel in a different position within the word compared to all of the other *en/el/er* words. Finally, the non-compound form has accent 2

[16] It is also possible that the two nasals coalesce. Without evidence one way or the other, I adopt a deletion analysis for the sake of concreteness.

throughout the paradigm - again, in contrast with other *en/el/er* words. I analyze this root as having two underlying vowels and the "epenthetic compounds" as being fossilized forms/lexicalized compounds - not synchronic compounds.

(44) *Fourth declension neuter* en/el/er

		'apple'	/UR/	[SR]
a.	indef.sing.	*äpple*	ep^{m}le $_{N4\_neut}$	ˈéplê
b.	def. sing.	*äpplet*	ep^{m}le $_{N4\_neut}$++t $_{def\_neut\_N4}$	ˈéplét
c.	indef.plur.	*äpplen*	ep^{m}le $_{N4\_neut}$+n $_{plur\_N4\_neut}$	ˈéplén
d.	def. plur.	*äpplena*	ep^{m}le $_{N4\_neut}$+***n*** $_{plur\_N4\_neut}$++na $_{def\_plur}$	ˈéplenâ

3.7.3 Polysyllables

Fourth declension trisyllables with light final syllables *always* have penultimate stress and accent 1 throughout the paradigm. An example is shown in (45).

(45) *Fourth declension neuter trisyllabic root*

		'piano'[17]	/UR/	[SR]
a.	indef.sing.	*piano*	pianu $_{N4\_neut}$	piˈɒːnû
b.	def. sing.	*pianot*	pianu $_{N4\_neut}$++t $_{def\_neut\_N4}$	piˈɒːnút
c.	indef.plur.	*pianon*	pianu $_{N4\_neut}$+n $_{plur\_N4\_neut}$	piˈɒːnún
d.	def. plur.	*pianona*	pianu $_{N4\_neut}$+***n*** $_{plur\_N4\_neut}$++na $_{def\_plur}$	piˈɒːnúnâ

However, if the penult is preceded by an even number of syllables, accent 2 arises. This is shown in (46).

(46) *Fourth declension neuter quadrisyllabic root*

		'panorama'	/UR/	[SR]
a.	indef.sing.	*panorama*	panurama $_{N4\_neut}$	ˌpanuˈrɒːmâ
b.	def. sing.	*panoramat*	panurama $_{N4\_neut}$++t $_{def\_neut\_N4}$	ˌpanuˈrɒːmát
c.	indef.plur.	*panoraman*	panurama $_{N4\_neut}$+n $_{plur\_N4\_neut}$	ˌpanuˈrɒːmán
d.	def. plur.	*panoramana*	panurama $_{N4\_neut}$+***n*** $_{plur\_N4\_neut}$++na $_{def\_plur}$	ˌpanuˈrɒːmanâ

The striking difference between trisyllable and quadrisyllabic forms deserves an explanation, as does the possible correlation between initial disyllabic trochees and accent 2. Recall that first declension *hacienda* (see (33)) also has accent 2.

3.7.4 Exceptional Prosody

Some disyllabic neuter fourth declension nouns have exceptional accent 1, even in the plural.

(47) *Fourth declension neuter disyllabic root with exceptional prosody*

		'party'	/UR/	[SR]
a.	indef.sing.	*party*	pa^{M}rty $_{N4\_neut}$	ˈpɒːʈý
b.	def. sing.	*partyt*	pa^{M}rty $_{N4\_neut}$++t $_{def\_neut\_N5}$	ˈpɒːʈýt
c.	indef.plur.	*partyn*	pa^{M}rty $_{N4\_neut}$+n $_{plur\_N4\_neut}$	ˈpɒːʈýn
d.	def. plur.	*partyna*	pa^{M}rty $_{N4\_neut}$+***n*** $_{plur\_N4\_neut}$++na $_{def\_plur}$	ˈpɒːʈýnâ

[17] This seems to be disyllabic with an onset cluster for some speakers.

3.8 Fourth Declension - non-neuter

3.8.1 en/el/er

Although fourth declension is sometimes claimed to have only neuter nouns ending in vowels, there are some exceptions. An important fact about these exceptions is that they do not have an indefinite plural form that is distinct from the indefinite singular. For this reason, they are sometimes classified as fifth declension. However, the definite plural clitic for non-neuter fourth and fifth declensions are different. As we see in (48), it is *na* for fourth declension, and as we will see in section 3.9, it is *en* for fifth declension.

I propose that the absence of a distinct indefinite plural form for the fourth declension is the result of there being neither a general plural suffix nor a plural suffix specific to fourth declension non-neuter (see (26) and (27)). Thus, plural fourth declension nouns surface without a suffix marking plurality. Note that these words have accent 1 throughout the paradigm. Also note the spread of accent 1 tones across multiple syllables.

(48) *Fourth declension non-neuter* en/el/er *root*

		'order'	/UR/	[SR]
a.	indef.sing.	*order*	ordr $_{N4}$	ˈoːd̲ér̀
b.	def. sing.	*ordern*	ordr $_{N4}$++n $_{def}$	ˈoːd̲éǹ̩
c.	indef.plur.	*order*	ordr $_{N4}$	ˈoːd̲ér
d.	def. plur.	*orderna*	ordr $_{N4}$++na $_{def\ plur}$	ˈoːd̲én̩â

3.8.2 Exceptional Prosody

There are even examples of fourth declension non-neuter nouns with exceptional prosody, as well as epenthetic vowels. This is exceptional because it has antepenultimate stress combined with accent 1 - despite the fact that there are two underlying vowels in the root. If this were not somehow marked as exceptional, we would expect the same pattern of stress and tone as found in the *månad* 'month' paradigm (see (78)).

(49) *Fourth declension non-neuter root with exceptional prosody*

		'musician'	/UR/	[SR]
a.	indef.sing.	*musiker*[18]	mʉ^{M}sikr $_{N4}$	ˈmʉːsík̲ér̀
b.	def. sing.	*musikern*	mʉ^{M}sikr $_{N4}$++n $_{def}$	ˈmʉːsík̲éǹ̩
c.	indef.plur.	*musiker*	mʉ^{M}sikr $_{N4}$	ˈmʉːsík̲ér
d.	def. plur.	*musikerna*	mʉ^{M}sikr $_{N4}$++na $_{def\ plur}$	ˈmʉːsík̲én̩â

3.9 Fifth Declension - non-neuter

The fifth declension roots do not have a separate plural marker for either neuter or non-neuter. In addition, the definite plural has an exceptional *-en* form (versus expected *-na* found in all other declensions). This leads to homophony between the plural and non-plural of both the indefinite and definite for non-neuter nouns but only homophony between plural indefinite and definite for neuter nouns. In addition, under the assumption that declension is defined by the shape of the plural, then there

[18] While it might be tempting to analyze this word as derived from *musik* 'music' with the addition of a derivational *-er* suffix, there is evidence that the one is not actually derived from the other. For example, *musik* has exceptional final stress while *musiker* has exceptional antepenultimate stress. It is unclear what mechanism would force not only stress-shift but also a shift in exceptional stress.

is some ambiguity as to how to treat some roots that do not take an indefinite plural suffix but have different shapes for the definite plural, e.g. *order/ordern/order/orderna* versus *mil/milen/mil/milen*. The traditional analysis claims that declension class is determined by the indefinite plural. If there is no suffix, it is fifth declension. However, given the otherwise conspicuous lack of non-neuter fourth declension roots and the need to explain non-neuter definite plurals ending in either *-na* or *-en*, I interpret this to mean that those ending in *-na* are fourth declension, while those ending in *-en* are fifth.

3.9.1 Monosyllables

As shown in (50), there is no surface distinction between the singular and plural forms of the indefinite or definite nouns. However, the reason for the homophony is different in each case. The indefinite homophony is the result of the lack of an appropriate plural ending. So, both the singular and the plural indefinites surface as bare roots. In contrast, the morphological structure of the definite homophonous forms is different. The singular involves the plain definite clitic combined with vowel epenthesis, while the plural involves the addition of a declension class-specific clitic that has an underlying vowel. All are accent 1 regardless of syllable count.

(50) *Fifth declension non-neuter monosyllablic root*

		’10 km’	/UR/	[SR]
a.	indef.sing.	*mil*	mil $_{N5}$	ˈmíːl̀
b.	def. sing.	*milen*	mil $_{N5}$++n $_{def}$	ˈmiːlə́ǹ
c.	indef.plur.	*mil*	mil $_{N5}$	ˈmíːl̀
d.	def. plur.	*milen*	mil $_{N5}$++en $_{def\ plur\ N5}$	ˈmiːléǹ

3.10 Fifth Declension - neuter

3.10.1 Monosyllables

The neuter fifth declension nouns only have homophony in the indefinite. They, too, have accent 1 throughout.

(51) *Fifth declension neuter monosyllabic root*

		‘table’	/UR/	[SR]
a.	indef.sing.	*bord*	burd $_{N5\ neut}$	ˈbúːɖ̀
b.	def. sing.	*bordet*	burd $_{N5\ neut}$++et $_{def\ neut}$	ˈbuːɖét̀
c.	indef.plur.	*bord*	burd $_{N5\ neut}$	ˈbúːɖ̀
d.	def. plur.	*borden*	burd $_{N5\ neut}$++en $_{def\ plur\ N5}$	ˈbuːɖéǹ

3.10.2 en/el/er

In (52) through (54), we see examples of fifth declension neuter *en/el/er* roots. These have accent 1 throughout the paradigm, they have an epenthetic vowel in the indefinite, and they show that both the definite neuter and the fifth declension definite plural morphemes have underlying vowels. If the definite plural did not have an underlying vowel, we would expect **segeln* and **pillern* instead of *seglen* and *pillren*.

(52) *Fifth declension neuter* en/el/er *root*

		'sail'	/UR/	[SR]
a.	indef.sing.	*segel*	segl $_{N5\ neut}$	ˈse:g*e̲*l̀
b.	def. sing.	*seglet*	segl $_{N5\ neut}$++et $_{def\ neut}$	ˈse:glétˋ
c.	indef.plur.	*segel*	segl $_{N5\ neut}$	ˈse:g*e̲*l̀
d.	def. plur.	*seglen*	segl $_{N5\ neut}$++en $_{def\ plur\ N5}$	ˈse:gléǹ

(53) *Fifth declension neuter* en/el/er *root*

		'water'	/UR/	[SR]
a.	indef.sing.	*vatten*	vat^{m}n $_{N5\ neut}$	ˈvat:*e̲*ǹ
b.	def. sing.	*vattnet*	vat^{m}n $_{N5\ neut}$++et $_{def\ neut}$	ˈvatnétˋ
c.	indef.plur.	*vatten*	vat^{m}n $_{N5\ neut}$	ˈvat:*e̲*ǹ
d.	def. plur.	*vattnen*	vat^{m}n $_{N5\ neut}$++en $_{def\ plur\ N5}$	ˈvatnéǹ

(54) *Fifth declension neuter* en/el/er *root*

		'pill'	/UR/	[SR]
a.	indef.sing.	*piller*	pil^{m}r $_{N5\ neut}$	ˈpil:*e̲*r̀
b.	def. sing.	*pillret*	pil^{m}r $_{N5\ neut}$++et $_{def\ neut}$	ˈpilrétˋ
c.	indef.plur.	*piller*	pil^{m}r $_{N5\ neut}$	ˈpil:*e̲*r̀
d.	def. plur.	*pillren*	pil^{m}r $_{N5\ neut}$++en $_{def\ plur\ N5}$	ˈpilréǹ

3.11 Fifth Declension - exceptional prosody

I have not found any fifth declension roots with exceptional prosodic word structure at this time. This is a reflex of the fact that I have not found any fifth declension roots with more than one underlying vowel.

3.12 Third Declension - two declensions in one[19]

The most complex patterns are found in what is usually called the third declension. These have an indefinite singular ending in *-er* or *-r*. Although there have been attempts to analyze these as a single declension class using a single indefinite plural suffix with either vowel epenthesis or vowel deletion, there is clear evidence that there are actually two declensions at work here. One declension has an underlying vowel in the plural suffix - declension 3a, and the other does not - declension 3b.

Although it is not always possible to tell which declension class a given root belongs to if it ends in a consonant (hence the desire for a single declension class), it is clear in looking at roots ending in vowels that there are two classes. Some vowel-final roots add *-er*, even when there is no obvious phonotactic motivation for the vowel. This vowel is absent in the definite singular, as seen in (55) and (56).

(55)

	Indef. sing.	*Def. sing.*	*Indef. plur.*		
a.	[iˈdé:̀]	[iˈdé:ǹ]	[iˈde:ér̀]	*idé*	'idea'
b.	[milˈjǿ:̀]	[milˈjǿ:ǹ]	[milˈjø:ér̀]	*miljö*	'environment'
c.	[meˈný:̀]	[meˈný:ǹ]	[meˈny:ér̀]	*meny*	'menu'

(56)

	Indef. sing.	*Def. sing.*	*Indef. plur.*		
a.	[ˈhob:ŷ]	[ˈhob:ýǹ]	[ˈhob:ýér̀]	*hobby*	'hobby'
b.	[saˈfɒ:rî]	[saˈfɒ:ríǹ]	[saˈfɒ:ríér̀]	*safari*	'safari'

[19] Note that there is dialectal variation with respect to the classification of given nouns as either 3a or 3b.

Compare this with the data in (57), where the addition of the suffix shifts stress, accent, and vowel length.

(57)	*Indef. sing.*	*Def. sing.*	*Indef. plur.*		
a.	[ˈmúːtùr]	[ˈmúːtúr̀n]	[muˈtuːrér]	*motor*	‘motor’
b.	[ˈdóktùr]	[ˈdóktúr̀n]	[dokˈtuːrér]	*doktor*	‘doctor’

In contrast, some roots ending in consonants have an extra vowel in both the definite singular and the indefinite plural, was shown in (58). Importantly, these have accent 2 in the plural.

(58)	*Indef. sing.*	*Def. sing.*	*Indef. plur.*		
a.	[ˈdɒ́ːmˌ]	[ˈdɒːméǹ]	[ˈdɒ́ːmér̀]	*dam*	‘lady’
b.	[ˈjǽlp̀]	[ˈjælpéǹ]	[ˈjæ̀lpér̀]	*hjälp*	‘help’
c.	[ˈfílm̀]	[ˈfilméǹ]	[ˈfílmér̀]	*film*	‘film’

In (59), we also see a mid front vowel triggering hiatus-motivated vowel deletion. This leads to the conclusion that at least some indefinite plural forms have a suffix containing both a vowel and a rhotic. In this example, we see an unstressed low vowel deleting under hiatus when followed by a suffix mid front vowel.

(59)	*Indef. sing.*	*Def. sing.*	*Indef. plur.*		
a.	[ˈdrɒ́ːmâ]	[ˈdrɒ́ːmáǹ]	[ˈdrɒ́ːmér̀]	*drama*	‘drama’
b.	[ˈdrák̀mâ]	[ˈdrák̀máǹ]	[ˈdrák̀mér̀]	*drakma*	‘drachma’

There are, however, data suggesting that some roots take a vowel-less indefinite plural suffix. (60) shows words that add the plural and do not have a mid front vowel. One interpretation of this is that the suffix does not have a vowel underlyingly.

(60)	*Indef. sing.*	*Def. sing.*	*Indef. plur.*		
a.	[ˈskúːˌ]	[ˈskúːǹ]	[ˈskúːr̀]	*sko*	‘shoe’
b.	[ˈklúːˌ]	[ˈklúːǹ]	[ˈklúːr̀]	*klo*	‘claw’
c.	[ˈbás̀tʉ]	[ˈbás̀tʉ́ǹ]	[ˈbás̀tʉ́r̀]	*bastu*	‘sauna’
d.	[ˈlʉ́s̀tâ]	[ˈlʉ́s̀táǹ]	[ˈlʉ́s̀tár̀]	*lusta*	‘desire’

Even more interesting are the roots ending in underlying sonority reversals - i.e. *en/el/er* roots. If the vowel associated with the plural were underlyingly part of the suffix, rather than epenthetic, we would expect accent 2 here. The lack of accent 2 suggests that the root+suffix combinations in (61) have only one underlying vowel.

(61)	*Indef. sing.*	*Def. sing.*	*Indef. plur.*		
a.	[ˈmʉskél̀]	[ˈmʉskél̀n]	[ˈmʉskl̀ér̀]	*muskel*	‘muscle’
b.	[ˈfiːbér̀]	[ˈfiːbérǹ]	[ˈfiːbrér̀]	*fiber*	‘fiber’

The conclusion I draw from this discussion is that there are two classes of noun roots traditionally grouped as third declension. One class has a plural suffix with an underlying mid front vowel and the other class has a plural suffix without an underlying vowel. The former can condition accent 2, stress-shift, accent-shift and/or vowel length-shift, while the latter cannot.

3.13 Declension 3a - non-neuter

3.13.1 Monosyllables

(62) shows a typical paradigm for the first type of third declension monosyllabic roots. The plural forms have accent 2, but the singulars have accent 1, and the plural morpheme has an underlying vowel.

(62) *3a declension non-neuter monosyllabic root*

		'lady'	/UR/	[SR]
a.	indef. sing.	*dam*	dam $_{N3a}$	ˈdɒ̀ːm̀
b.	def. sing.	*damen*	dam $_{N3a}$++n $_{def}$	ˈdɒ̀ːméǹ
c.	indef. plur.	*damer*	dam $_{N3a}$+er $_{N3a\_plur}$	ˈdɒ̀ːmér̀
d.	def. plur.	*damerna*	dam $_{N3a}$+er $_{N3a\_plur}$++na $_{def\_plur}$	ˈdɒ̀ːmeɳ̀â

3.13.2 Disyllables

An interesting set of words are those of declension class 3a "shifting" roots. These have accent 2 in the singular and accent 1 in the plural. They also show stress-shift and vowel length-shift in response to suffixation.

(63) *3a declension non-neuter disyllabic root*

		'motor'	/UR/	[SR]
a.	indef.sing.	*motor*	mutur $_{N3a}$	ˈmúːtúr̀
b.	def. sing.	*motorn*	mutur $_{N3a}$++n $_{def}$	ˈmúːtúɳ̀
c.	indef.plur.	*motorer*	mutur $_{N3a}$+er $_{N3a\_plur}$	muˈtuːrér̀
d.	def. plur.	*motorerna*	mutur $_{N3a}$+er $_{N3a\_plur}$++na $_{def\_plur}$	muˈtuːréɳ̀â

The example in (63) provides some of the strongest evidence against the claim that accent 2 is lexically prespecified on the plural morpheme. What is striking about this example is that the singular has accent 2 and the plural has accent 1, despite the fact that the latter could have otherwise licensed more tones and traditional lexical tone analyses claim that the plural suffix has an underlying accent 2 toneme. In other words, the tonal pattern is exactly opposite of that normally expected. Interestingly, the presence of accent 1 on trisyllable root-suffix complexes with penultimate stress is exactly what we expect when we compare it with similar words that have three underlying vowels in the root - e.g. see (45).

An important observation about this type of word is that it has two underlying vowels and it takes a plural suffix that also has an underlying vowel. This is in contrast with examples like *månad* 'month', which have two underlying root vowels and a plural suffix with an epenthetic vowels (see (78)).

3.13.3 Polysyllables

The example in (64) has the same pattern as (63), but it has more syllables and extra underlying prosodic material. It also has a tonal pattern that is exactly opposite of that normally expected.

(64) *3a declension non-neuter polysyllabic root*

		'professor'	/UR/	[SR]
a.	indef.sing.	*professor*	pruf^{m}es^{m}ur $_{N3a}$	ˌpruf'ːésːúr̀
b.	def. sing.	*professorn*	pruf^{m}es^{m}ur $_{N3a}$++n $_{def}$	ˌpruf'ːésːúɳ̀
c.	indef.plur.	*professorer*	pruf^{m}es^{m}ur $_{N3a}$+er $_{N3a\_plur}$	ˌpruf:eˈsuːrér̀
d.	def. plur.	*professorerna*	pruf^{m}es^{m}ur$_{N3a}$+er$_{N3a_plur}$++na$_{def_plur}$	ˌpruf:eˈsuːréɳ̀â

(65) shows a similar case, but where the initial non-head foot is disyllabic instead of monosyllabic.

(65) *3a declension non-neuter polysyllabic root*

		'generator'	/UR/	[SR]
a.	indef.sing.	*generator*	jeneratur $_{N3a}$	ˌjeneˈrɒ̀ːtúr̀
b.	def. sing.	*generatorn*	jeneratur $_{N3a}$++n $_{def}$	ˌjeneˈrɒ̀ːtúǹ
c.	indef.plur.	*generatorer*	jeneratur $_{N3a}$+er $_{N3a\_plur}$	ˌjeneraˈtuːrér̀
d.	def. plur.	*generatorerna*	jeneratur $_{N3a}$+er $_{N3a\_plur}$++na $_{def\_plur}$	ˌjeneraˈtuːréɳâ

It is interesting to note the presence of secondary stress on the initial syllable in both (64) and (65). This provides us with some important information about the prosodic system that will be useful in comparing and contrasting this type of noun with other trisyllables that have accent 1 throughout the paradigm (e.g. [piˈɒːnû] *piano*), as well as words with disyllabic initial feet with secondary stress (e.g. [ˌhasiˈénd̀â] *hacienda* and [ˌpanuˈrɒ̀ːmâ] *panorama*).

3.14 Declension 3a - neuter

In (66), we see an example of a neuter 3a declension noun. These behave just as the non-neuters do. That is, there is accent 1 in the singular and accent 2 in the plural.

(66) *3a declension neuter monosyllabic root*

	wine	/UR/	[SR]
a.	vin	vin $_{N3a\_neut}$	ˈvíːǹ
b.	vinet	vin $_{N3a\_neut}$++et $_{def\_neut}$	ˈviːnét̀
c.	viner	vin $_{N3a\_neut}$+er $_{N3a\_plur}$	ˈvíːnér̀
d.	vinerna	vin $_{N3a\_neut}$+er $_{N3a\_plur}$++na $_{def\_plur}$	ˈvíːneɳâ

3.15 Declension 3a - exceptional prosody

Although there are non-neuter declension 3a words such as (63), (64) and (65) which have stress, accent and vowel length shift when concatenated with a plural suffix containing an underlying vowel, there are others that do not. These *always* have accent 1.

(67) *3a declension neuter disyllabic root with exceptional prosody*

		'hobby'	/UR/	[SR]
a.	indef.sing.	*hobby*	ho^{M}b^{m}y $_{N3a}$	ˈhobːŷ
b.	def. sing.	*hobbyn*	ho^{M}b^{m}y $_{N3a}$++n $_{def}$	ˈhobːýǹ
c.	indef.plur.	*hobbyer*	ho^{M}b^{m}y $_{N3a}$+er $_{N3a\_plur}$	ˈhobːýér̀
d.	def. plur.	*hobbyerna*	ho^{M}b^{m}y $_{N3a}$+er $_{N3a\_plur}$++na $_{def\_plur}$	ˈhobːýéɳâ

(68) *3a declension neuter trisyllabic root with exceptional prosody*

		'safari'	/UR/	/SR/
a.	indef.sing.	*safari*	safa^{M}ri $_{N3a}$	saˈfɒːrî
b.	def. sing.	*safarin*	safa^{M}ri $_{N3a}$++n $_{def}$	saˈfɒːríǹ
c.	indef.plur.	*safarier*	safa^{M}ri $_{N3a}$+er $_{N3a\_plur}$	saˈfɒːríér̀
d.	def. plur.	*safarierna*	safa^{M}ri $_{N3a}$+er $_{N3a\_plur}$++na $_{def\_plur}$	saˈfɒːríéɳâ

The example in (69) shows that although stress is usually on the penultimate syllable in disyllables, there are examples with exceptional final stress. These *always* have accent 1 throughout the paradigm. Note

that neither the stressed vowel nor the suffix vowel delete even though they have identical qualities and this results in an extra-long vowel on the surface.

(69) *3a declension neuter disyllabic root with exceptional prosody*

		'idea'	/UR/	[SR]
a.	indef.sing.	*idé*	ide^{M} $_{N3a}$	iˈdé̗ː
b.	def. sing.	*idén*	ide^{M} $_{N3a}$++n $_{def}$	iˈdéːǹ̗
c.	indef.plur.	*idéer*	ide^{M} $_{N3a}$+er $_{N3a\ plur}$	iˈdeːéŕ
d.	def. plur.	*idéerna*	ide^{M} $_{N3a}$+er $_{N3a\ plur}$++na $_{def\ plur}$	iˈdeːéŋ̗̂a

In (70) and (71), we see neuter declension 3a words with exceptional final stress. These do not undergo stress-shift, accent-shift, vowel lengthen-shift or lose either the stressed vowel or suffix vowel under hiatus. They *always* have accent 1 throughout the paradigm.

(70) *3a declension neuter disyllabic root with exceptional prosody*

		'genius'	/UR/	[SR]
a.	indef.sing.	*geni*	ɧeni^{M} $_{N3a\ neut}$	ɧeˈníː
b.	def. sing.	*geniet*	ɧeni^{M} $_{N3a\ neut}$ ++et $_{def\ neut}$	ɧeˈniːét̀
c.	indef.plur.	*genier*	ɧeni^{M} $_{N3a\ neut}$ +er $_{N3a\ plur}$	ɧeˈniːéŕ
d.	def. plur.	*genierna*	ɧeni^{M} $_{N3a\ neut}$ +er $_{N3a\ plur}$++na $_{def\ plur}$	ɧeˈniːéŋ̗̂a

(71) *3a declension neuter trisyllabic root with exceptional prosody*

		'umbrella'	/UR/	[SR]
a.	indef.sing.	*paraply*	paraply^{M} $_{N3a\ neut}$	ˌparaˈplýː
b.	def. sing.	*paraplyet*	paraply^{M} $_{N3a\ neut}$++et $_{def\ neut}$	ˌparaˈplyːét̀
c.	indef.plur.	*paraplyer*	paraply^{M} $_{N3a\ neut}$+er $_{N3a\ plur}$	ˌparaˈplyːéŕ
d.	def. plur.	*paraplyerna*	paraply^{M} $_{N3a\ neut}$ +er $_{N3a\ plur}$++na $_{def\ plur}$	ˌparaˈplyːéŋ̗̂a

3.16 Declension 3b - non-neuter

The major difference between declension 3a and 3b is in the nature of the plural morpheme. 3a has a plural with an underlying vowel, while 3b has a plural without an underlying vowel. This difference in vowel content has profound effects on the prosodification and the tone distribution.

3.16.1 Monosyllables

As we have seen, a number of roots from different declension classes that end in non-*e* surface in the plural with hiatus - both the stressed root-final and the suffix-initial vowel. However, declension 3b words do not have hiatus because the suffix does not have a vowel.

(72) *3b declension non-neuter monosyllabic root*

		'shoe'	/UR/	[SR]
a.	indef. sing.	*sko*	sku $_{N3b}$	ˈskúː̗̀
b.	def. sing.	*skon*	sku $_{N3b}$++n $_{def}$	ˈskúːǹ̗
c.	indef. plur.	*skor*	sku $_{N3b}$+r $_{N3b\ plur}$	ˈskúːr̗̀
d.	def. plur.	*skorna*	sku $_{N3b}$+r $_{N3b\ plur}$++na $_{def\ plur}$	ˈskuːŋ̗̂a

There are some third declension nouns that have what is considered by some analyses to have unexpected accent 1 in the plural. However, an important difference between disyllabic plural nouns with accent 2

and the declension 3b plural nouns with accent 1 is that the former have an underlying vowel in the post-stressed syllable and the latter have an epenthetic vowel. Recall that one of the generalizations that emerges from the data above is that epenthetic vowels are *never* associated with accent 2.

(73) *3b declension non-neuter monosyllabic root*

		'Slav'	/UR/	[SR]
a.	indef.sing.	*slav*	slav $_{\text{N3b}}$	ˈslɒ́:v̀
b.	def. sing.	*slaven*	slav $_{\text{N3b}}$++n $_{\text{def}}$	ˈslɒ:vé̲ǹ
c.	indef.plur.	*slaver*	slav $_{\text{N3b}}$+r $_{\text{N3b\_plur}}$	ˈslɒ:vé̲r̀
d.	def. plur.	*slaverna*	slav $_{\text{N3b}}$+r $_{\text{N3b\_plur}}$++na $_{\text{def\_plur}}$	ˈslɒ:vé̲ɳâ

3.16 Disyllables

Declension class 3b roots with two underlying vowels have accent 2 across the paradigm. Note that the lack of hiatus in the plural forms is part of the motivation for analyzing these as a declension class distinct from 3a.

(74) *3b declension non-neuter disyllabic root*

		'sauna'	/UR/	[SR]
a.	indef.sing.	*bastu*	bastʉ $_{\text{N3b}}$	ˈbás̀tʉ̂
b.	def. sing.	*bastun*	bastʉ $_{\text{N3b}}$++n $_{\text{def}}$	ˈbás̀tʉ́ǹ
c.	indef.plur.	*bastur*	bastʉ $_{\text{N3b}}$+r $_{\text{N3b\_plur}}$	ˈbás̀tʉ́r̀
d.	def. plur.	*basturna*	bastʉ $_{\text{N3b}}$+r $_{\text{N3b\_plur}}$++na $_{\text{def\_plur}}$	ˈbás̀tʉɳâ

(75) *3b declension non-neuter disyllabic root*

		'desire'	/UR/	[SR]
a.	indef.sing.	*lusta*	lʉsta $_{\text{N3b}}$	ˈlʉ́s̀tâ
b.	def. sing.	*lustan*	lʉsta $_{\text{N3b}}$++n $_{\text{def}}$	ˈlʉ́s̀táǹ
c.	indef.plur.	*lustar*	lʉsta $_{\text{N3b}}$+r $_{\text{N3b\_plur}}$	ˈlʉ́s̀tár̀
d.	def. plur.	*lustarna*	lʉsta $_{\text{N3b}}$+r $_{\text{N3b\_plur}}$++na $_{\text{def\_plur}}$	ˈlʉ́s̀taɳâ

There are also some 3b declension nouns that have predictable final stress due to heavy final syllables. This final heavy syllable attracts stress (see Rice (2006b) for an analysis of similar data in Norwegian), and these words have accent 1 throughout the paradigm.

(76) *3b declension non-neuter disyllabic root*

		'finance'	/UR/	[SR]
a.	indef.sing.	*finans*	finans $_{\text{N3b}}$	fiˈnáns̀
b.	def. sing.	*finansen*	finans $_{\text{N3b}}$++n $_{\text{def}}$	fiˈnansé̲ǹ
c.	indef.plur.	*finanser*	finans $_{\text{N3b}}$+r $_{\text{N3b\_plur}}$	fiˈnansé̲r̀
d.	def. plur.	*finanserna*	finans $_{\text{N3b}}$+r $_{\text{N3b\_plur}}$++na $_{\text{def\_plur}}$	fiˈnansé̲ɳâ

(77) *3b declension non-neuter disyllabic root*

		'pitcher'	/UR/	[SR]
a.	indef.sing.	*karaff*	karaf^{m} $_{\text{N3b}}$	kaˈráf:̀
b.	def. sing.	*karaffen*	karaf^{m} $_{\text{N3b}}$++n $_{\text{def}}$	kaˈraf:é̲ǹ
c.	indef.plur.	*karaffer*	karaf^{m} $_{\text{N3b}}$+r $_{\text{N3b\_plur}}$	kaˈraf:é̲r̀
d.	def. plur.	*karafferna*	karaf^{m} $_{\text{N3b}}$+r $_{\text{N3b\_plur}}$++na $_{\text{def\_plur}}$	kaˈraf:é̲ɳâ

Finally, there are also 3b declension nouns that have penultimate stress and accent 2 in the singular, and antepenultimate stress and accent 2 in the plural. These words clearly show the lack of an underlying vowel in the declension 3b plural. It is exactly this lack of an underlying vowel in the plural that distinguishes these from examples like *motor*, which undergo stress-shift, accent-shift and vowel length-shift under plural suffixation (see (63)).

(78) *3b declension non-neuter disyllabic root*

		'month'	/UR/	[SR]
a.	indef.sing.	*månad*	monad $_{N3b}$	ˈmóːnád̀
b.	def. sing.	*månaden*	monad $_{N3b}$++n $_{def}$	ˈmóːnad̲ɛ́ǹ
c.	indef.plur.	*månader*	monad $_{N3b}$+r $_{N3b\_plur}$	ˈmóːnad̲ɛ́r̀
d.	def. plur.	*månaderna*	monad $_{N3b}$+r $_{N3b\_plur}$++na $_{def\_plur}$	ˈmóːnad̲ɛ́ɳâ

A very important observation about these is that the second high-low sequence of tones appears in three different positions depending on the number of syllables in the word. It can even appear on the third syllable from the main stress. This is a detail about the tonal system of the language that is hidden by standard shorthand transcriptions.

3.16.3 en/el/er

In (79), we see another reason to suppose that not all third declension plurals have an underling vowel. In those contexts where an epenthetic vowel would suffice, we find accent 1 throughout the paradigm.

(79) *3b declension non-neuter* en/el/er *monosyllabic root*

		'rule'	/UR/	[SR]
a.	indef.sing.	*regel*	regl $_{N3b}$	ˈreːgɛ̀l
b.	def. sing.	*regeln*	regl $_{N3b}$++n $_{def}$	ˈreːgɛ́lǹ
c.	indef.plur.	*regler*	regl $_{N3b}$+r $_{N3b\_plur}$	ˈreːglɛ́r̀
d.	def. plur.	*reglerna*	regl $_{N3b}$+r $_{N3b\_plur}$++na $_{def\_plur}$	ˈreːglɛ́ɳâ

3.17 Declension 3b - exceptional prosody

Both third declension plural morphemes will also get the correct result on forms with exceptional prosodic structure. I assume a minimal lexical storage strategy for concreteness and assign these words to declension class 3b instead of 3a.

(80) *3b declension non-neuter disyllabic root with exceptional prosody*

		'nation'	/UR/	[SR]
a.	indef.sing.	*nation*	natɧo^{M}n $_{N3b}$	natˈɧóːǹ
b.	def. sing.	*nationen*	natɧo^{M}n $_{N3b}$++n $_{def}$	natˈɧoːnɛ́ǹ
c.	indef.plur.	*nationer*	natɧo^{M}n $_{N3b}$+r $_{N3b\_plur}$	natˈɧoːɛ́r̀
d.	def. plur.	*nationerna*	natɧo^{M}n $_{N3b}$+r $_{N3b\_plur}$++na $_{def\_plur}$	natˈɧoːnɛ́ɳâ

3.18 Irregular nouns

Thus far, I have described the stress and tone distribution of regular nouns that have a single root stored in the lexicon. However, there are several nouns that have roots with lexical allomorphy - one singular root and one plural root. Since the plural forms are underlyingly specified for plural, a separate plural marker is not added. Irregular nouns come in many shapes and sizes. Only a sample is given below.

3.18.1 Exceptional gemination

Since the vast majority of monosyllabic nouns do not undergo vowel/consonant duration alternations in the presence of the plural suffix, the example in (81) stands out as exceptional. I analyze this as a non-plural root with no underlyingly moraic consonant and a plural root with a moraic consonant.

(81) *Irregular noun with exceptional gemination*

		'goat'	/UR/	[SR]
a.	indef.sing.	*get*	jet $_{N3b}$	ˈjéːt̀
b.	def. sing.	*geten*	jet $_{N3b}$++n $_{def}$	ˈjeːt̲é̲ǹ
c.	indef.plur.	*getter*	jet^{m}r $_{N3b\ plur}$	ˈjetː̲é̲r̀
d.	def. plur.	*getterna*	jet^{m}r $_{N3b\ plur}$++na $_{def\ plur}$	ˈjetː̲é̲n̲â

3.18.2 Exceptional vowel mutations

Some nouns have plural forms with unexpected vowels. (82) has a back stressed vowel in the singular and a front stressed vowel in the plural. While there may be historical reasons for this alternation, there is no evidence in the modern language to suggest a synchronic umlauting process.

(82) *Irregular noun with exceptional vowel mutation*

		'duck'	/UR/	[SR]
a.	indef.sing.	*and*	and $_{N3b}$	ˈándˋ
b.	def. sing.	*anden*	and $_{N3b}$++n $_{def}$	ˈandé̲ǹ
c.	indef.plur.	*änder*	ændr $_{N3b\ plur}$	ˈændé̲r̀
d.	def. plur.	*änderna*	ændr $_{N3b\ plur}$++na $_{def\ plur}$	ˈændé̲n̲â

Unlike (82), the following two examples have accent 2 in at least part of the paradigm. (83) has two underlying vowels and accent 2 only in the singular, whereas (84) has two underlying vowels and accent 2 in both the singular and plural. (84) also has extra segmental material in the plural. Importantly, (83) has accent 2 in the singular and accent 1 in the plural. This is somewhat difficult to reconcile with an analysis making use of an accent 2 toneme on a plural suffix.

(83) *Irregular noun with exceptional vowel mutation*

		'father'	/UR/	[SR]
a.	indef.sing.	*fader*	fader $_{N3b}$	ˈfɒ̀ːdér̀
b.	def. sing.	*fadern*	fader $_{N3b}$++n $_{def}$	ˈfɒ̀ːdéǹ̲
c.	indef.plur.	*fäder*	fædr $_{N3b\ plur}$	ˈfæːdé̲r̀
d.	def. plur.	*fäderna*	fædr $_{N3b\ plur}$++na $_{def\ plur}$	ˈfæːdé̲ǹ̲â

(84) *Irregular noun with exceptional vowel mutation*

		'mother'	/UR/	[SR]
a.	indef.sing.	*moder*	muder $_{N2}$	ˈmúːdér̀
b.	def. sing.	*modern*	muder $_{N2}$++n $_{def}$	ˈmúːdéǹ̲
c.	indef.plur.	*mödrar*	mødrar $_{N2\ plur}$	ˈmø̀ːdrár̀
d.	def. plur.	*mödrarna*	mødrar $_{N2\ plur}$++na $_{def\ plur}$	ˈmø̀ːdraǹ̲â

3.18.3 Exceptional gemination and mutation

There are even nouns that have both gemination and mutation. These have accent 1 throughout the paradigm.

(85) *Irregular noun with exceptional gemination and vowel mutation*

		'root'	/UR/	[SR]
a.	indef.sing.	*rot*	rut $_{N3b}$	ˈrú:t̀
b.	indef.plur.	*roten*	rut $_{N3b}$++n $_{def}$	ˈru:t̲é̲ǹ
c.	def. sing.	*rötter*	røt^{m}r $_{N3b\_plur}$	ˈrøt:é̲r̀
d.	def. plur.	*rötterna*	røt^{m}r $_{N3b\_plur}$++na $_{def\_plur}$	ˈrøt:é̲n̲â

3.18.4 Plural augmentation - exceptional 'eyes' and 'ears'

The words for 'eye' and 'ear' are often described as being exceptional fourth declension. Their classification as fourth declension is a result of the indefinite plurals ending in *-n*. However, the fact that the definite plural form ends in *-en* clearly places these words into fifth declension. The exceptional *on* form of the plurals is the result of root storage. These have two underlying vowels in the root-suffix complex and accent 2 throughout the paradigm.

(86) *Irregular noun with exceptional plural augmentation*

		'eye'	/UR/	[SR]
a.	indef.sing.	*öga*	øga $_{N5\_neut}$	ˈø̂:gâ
b.	indef.plur.	*ögat*	øga $_{N5\_neut}$++e̲t $_{def\_neut}$	ˈø̂:gát̀
c.	def. sing.	*ögon*	øgun $_{N5\_neut\_plur}$	ˈø̂:gúǹ
d.	def. plur.	*ögonen*	øgun $_{N5\_neut\_plur}$++en $_{def\_plur\_N5}$	ˈø̂:gunéǹ

(87) *Irregular noun with exceptional plural augmentation*

		'ear'	/UR/	[SR]
a.	indef.sing.	*öra*	øra $_{N5\_neut}$	ˈø̂:râ
b.	indef.plur.	*örat*	øra $_{N5\_neut}$++e̲t $_{def\_neut}$	ˈø̂:rát̀
c.	def. sing.	*öron*	ørun $_{N5\_neut\_plur}$	ˈø̂:rúǹ
d.	def. plur.	*öronen*	ørun $_{N5\_neut\_plur}$++en $_{def\_plur\_N5}$	ˈø̂:runéǹ

An interesting difference between (86) and (87) on the one hand and some other words with final vowels followed by clitics containing underlying vowels on the other hand is that the clitic vowel deletes in (86) and (87). This only happens when the first vowel is low and the second vowel is "e". We saw similar behavior in words such as *panoramat* 'the panorama'.

3.18.5 Exceptional vowel deletion

Some roots ending in Vn, Vl, Vr, where the vowel is not a mid front vowel, delete this vowel in the plural. Following the general analysis proposed above, this is also due to lexical allomorphy. Examples are given in (88) and (89). These have two underlying vowels in both roots and accent 2 throughout the paradigm.

(88) *Irregular noun with exceptional vowel deletion*

		'evening'	/UR/	[SR]
a.	indef.sing.	afton	afton $_{N2}$	ˈáf̀tóǹ
b.	def. sing.	aftonen	afton $_{N2++n\ def}$	ˈáf̀tonéǹ
c.	indef.plur.	aftnar	aftnar $_{N2\ plur}$	ˈáf̀tnár̀
d.	def. plur.	aftnarna	aftnar $_{N2\ plur++na\ def\ plur}$	ˈáf̀tnaɳ̀â

(89) *Irregular noun with exceptional vowel deletion*

		'summer'	/UR/	[SR]
a.	indef.sing.	sommar	som^{m}ar $_{N2}$	ˈsóm̀:ár̀
b.	def. sing.	sommarn	som^{m}ar $_{N2++n\ def}$	ˈsóm̀:áɳ̀
c.	indef.plur.	somrar	somrar $_{N2\ plur}$	ˈsóm̀rár̀
d.	def. plur.	somrarna	somrar $_{N2\ plur++na\ def\ plur}$	ˈsóm̀raɳ̀â

3.18.5 Exceptional singular and plural augmentation

Some roots have a vowel in the singular that is absent in the plural. Following the general analysis proposed above, this is also due to lexical allomorphy. An example is given in (90). These have two underlying vowels in both roots and accent 2 throughout the paradigm.

(90) *Irregular noun with exceptional singular and plural augmentation*

		'bolt'	/UR/	[SR]
a.	indef.sing.	*regel*	regel $_{N2}$	ˈré̗:gél̀
b.	def. sing.	*regeln*	regel $_{N2++n\ def}$	ˈré̗:gélǹ
c.	indef.plur.	*reglar*	reglar $_{N2\ plur}$	ˈré̗:glár̀
d.	def. plur.	*reglarna*	reglar $_{N2\ plur++na\ def\ plur}$	ˈré̗:glaɳ̀â

3.19 Interim summary and discussion

This concludes the description of Swedish noun inflection. There are 12 types of nouns defined by a combination of underlying specification for gender and declension. There are two genders - neuter and non-neuter, and there are seven possible underlying specifications for declension - including no underlying specification. There is only one suffix that specifies only declension, and that suffix attaches to underlyingly declensionless roots. It defines what is typically called weak first declension. There are five suffixes that encode both plurality and different declensions. There are two definite singular clitics that differ in gender. There are two definite plural clitics, one of which is specific to fifth declension. This is summarized in (91).

(91) *Noun inflectional morphology*

Underlying gender and declension	Surface gender and declension	Indefinite singular suffix	Indefinite plural suffix	Definite singular clitic	Definite plural clitic
---	N1	+a	+ur	++n	++na
N1	N1	---	+ur	++n	++na
N2	N2	---	+ar	++n	++na
N3a	N3a	---	+er	++n	++na
N3b	N3b	---	+r	++n	++na
N4	N4	---	---	++n	++na
N5	N5	---	---	++n	++en
Neuter N2	Neuter N2	---	+ar	++et	++na
Neuter N3a	Neuter N3a	---	+er	++et	++na
Neuter N3b	Neuter N3b	---	+r	++et	++na
Neuter N4	Neuter N4	---	+n	++et	++na
Neuter N5	Neuter N5	---	---	++et	++en

In addition to regular nouns, which have a single underlying root, the language has a range of irregular nouns that have lexical allomorphy distinguishing singular roots from plural roots. A sample is given in (92).

(92) *Sample of irregular nouns*

Singular to plural root difference	Singular root	Indefinite singular	Definite singular		Plural root	Indefinite plural	Definite plural
Gemination	/jet/	ˈjéːt̀	ˈjeːténˀ		/jet^{m}r/	ˈjetːérˀ	ˈjetːénd̨â
Mutation	/and/	ˈándˀ	ˈandénˀ		/ændr/	ˈændérˀ	ˈændénd̨â
Mutation	/fader/	ˈfɒ̀ːdérˀ	ˈfɒ̀ːdénˀ		/fædr/	ˈfæːdérˀ	ˈfæːdénd̨â
Gemination and mutation	/rut/	ˈrúːt̀	ˈruːténˀ		/røt^{m}r/	ˈrøtːérˀ	ˈrøtːénd̨â
Plural augmentation	/øga/	ˈǿːgâ	ˈǿːgát̀		/øgun/	ˈǿːgúnˀ	ˈǿːgunénˀ
Mutation and plural augmentation	/muder/	ˈmúːdérˀ	ˈmúːdénˀ		/mødrar/	ˈmǿːdrárˀ	ˈmǿːdrand̨â
Deletion and plural augmentation	/afton/	ˈáftónˀ	ˈáftonénˀ		/aftnar/	ˈáftnárˀ	ˈáftnand̨â
Deletion and plural augmentation	/som^{m}ar/	ˈsómːárˀ	ˈsómːánˀ		/somrar/	ˈsómrárˀ	ˈsómrand̨â
Singular and plural augmentation	/regel/	ˈréːgélˀ	ˈréːgélnˀ		/reglar/	ˈréːglárˀ	ˈréːgland̨â

As far as stress, pitch accent and tone distribution are concerned, we have seen evidence for 19 important generalizations regarding nouns in citation context in this dialect (grouped by relatedness):

1. Definite article clitics *never* affect stress placement or pitch accent.
2. Definite article clitics *always* affect tone distribution.

3. Plural suffixes without underlying vowels *never* affect stress placement or pitch accent.
4. Plural suffixes without underlying vowels *always* affect tone distribution.
5. Plural suffixes with underlying vowels *sometimes* cause stress-shift, accent-shift from accent 1 to accent 2, and/or accent-shift from accent 2 to accent 1.

6. Plural suffixes with underlying vowels *always* affect tone distribution.

7. Words with final stress *always* have accent 1 throughout the paradigm.
8. Words with penultimate stress *usually* have accent 2 throughout the paradigm.
9. Words with antepenultimate stress *usually* have accent 1 in the plural.
10. Words with pre-antepenultimate stress *usually* have accent 1 in the plural.

11. The segmental association of tones can differ nontrivially, but predictably, from context to context.

12. There is *always* at least one high-low tone sequence.
13. There is *always* a high-low tone sequence associated with the final syllable.[20]

14. Monosyllables *always* have accent 1.
15. Polysyllables with accent 1 *always* have a high tone on the post-stressed syllable *and* every following syllable.
16. Polysyllables with accent 1 *never* have tone on the stressed syllable.

17. Words with accent 2 *always* have a high-low tone sequence on the stressed syllable.
18. Words with accent 2 *never* have tone on a post-stressed syllable unless it is final (excluding cases of compound accent 2).

19. Trisyllables with penultimate stress and a light first syllable *always* have accent 1.

It is telling that most of these generalizations are of the "always" or "never" sort. In fact, there are just four generalizations showing variation:

5. Plural suffixes with underlying vowels *sometimes* cause stress-shift, accent-shift from accent 1 to accent 2, and accent-shift from accent 2 to accent 1.
8. Words with penultimate stress *usually* have accent 2 throughout the paradigm.
9. Words with antepenultimate stress *usually* have accent 1 in the plural.
10. Words with pre-antepenultimate stress *usually* have accent 1 in the plural.

Generalizations 9 and 10 are actually related, and they have only a single type of exception - words like *månad* ([ˈmóː̀.nád̀], [ˈmóː̀.na.dé̲̀r], [ˈmóː̀.na.dé̲.ɳâ]). All other words with antepenultimate stress in the plural behave like *hobby* ([ˈhob.ːŷ], [ˈhob.ːý.ér̀], [ˈhob.ːý.é.ɳâ]) with accent 1 throughout the paradigm or *motor* ([múː̀.túr̀], [mu.tuː.rér̀], [mu.tuː.ré.ɳâ]) with stress-shift and accent-shift. What makes the *månad*-type words stand out from the others is that they have two underlying vowels in the root and an epenthetic vowel in the plural. Since epenthetic vowels never affect pitch accent or stress, stress and pitch accent 2 remain predictably fixed in exactly this environment.

Words with penultimate stress and accent 1 throughout the paradigm (i.e. generalization 8) fall into three classes:

- Those with only one underlying vowel in the root-suffix complex (e.g. *slav*, *slave̲n*, *slave̲r*, *slave̲rna* 'Slav' and *rege̲l*, *regeln*, *regle̲r*, *regle̲rna* 'rule'),
- Those with an open antepenultimate syllable (e.g. *piano*, *pianot*, *pianon*, *pianona* 'piano'), and

[20] Strictly speaking, this is not true. There is a great deal of intra-speaker variation in the presence and realization of the final low tone. This variation is partially due to the truncation of final pitch excursions when the final consonant is voiceless. However, some of the variation seems to be more random in nature and perhaps dependent on both speech rate and intonation context. In the data that I collected, the consultant sometimes had a list-intonation or "teacher" intonation, which resulted in a final high tone instead of low tone. Such variation is not unexpected given the phonetic and intonation contexts involved.

- Those that are truly exceptional (e.g. *hobby*, *hobbyn*, *hobbyer*, *hobbyerna* 'hobby').

Further, these usually fall into one of four "exceptional" categories: a) proper name, b) borrowing, c) root with an underlying sonority reversal, and d) lexicalized compound.

Finally, the variation found in generalization 5 (i.e. the presence or absence of stress-shift and accent-shift) has already been addressed. Words that undergo stress-shift and accent-shift from accent 2 to accent 1 have an unexceptional root with two underlying vowels and a plural suffix with an underlying vowel, e.g. *motor* ([mú͡ː.túr], [mu.tuː.rér], [mu.tuː.ré.ɳâ]). All other words have static stress and either no accent shift or a shift from accent 1 to accent 2 under plural suffixation.

It should be clear from this summary and discussion that there is little in the data suggesting the need for the lexical prespecification of either "accent 2" or "accent 1". The distribution of tones is perfectly predictable in most cases. The only words that are not accounted for directly via morphophonological generalizations are disyllabic words like *hobby*. While most disyllabic roots with two underlying vowels have accent two in the indefinite singular, the truly exceptional disyllables have accent 1. Does this mean that these have a lexical pitch accent? The answer that I propose is no.

Recall that although stress is often predictably located (i.e. derived by rule), there are at least two contexts in which it is not. There are words with exceptional final stress, such as *idé* 'idea' and *geni* 'genius' and words with exceptional antepenultimate stress, such as *kamera* 'camera' and *domino* 'domino'. In both of these contexts, exceptional stress goes hand-in-hand with accent 1 (recall generalizations 7 and 9). While accent 1 might be expected in cases with final stress because a single syllable never licenses a double-peak pitch accent in this language, its presence in cases with exceptional antepenultimate stress warrants an explanation. In fact, it appears as if the mechanism that accounts for exceptional stress restricts the distribution of tones such that only accent 1 is licit.

This linking of exceptional stress (i.e. lexical specification of prosodic structure) gives us a natural means of distinguishing between those disyllables with accent 2 and those with accent 1. If prosodic structure (i.e. "stress") can be stored lexically on final and antepenultimate syllables - and result in accent 1, what would happen if that same prosodic structure were stored on penultimate syllables? Given that lexical stress results in accent 1 on final and most antepenultimate syllables - *without exception*, then one would expect that lexical stress on penultimate syllables would also result in accent 1.

Accent 2 on disyllabic words is always predictable and due to rule application, as is accent 1 on many disyllabic words. However, those disyllables with exceptional/lexically stored prosodic structure have accent 1. There are no lexical tones involved and there are no *ad hoc* mechanisms needed. This account only makes use of independently motivated tools and applies them to all relevant contexts.

4. Representational analysis of predictable prosodification

This section provides a representational analysis of those words with predictable prosodification and tone distribution - i.e. words without underlying stress/prosodic structure. However, before providing an analysis, it is important to discuss one's assumptions about how one builds prosodic representations higher than the syllable and why particular representations are chosen over others in a given analysis of a given language. For this purpose, I will present what I consider the default prosodification of CVCV (disyllabic), CVCVCV (trisyllabic) and CVCVCVCV (quandrisyllabic) words in Swedish. "Default prosodification" here refers to what happens to forms on the surface (i.e. output of the phonological computation) when they have no underlying prosodic structure. The main evidence I use for determining what words display default prosodification and what words display underlying prosodification comes from stress-shift and accent-shift patterns discussed in section 3, as well as the generalizations discussed in section 3.19.

Stress-shift and accent-shift occur in Swedish when an inflectional suffix containing an underlying vowel is added to some words. As is the case in other languages, I assume that words that are susceptible to stress-shift show default prosodification, while those that resist stress-shift in the same context have underlying prosodification to which one must be faithful on the surface. Examples of Swedish words

demonstrating stress-shift, accent-shift and sometimes vowels quality/quantity-shift under inflectional suffixation are repeated in (93).

(93) *Stress-shift and/or accent-shift (and vowel quality/quantity-shift) under affixation in Swedish*

a. Monosyllabic root - s-accent 1 to ss-accent 2

[ˈdɒ́ːm̀]	-->	[ˈdɒ̂ːmér̀]
dam		damer
'lady'		'ladies'

b. Disyllabic root - ss-accent 2 to sss-accent 1

[ˈmú̀ːtúr̀]	-->	[muˈtuːrér̀]
motor		motorer
'engine'		'engines'

c. Trisyllabic root - sss-accent 2 to ssss-accent 1

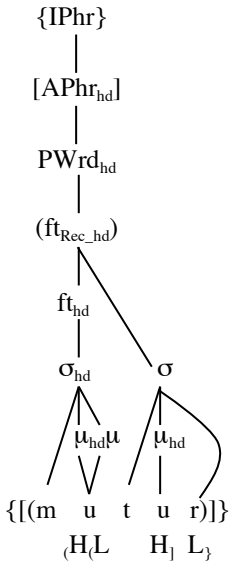
[ˌprufˈːé̀ːsúr̀]	-->	[ˌpruːfeˈsuːrér̀]
professor		professorer
'professor'		'professors'

d. Quadrasyllabic root - ssss-accent 2 to sssss-accent 1

[ˌjeneˈrɒ̂ːtúr̀]	-->	[ˌjeneraˈtuːrér̀]
generator		generatorer
'generator'		'generators'

Let us begin with CVCV inputs. These have default penultimate stress and accent 2 in the singular. I propose that underlyingly unprosodified CVCV inputs prosodify into a structural uneven trochee where the head is a bimoraic minimal foot and this merges with the post-stressed syllable to form a recursive foot. This is schematized in (94).

(94) [ˈmú̀ːtúr̀] motor 'engine'



There is nothing particularly surprising about this representation. Making use of foot structure in analyzing North Germanic pitch accent has been done before, albeit for different reasons and with different results (e.g. Lorentz 1995). Assigning and aligning "lexical" tones to the edges of prosodic constituents in lexical tone languages has also yielded positive results (e.g. Thai - Morén and Zsiga 2006).

And, recursive feet are also nothing new, as they are reminiscent of both "superfeet" and other types of recursive prosodic structure (e.g. Rice 1992, van Oostendorp 1995, Davis 2005, Itô and Mester 2010, Martínez-Paricio 2012). For expositional purposes, I will refer to the "superfeet" of General Götaland Swedish as "recursive feet" and use a "$_{Rec}$" subscript in the proposed representations, as shown in (94).

There are a number of options for how to formalize this recursive foot and to make reference to it in the grammatical computation. Because space considerations preclude a full discussion here, I will simply state that a "minimal foot" does not dominate another foot, where a "recursive foot" does. Since these are two different structural descriptions, the shorthand subscript notation is not a diacritic. Rather, it indicates different, but related, structures.

Note that I allow only maximally binary branching above the syllable, and I assume a prosodic hierarchy with at least six levels. What these levels are called is ultimately immaterial and dependent on the particular theory being used. For concreteness, I call these mora (m), syllable (s), foot (ft), prosodic word (PWrd), accent phrase (APhr)[21], and intonation phrase (IPhr). However, they could just as well have been called A, B, C, D, E and F. What is important is that they are different categories with different behaviors.

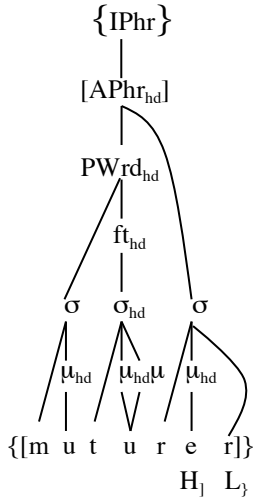
The brackets in (94) and the rest of the examples are a notational device used to illustrate the edges of prosodic structures relevant to the analysis of tones in this paper. They are not used here as phonological structures in and of themselves.[22] I propose that this dialect of Swedish makes use of at least four types of tones to mark the edges of prosodic constituents in citation intonation context. There is a high tone at the right edge of the accent phrase, a low tone at the right edge of the intonation phrase, and both a high and low tone at the left edge of the recursive foot. These tones are not underlying, but arise on the surface. As we see in (94), a CVCV input will surface with accent 2, where the high and low recursive foot tones are associated with the segmental material of the head of that foot, and the high and low right-boundary tones are associated with the final syllable.

When a suffix with an underlying vowel is added, stress shifts one syllable to the right and results in accent 1. I propose that this is because the unfooted syllable preceding the main stress merges first to form a prosodic word. This blocks the building of an uneven trochee/recursive foot, and the post-stressed syllable is left to attach higher in the prosodic structure. This is shown in (95).

[21] There is a significant literature referring to levels of prosodic representation relevant to tone between the prosodic word and the intonation phrase. For example, "accent phrase", "accent group", "tone group" and "tonal feet" are found in the literature (e.g. Leben 1978, Selkirk 1984, Hyman 1987, Pierrehumbert and Beckman 1988, Hayes and Lahiri 1991, Creissels and Grégoire 1993, House and Hawkins 1995, Cassimjee and Kisseberth 1997, Leben 1997, Local and Ogden 1997).

[22] Thus, they are not to be confused with the brackets of, for example, Idsardi (1992).

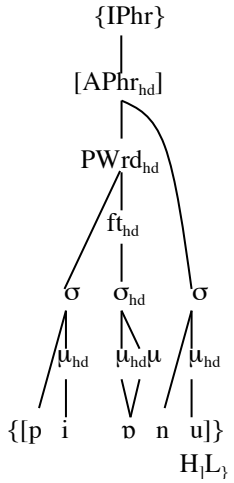
(95) [muˈtuːrér̀] motorer 'engines'



Although one might suggest that the final syllable attaches to a recursive prosodic word (in parallel with the recursive foot), we will see below that that option has difficulties accounting for the presence and position of some of the tones. Instead, I attach it to some higher level and I call that the accent phrase for concreteness. Thus, the lack of a recursive foot means that there are two fewer tones in (95) than in (94). That is, we see accent 1 instead of accent 2.

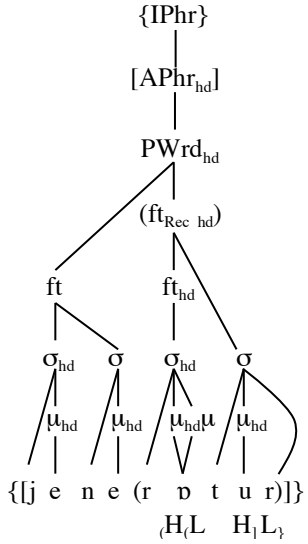
This representation works equally well for all trisyllabic roots without underlying prosodic structure, as shown in (96). These *always* have penultimate stress and accent 1.

(96) [piˈɒːnû] piano 'piano'



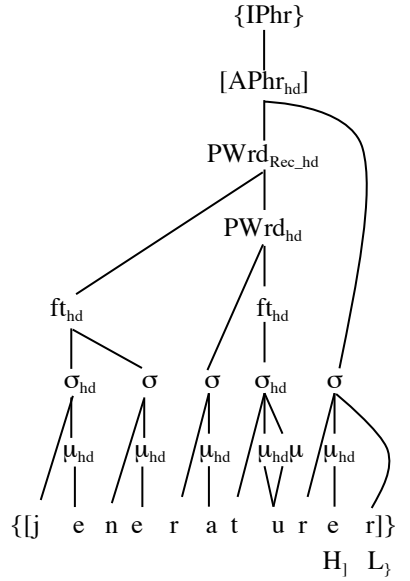
CVCVCVCV inputs have default penultimate main stress, secondary stress on the initial syllable, and accent 2. When an appropriate suffix is added, stress shifts one syllable to the right and results in accent 1. As (97) shows, I propose that the two initial syllables form a disyllabic foot and this blocks the merger of the peninitial syllable directly with the penult to form a prosodic word. This leaves the penult to merge with the following syllable into an uneven trochee/recursive foot. The initial non-head foot and the head foot merge into a prosodic word, and required accent phrase and intonation phrase structure is built on top of the word. There are four surface tones indicating three prosodic constituent edges and corresponding to accent 2.

(97) [ˌjeneˈrɒːtúr̀] generator 'generator'



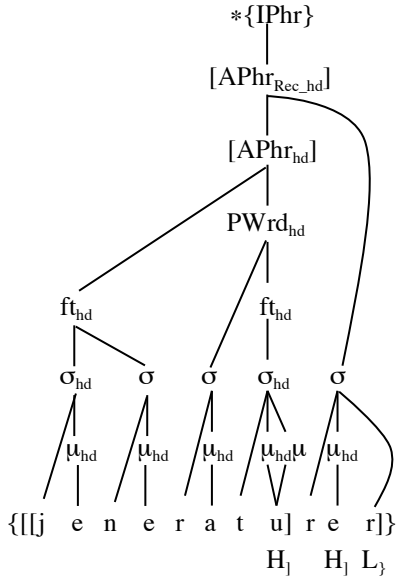
As was the case with (95), and expected under this analysis, the addition of a suffix with an underlying vowel causes stress-shift, accent-shift and vowel length-shift. This is shown in (98).

(98) [ˌjeneraˈtuːrér̀] generatorer 'generators'



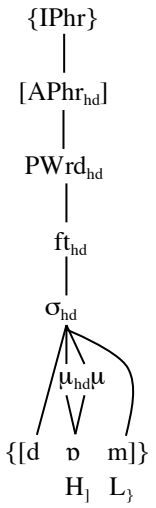
The first two syllables form a disyllabic foot and merge with the minimal prosodic word to form a recursive prosodic word. We know that it does not merge to form an accent phrase because of the tonal distribution. The current analysis ensures that only a single high tone appears in the last syllable. If the initial foot were to attach at the accent phrase level, one would expect the stressed syllable to also have a high tone. See (108d) for such an example.

(99) *Incorrect prosodification* - *[ˌjeneraˈtuːréɾ] generatorer 'generators'



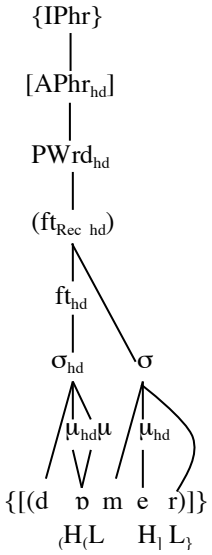
Finally, CV(C) inputs surface as might be expected given (94) through (98). There is prosodification without the need for a recursive foot - i.e. no uneven trochee. Thus, the surface form has accent 1 - i.e. just the prosodic phrase and intonation phrase right boundary tones.

(100) [ˈdɒ́ːm̀] dam 'lady'

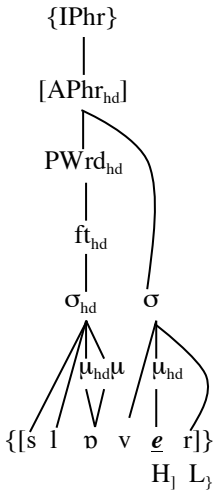


If we add a plural suffix with an underlying vowel, then we get the expected penultimate stress and accent-shift from accent 1 to accent 2. However, if we add a suffix without an underlying vowel, then the word remains accent 1. The analysis I propose for the latter is that epenthetic vowels do not prosodify into the foot. That is, they do not condition recursive foot formation. This difference between underlying and epenthetic vowel behavior is shown in (101). Although the syllable containing the epenthetic vowel could be prosodified into the prosodic word in (101b), I have attached it higher in anticipation of data to come.

(101) a. [ˈdɒ̏̀:mér̀] damer 'ladies'

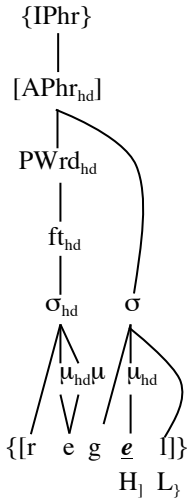


b. [ˈslɒ:vér̀] slaver 'Slavs'



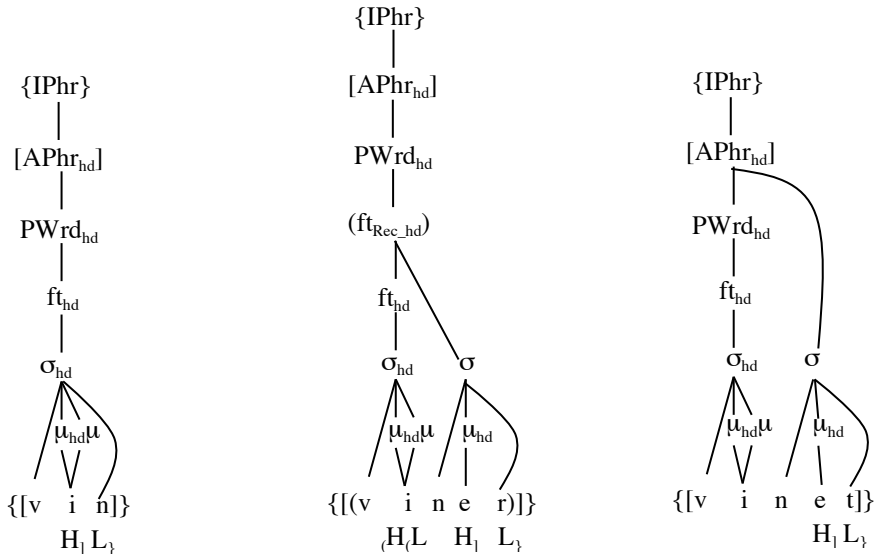
There are three other types of underlyingly unprosodified disyllabic words which do not surface with accent 2: 1) bare roots with an epenthetic vowel of the *en/el/er* sort, 2) accent 1 monosyllabic bases followed by a clitic, and 3) disyllables with predictable final stress. As just discussed, epenthetic vowels do not trigger recursive foot formation. Thus, bare roots with epenthetic vowels predictably have accent 1 in this analysis.

(102) [ˈre:gél̀] regel 'rule'



As mentioned in section 3.19, clitics never affect stress or pitch accent. However, they do affect tone placement. This is demonstrated in (103), where three words are compared. The first is the bare root and has accent 1. The second is a plural with two underlying vowels and accent 2. The third is the definite singular and has accent 1 despite there being an underlying vowel in both the root and the clitic.

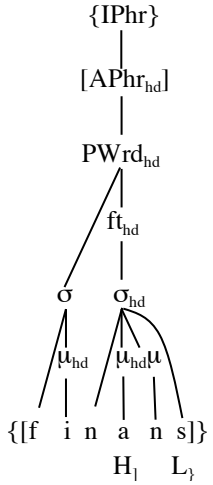
(103) a. [ˈvíːǹ] vin 'wine' b. [ˈvíːnér̀] viner 'wines' c. [ˈviːnét̀] vinet 'the wine'



These data do not suggest what the attachment site of the clitic is. It could be either the prosodic word, the accent phrase or some other level not discussed here (e.g. clitic group). For the sake of concreteness and in anticipation of data to follow, I attach the clitic higher than the prosodic word and at what I am calling the accent phrase level. It cannot be attached higher than that because the clitic displays an accent phrase boundary tone.

Finally, words with predictable final stress are those with final heavy syllables. As shown in (104), these have predictable accent 1.

(104) [fiˈnáns̀] finans 'finance'

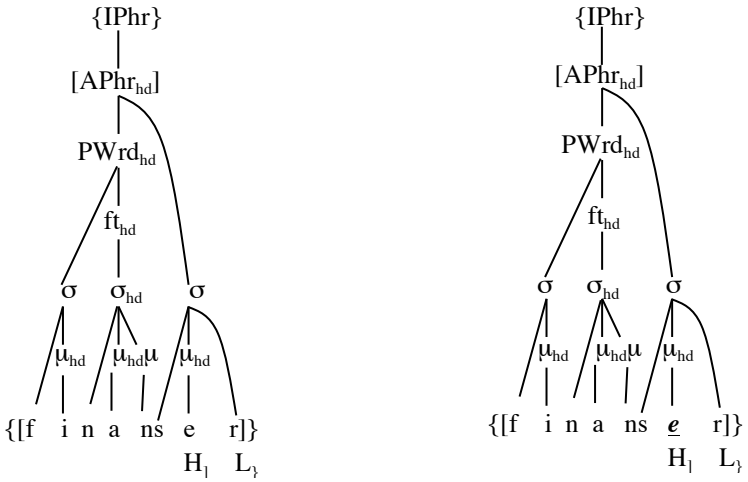


A distinguishing characteristic of these predictable final stress cases is that there is ambiguity with respect to whether they belong to declension class 3a or 3b.[23] This is because both options result in the same stress placement and tone distribution. If the declension class is 3a, then the plural morpheme has an

[23] There is also ambiguity with respect to whether or not they have predictable final stress or exceptional final stress. Both options will return the same stress and tone distribution.

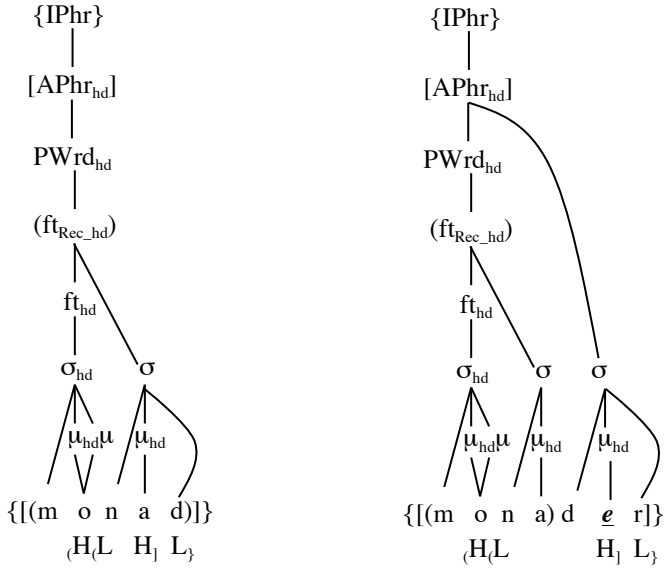
underlying vowel. While one might expect this to cause accent shift in parallel with (103), we already saw that penultimate and lone antepenultimate syllables form a prosodic word and block the formation of a recursive foot in trisyllables (recall (96) *piano*). This is demonstrated in (105a). On the other hand, if the declension class is 3b, then the epenthetic vowel of the plural is not expected to condition accent-shift (recall (101b) *slaver*). Thus, both options are available, and this might be a part of the intuition behind various attempts in the literature to unify declension 3a and 3b into a single declension class (recall section 3.12).

(105) a. [fiˈnansér̀] finanser 'finanses' b. [fiˈnansér̀] finanser 'finanses'



The final type of word to demonstrate has two underlying vowels in the root and a suffix with an epenthetic vowel. The prediction of this analysis is that they will have antepenultimate stress and accent 2. As discussed above, these do exist, and they are, in fact, the only type of underived noun in Swedish with antepenultimate stress and accent 2.

(106) a. [ˈmóːnád̀] månad 'month' b. [ˈmóːnadér̀] månader 'months'

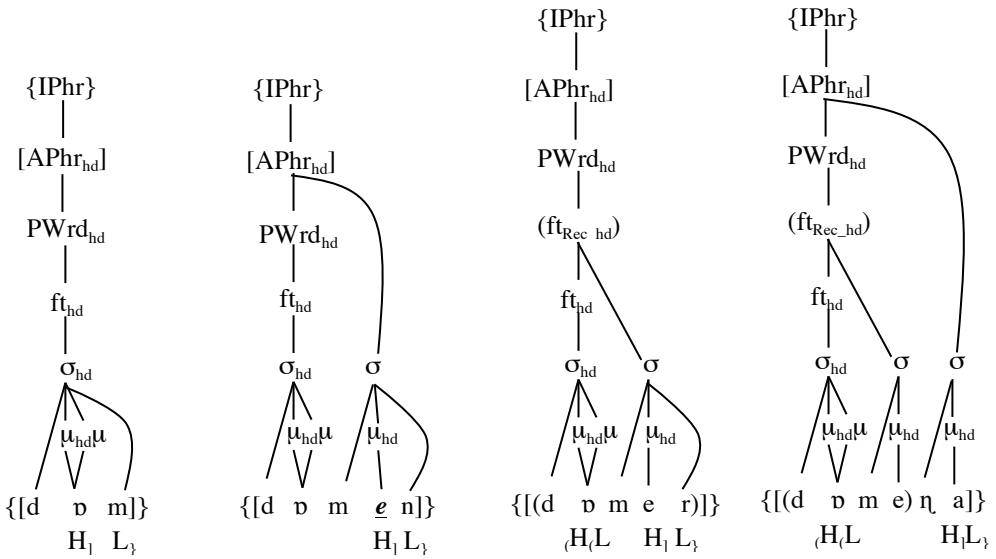


Before moving on to exceptional stress/accent 1, it is vital to demonstrate the inertness of definite clitics on both stress and accent for the full range of root types discussed thus far. This is because the tonal realization of accent 1 and accent 2 is not static across contexts, and the clitic environment often provides important clues regarding higher-level prosodic structure, as well as the nature of some of the tones. Sometimes accent 1 involves more than one high tone spread across several syllables, and sometimes the second peak of accent 2 can appear at a distance from both the root and the plural morpheme. The present analysis accounts for the exact distribution of the tonal realizations across contexts using the same mechanisms, whereas other analyses either ignore these details or rely on *ad hoc* mechanisms.

In (107), we see the final high-low sequence of tones on different syllables in relation to the stressed syllable. Note that there is no tone on the post-stressed syllable in (107d).

(107)

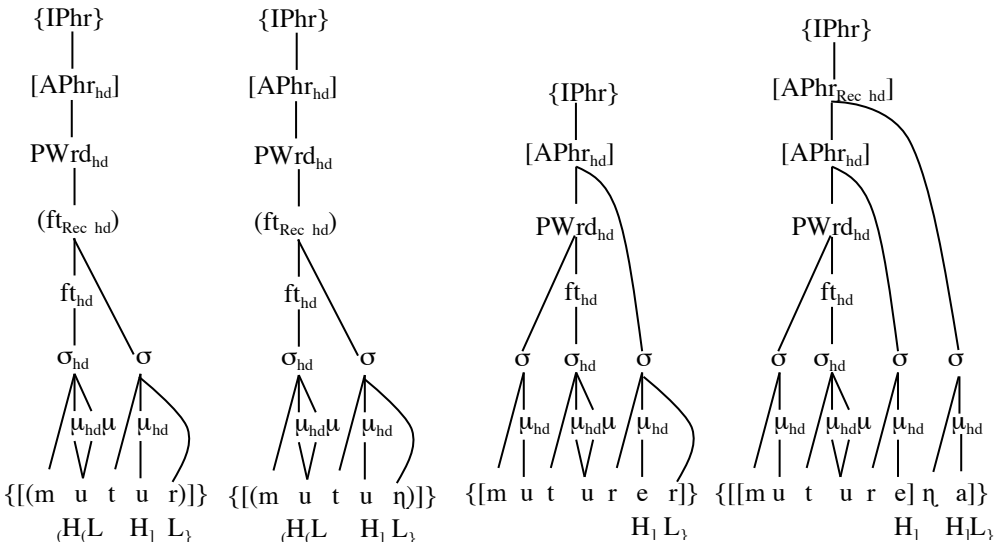
a. [ˈdɒ́ːm̀]	b. [ˈdɒːméǹ]	c. [ˈdɒ̂ːmér̀]	d. [ˈdɒ̂ːmeŋâ]
dam	damen	damer	damerna
'lady'	'the lady'	'ladies'	'the ladies'



In (108), we also see not only the final high-low sequence on different syllables in respect to the stressed syllable, but we also see that accent 1 can have multiple high tones - e.g. (108d).

(108)

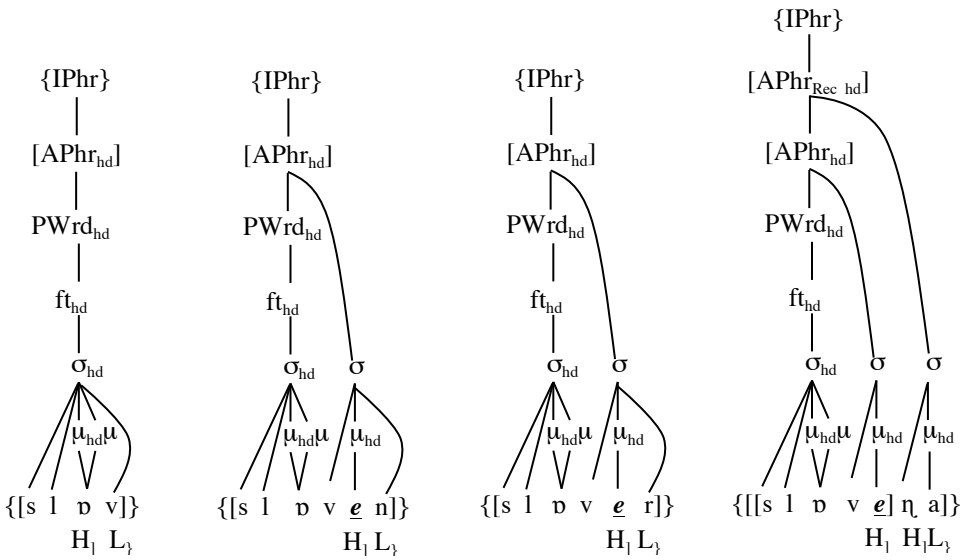
a. [ˈmúːtúr]	b. [ˈmúːtúɳ]	c. [muˈtuːrér]	d. [muˈtuːréɳâ]
motor	motorn	motorer	motorerna
'engine'	'the engine'	'engines'	'the engines'



In contrast with (107), (109) is a monosyllabic root in declension 3b. This has accent 1 throughout the paradigm.

(109)

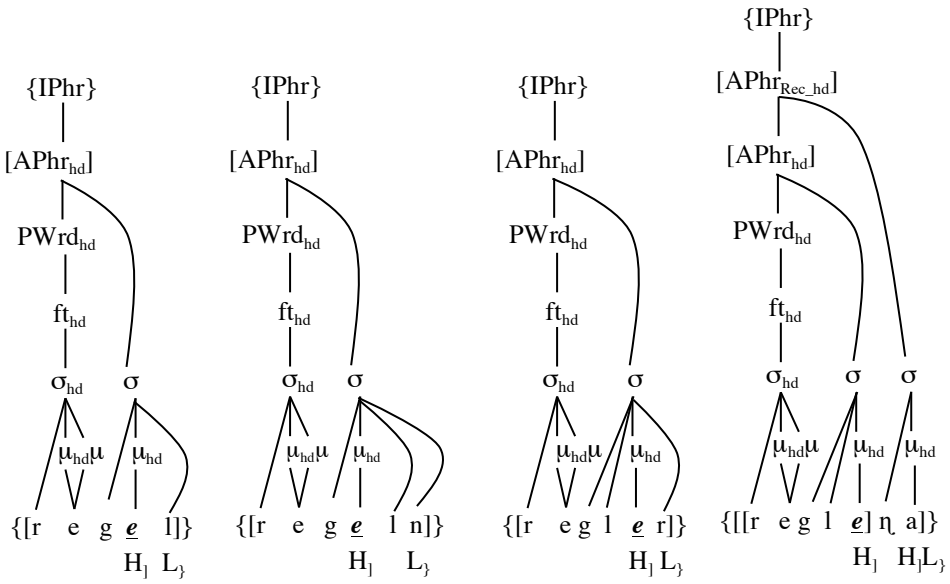
a. [ˈslɔ́ːv̀]	b. [ˈslɔːvéǹ]	c. [ˈslɔːvér̀]	d. [ˈslɔːvéɳâ]
slav	slaven	slaver	slaverna
'Slav'	'the Slav'	'Slavs'	'the Slavs'



(110) shows the paradigm for a root ending in a sonority reversal. It is accent 1 throughout the paradigm because the vowel following the stressed syllable is epenthetic and thus cannot trigger recursive foot formation. Note that accent 1 can have two high tones here, as well.

(110)

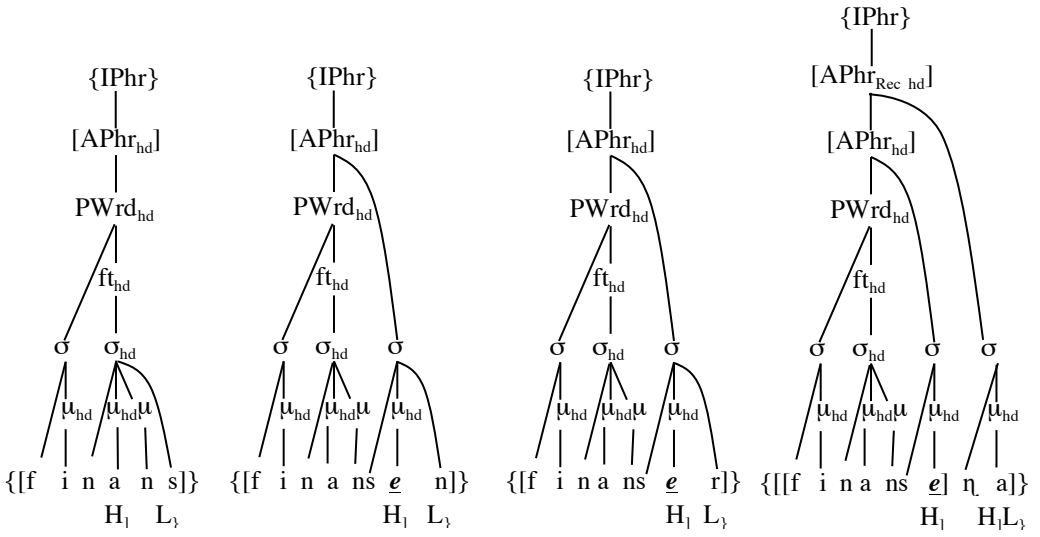
a. [ˈre:g***é***l̀]	b. [ˈre:g***é***lǹ]	c. [ˈre:gl***é***r̀]	d. [ˈre:gl***é***ɳâ]
regel	regeln	regler	reglerna
'rule'	'the rule'	'rules'	'the rules'



(111) shows the same basic pattern but for roots with predictable final stress.

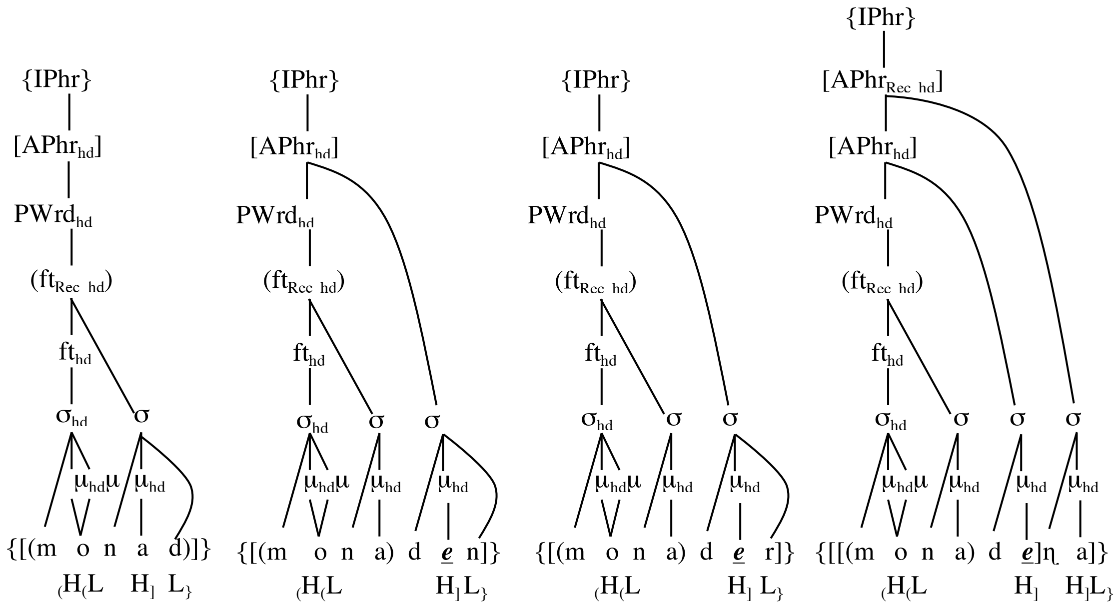
(111)

a. [fiˈnánṣ]	b. [fiˈnans***é***ǹ]	c. [fiˈnans***é***r̀]	d. [fiˈnans***é***ɳâ]
finans	finansen	finanser	finanserna
'finance'	'the finance'	'finances'	'the finances'

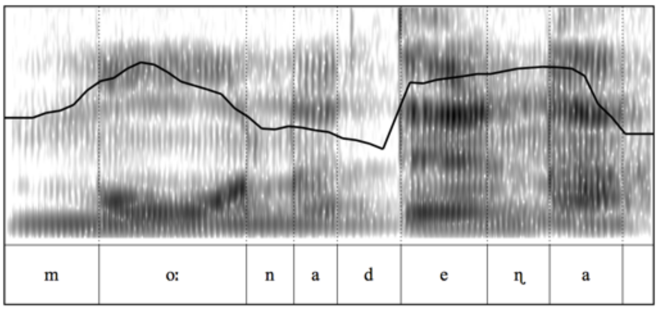


And finally, an example of a root with two underlying vowels and that takes a plural with an epenthetic vowel is shown in (112). We see in (112d) and (113) that accent 2 can sometimes have three high tones instead of just two.

(112) a. [ˈmóːnád̀] <u>månad</u> 'month' b. [ˈmóːnad*é*ǹ] <u>månaden</u> 'the month' c. [ˈmóːnad*é*r̀] <u>månader</u> 'months' d. [ˈmóːnad*é*ɳâ] <u>månaderna</u> 'the months'



(113) *General Götaland Swedish accent 2 with three high tones*
[ˈmóːnad*é*ɳâ] <u>månaderna</u> 'the months'

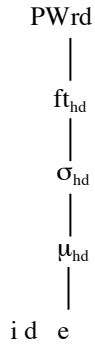


5 Exceptional stress

We can now move on to examples of exceptional stress/accent 1. As mentioned above, the analysis presented here proposes that most examples of final and antepenultimate stress in Swedish are the result of underlying prosodic structure. The question is, what kind of underlying structure.

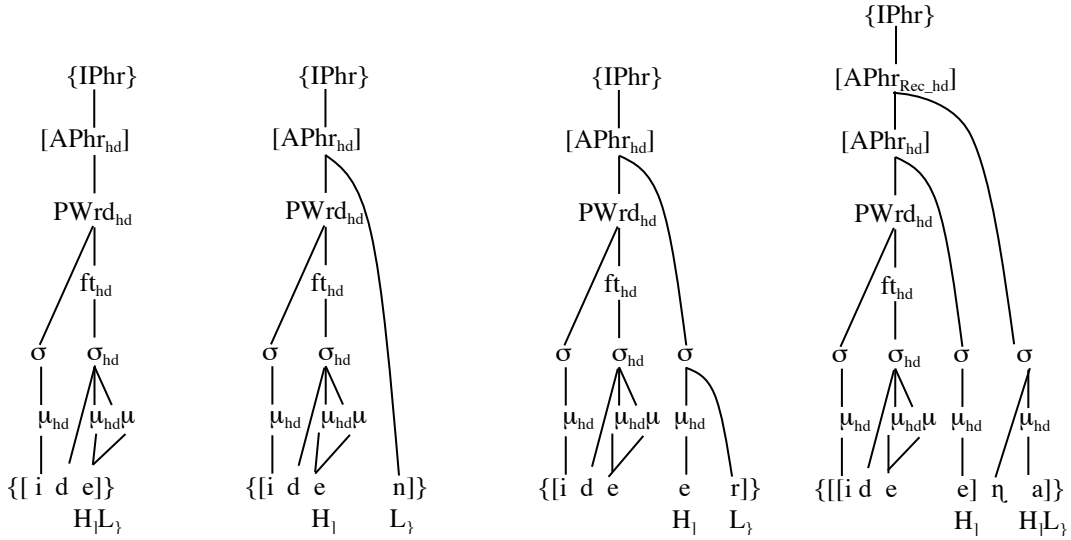
Because these *always* have accent 1, I propose that the underlying prosodic structure must block the formation of a recursive foot. Thus, it must be above the foot, and because there is no independent evidence of exceptional accent phrase formation in these underived noun data, I tentatively propose that that is below the accent phrase. For the sake of concreteness, I suggest that exceptional stress involves the lexical storage of the heads of prosodic structures up to the prosodic word (or some other intermediate level). This is demonstrated in (114) and (115) for exceptional final stress.

(114) *Underlying representation of exceptional final stress:* /ide^{M}/ <u>idé</u> 'idea'



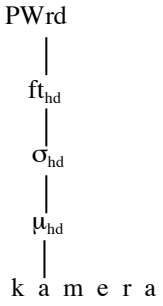
(115) *Surface representation of exceptional final stress*

a. [iˈdéːˋ]	b. [iˈdéːǹ]	c. [iˈdeːér̀]	d. [iˈdeːéŋâ]
<u>idé</u>	<u>idén</u>	<u>idéer</u>	<u>idéerna</u>
'idea'	'the idea'	'ideas'	'the ideas'



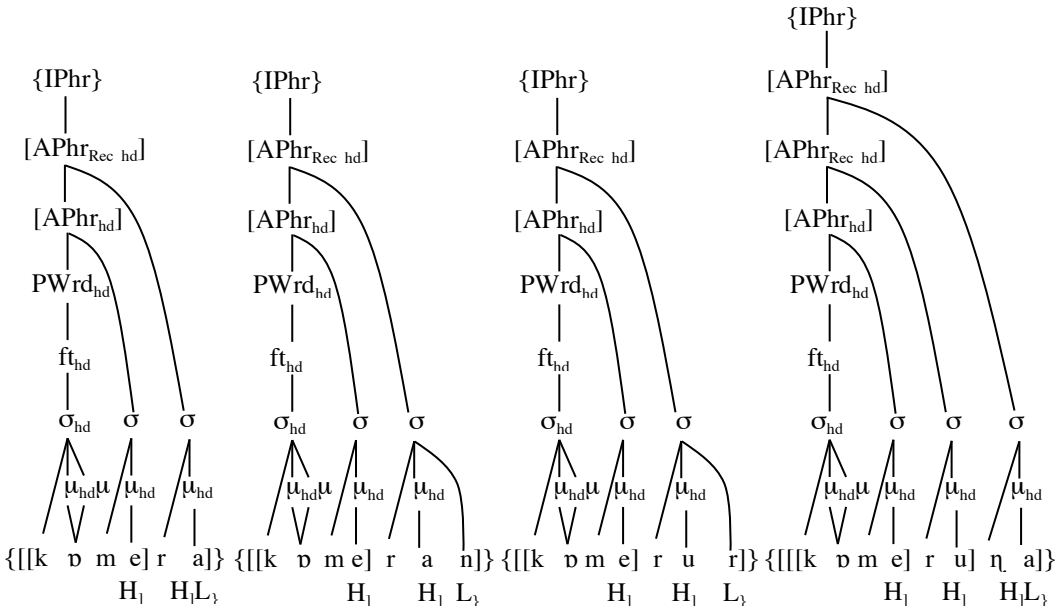
(116) and (117) show that this strategy also accounts for exceptional antepenultimate stress and accompanying accent 1. There are two things to note here. First, the underlying prosodic structure must be above the level of the foot, otherwise, there is nothing to block the formation of a recursive foot by the initial and peninitial syllables - leading to accent 2 as we see in *månaden*, *månader* and *månaderna*. Second, (117) shows that accent 1 can have at least three high tones.

(116) *Underlying representation of exceptional antepenultimate stress:* /ka^{M}mera/ <u>kamera</u> 'camera'



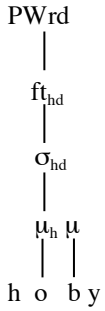
(117) *Surface representation of exceptional antepenultimate stress*

a. [ˈkɒːmérâ]	b. [ˈkɒːméráǹ]	c. [ˈkɒːmérúr̀]	d. [ˈkɒːmérúɳ̂a]
<u>kamera</u>	<u>kameran</u>	<u>kameror</u>	<u>kamerorna</u>
'camera'	'the camera'	'cameras'	'the cameras'



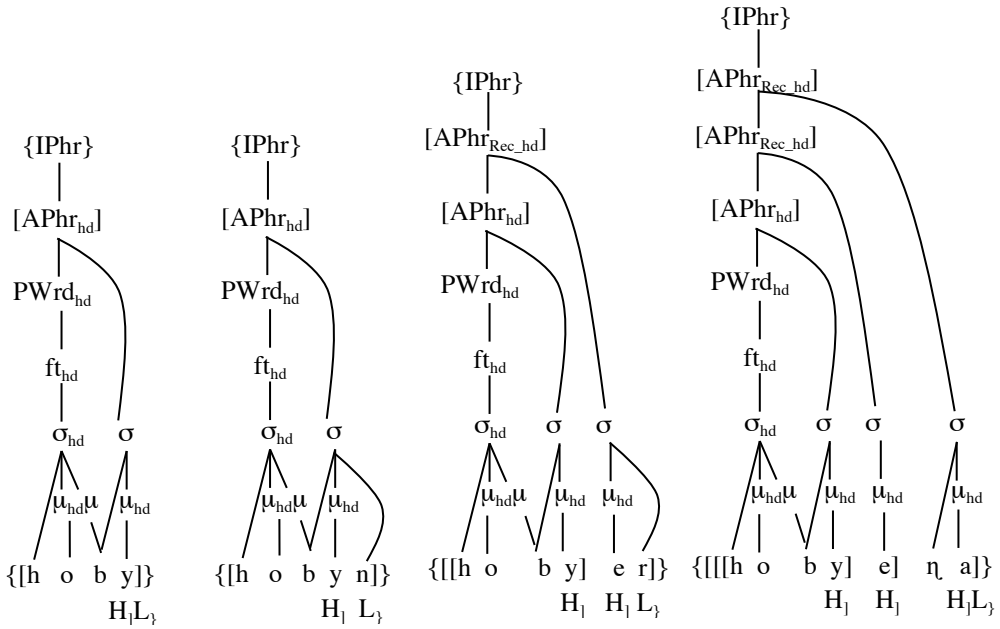
With this strategy of marking exceptional prosody with underlying prosodic word structure, we can now account for exceptional accent 1 on disyllables with penultimate stress. Recall that these not only have exceptional accent 1, but they are also resistant to stress-shift under suffixation even if that suffix has an underlying vowel. The analysis proposed here accounts for both of these facts without additional mechanisms.

(118) *Underlying representation of exceptional accent 1:* /ho^{M}b^{m}y/ hobby 'hobby'



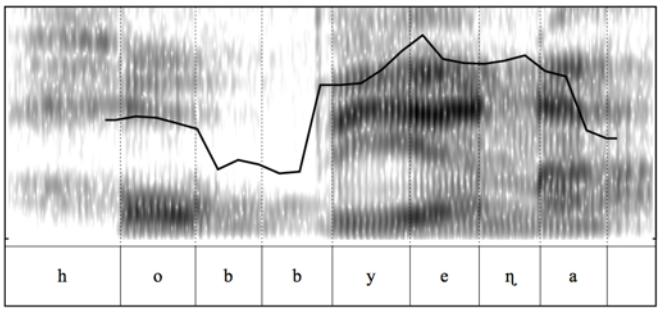
(119) *Surface representation of exceptional accent 1*

a. [ˈhob:ŷ]	b. [ˈhob:ýǹ]	c. [ˈhob:ýér̀]	d. [ˈhob:ýéɳâ]
hobby	hobbyn	hobbyer	hobbyerna
'hobby'	'the hobby'	'hobbies'	'the hobbies'



An example spectrogram, pitch track and transcription is given in (120).

(120) *General Götaland Swedish*
[ˈhob:ýéɳâ] hobbyerna ‘the hobbies’



This exhausts the majority of predictable and exceptional prosodic patterns for underived nouns in this dialect of Swedish.

6 Conclusion

This paper has looked carefully at the morphology, tone distribution and stress system of underived nouns in a fairly typical dialect of Swedish (i.e. General Götaland). We have seen that Swedish has relatively complex noun inflectional morphology, which includes several suffixes and clitics expressing neuter gender, six declension classes and/or definiteness. Some of these morphemes have certain effects on stress and tone distribution depending on several interrelated factors. Clitics never have an effect on stress or pitch accent, while suffixes do or not depending on whether they have underlying or epenthetic vowels and the morphophonological nature of the root to which they attach.

We have seen that noun roots come in a variety of phonological shapes and with a variety of declension and gender specifications. There are roots that are unspecified for both gender and declension class, roots that are specified with one of six declension classes, and roots that are specified with neuter gender and one of five declension classes. Some roots display lexical allomorphy, where one allomorph is not prespecified for number and one is prespecified with plurality. Roots can have one or more underlying vowels.

The vast majority of underived nouns have absolutely predictable stress and tone distributions. When stress placement is strictly the result of surface prosodification and not underlying prosodic structure, pitch accent is also surface predictable. Accent 2[24] occurs when a structural uneven trochee, i.e. a recursive foot, is built, and accent 1 occurs in *all* other contexts.

Exceptional stress on final and antepenultimate syllables in Swedish is the result of the lexical storage of prosodic structure, as it is in other languages. This lexical "stress" not only ensures that the main stress is not on the penult when it otherwise should have been, but it also blocks the formation of recursive feet and thus conditions predictable accent 1.

This paper has shown that not all examples of "exceptional" accent 1 are actually exceptional. For example, some arise predictably on disyllables that have epenthetic vowels. However, there are cases of truly exceptional accent 1, where default prosodification predicts the correct stress placement but incorrectly predicts accent 2 instead of accent 1. This paper proposes that the same mechanism used to account for exceptional stress on final and antepenultimate syllables - the lexical storage of prosodic structure, is at play in all cases of truly exceptional accent 1. Prespecified prosodic structure on penults blocks the building of recursive feet and thus blocks the appearance left-boundary tones associated with recursive feet. Since recursive feet boundary tones define accent 2 in this dialect, accent 2 is blocked.

[24] This is specific to accent 2 in underived environments. As discussed, accent 2 in derived environments can have both different tonal distributions and different prosodic structures.

In addition to providing a detailed descriptive and representational analysis, this paper also unifies the three major hypotheses previously proposed to account for North Germanic pitch accent - not only with one another but also with recent descriptive and theoretical advances found in the literature. First, it shows that the analyses of the 1960s and 1970s were on the right track in that North Germanic tone distributions *are* determined solely by rule. The problems encountered by the linguists in the 1960s and 1970s are resolved here by making use of new theoretical tools, such as certain prosodic representations and underlying prosodic structures.

Second, it shows that lexical accent 2 analyses are correct when they claimed that accent 2 involves more complex phonological structure than accent 1 *and* that accent 2 is in some sense more phonologically "marked" than accent 1. Recursive feet are an extra layer of prosodic structure found in this language only in those environments where a structural uneven trochee is built. This conditions a special tonal distribution corresponding to what is usually called accent 2. This analysis achieves the desired effect and captures the "lexical accent 2" intuitions without the need for lexical tones.

Third, it also shows that the lexical accent 1 analyses are correct when they claim that those cases of truly exceptional pitch accent are accent 1, not accent 2. As already mentioned, those cases of truly exceptional accent in underived forms involve lexically pre-specified prosodic structure which blocks the formation of recursive feet and thus blocks the appearance of the tones responsible for "accent 2" in this language. This achieves the desired effect and captures the "lexical accent 1" intuitions without the need for lexical tones.

There is obviously much more work to be done. For example, we need a detailed analysis of the alignment of tones to tone-bearing units, as well as a mechanism ensuring correct tone ordering when there are several tones on the same syllable. In addition, this approach must be tested on other word classes (e.g. verbs), it must be shown to work with the derivational morphology[25], and it must be shown to work on the myriad of other North Germanic dialects that have been claimed to have a "pitch accent contrast". There are two reasons to be hopeful. First, work on Norwegian and Danish varieties has been started, and preliminary findings suggest that this approach not only works for their underived nouns, but also verbs and compounds[26] (Morén 1995a, b, c, d, Morén 2008). Second, a very similar approach has been shown to work for West Germanic varieties with purported pitch accent contrasts (e.g. Köhnlein 2011).

So, is there evidence from Swedish underived nouns that lexical tones are needed? No. Is there a way to capture the surface tonal patterns without the use of lexical tones? Yes.

References

Andreasson, A.M. 2001. *Swedish Word Accents*. Muenchen: Lincom Europa.

Bruce, G. 1977. *Swedish word accents in sentence perspective*. Gleerup, Lund.

Bye, P. 2004. *Evolutionary typology and Scandinavian pitch accent*. Kluwer Academic Publishers, the Netherlands.

Cassimjee, F., and C. W. Kisseberth. 1997. Optimal Domains Theory and Bantu Tonology: A Case study from Isixhosa and Shingazidja (ROA-176).

[25] There are at least three considerations that must be looked at in fine-grained detail: 1) the possibility of underlying prosodification of particular derivational morphemes, 2) the possibility that some "derived" forms are actually lexicalized, and 3) the possibility that there are cyclic effects in building prosodic phonological structure, derivational morphological structure and inflectional morphological structure.

[26] One interesting consequence of looking carefully at tonal alignment in compounds (as opposed to using shorthand transcriptions) is that one sees that some dialects have distinct tonal differences between non-compound "accent 2" and compound "accent 2". This suggests that analyses which treat compound and non-compound "accent 2" the same are fundamentally flawed - at least for those dialects.

Creissels, D., and C. Grégoire. 1993. La notion du ton marqué dans l'analyse d'une opposition tonale binaire: Le cas du mandingue. *Journal of African Languages and Linguistics* 14.107-154.

Davis, S. 2005. "Capitalistic" vs. "Militaristic": The Paradigm Uniformity Effect Reconsidered. In Laura Downing, T. A. Hall, and Renate Raffelsieffen (eds.) *Paradigms in Phonological Theory*. Oxford: Oxford University Press, 107-121.

Elert, C. 1965. *Phonologic Studies of Quantity in Swedish*. Språkförlaget Skriptor, Uppsala.

Elert, C. 1972. Tonality in Swedish: Rules and a list of minimal pairs. In *Studies for Einar Haugen*, ed. Evelyn Scherabon Fischow, Kaaren Grimstad, Nils Hasselmo, and Wayne A. O'Neil, 151-173. The Hague: Mouton.

Gussenhoven, C. & G. Bruce. 1999. Word prosody and intonation. In H. van der Hulst (ed.) *Word prosodic systems in the languages of Europe*. Berlin: Mouton de Gruyter. 233-271.

Gårding, E. 1977. The Scandinavian Word Accents. Vol. 11 of *Travaux de l'Institut de linguistique de Lund*. Lund: Gleerup.

Gårding, E. & P. Lindblad. 1973. Constancy and variation in Swedish word accent patterns. *Lund Working Papers* 7, 36-110.

Haugen, E. 1967. On the Rules of Norwegian Tonality. *Language* 43, 185- 202.

Hayes, B. & A. Lahiri (1991) Bengali Intonational Phonology. *Natural Language and Linguistic Theory*, Vol. 9.1, 47-96.

Helgason, P. and C. Ringen. 2008. Voicing and Aspiration in Swedish Stops. *Journal of Phonetics* 36, 607-628.

Hellberg, S. 1978. *The Morphology of Present-Day Swedish*. Almqvist & Wiksell International, Stockholm.

House, J. & Hawkins, S. (1995). `An integrated phonological-phonetic model for text-to-speech synthesis.' In *Proceedings of the XIIIth International Congress of Phonetic Sciences* (Elenius, K., and Branderud, P. eds.) 2, pp. 326-329. KTH and Stockholm University, Sweden

Hyman, L. M. 1987. Prosodic domains in Kukuya. *Natural Language and Linguistic Theory* 5:311-333.

Hyman, L. 2009. How (not) to do phonological typology: the case of pitch-accent. *Language Sciences* 31 (2–3): 213–238.

Idsardi, W. 1992. *The computation of prosody*. PhD dissertation. MIT.

Itô, J. and A. Mester. 2010. Recursive prosodic phrasing in Japanese, *Proceedings of the 18th Japanese/Korean Conference*. CSLI, Stanford, CA, 147-164.

Iverson, G. and J. Salmons. 1995. Aspiration and Laryngeal Representation in Germanic. *Phonology* 12, 369-396.

Josefsson, G. 1997. *On the principles of word formation in Swedish*. Lund University Press.

Kristoffersen, G. 1990. *East Norwegian Prosody and the Level Stress Problem*. Ms. University of Tromsø.

Kloster-Jensen, M. 1958. *Bokmålets tonelagspar*. Bergen: Grieg.

Köhnlein, B. 2011. *Rule reversal revisited: synchrony and diachrony of tone and prosodic structure in the Franconian dialect of Arzbach*. PhD diss., Leiden University.

Lahiri, A., A. Wetterlin and E. Jönsson-Steiner. 2005. Lexical Specification of Tone in North Germanic. *Nordic Journal of Linguistics* 28, 61-96.

Leben, W. R. 1978. The representation of tone. In V. Fromkin, ed., *Tone: A Linguistic Survey*. New York: Academic Press, 177-219.

Leben, W. R. 1997. Tonal feet and the adaptation of English borrowings into Hausa. *Studies in African Linguistics* 25: 139-154.

Local, J.K. & Ogden R. (1997). `A model of timing for nonsegmental phonological structure.' In *Progress in Speech Synthesis* (van Santen, J.P.H., Sproat R.W., Olive J.P. & Hirschberg J. eds.) Springer, New York. pp. 109-122.

Lorentz, O. 1995. Tonal prominence and alignment. *Phonology at Santa Cruz* 4, 39-58

Martínez-Paricio, V. 2012. Superfeet as Recursion. Paper presented at the 30th West Coast Conference on Formal Linguistics (WCCFL 30), University of California, Santa Cruz, USA.

Morén, B. & E. Zsiga. 2005. The lexical and post-lexical phonology of Thai tones. *Natural Language and Linguistic Theory* 24:113-178.

Morén, B. 2005a. Scandinavian Tones: Back to Basics. Presented at Workshop on Tone and Intonation (±Europe), Konstanz, Germany.

Morén, B. 2005b. Danish Stød and Eastern Norwegian Pitch Accent: Prosody, Morphology and Non-tonal Lexical Specification. Presented at 11. møte om norsk språk - 11MONS [The 11th Meeting about the Norwegian Language], Bergen, Norway.

Morén, B. 2005c. Danish Stød and Eastern Norwegian Pitch Accent: The Myth of Lexical Tones. 13th Manchester Phonology Meeting (MFM13), Manchester, England.

Morén, B. 2005d. The Relationship between Here/Now and There/Then: Synchrony and Diachrony in Peninsular Scandinavian Pitch Accent. Presented at Workshop: Synchrony meets Diachrony in Phonology. Generative Linguistics in the Old World (GLOW28), Geneva, Switzerland.

Morén, B. 2008. Using the Prosodic Hierarchy to Account for North Germanic Tones. Presented at Workshop on the Prosodic Hierarchy. Tromsø, Norway.

Morén-Duolljá, B. 2012. Ordenes makt: språk, etnisitet og politikk. [The power of words: language, ethnicity and politics] *Ottar* No. 291. Tromsø Museum. Tromsø. pp. 33-39.

Oostendorp, M. van. 1995. *Vowel quality and syllable projection*. Ph.D. Dissertation, University of Tilburg.

Petrova, O., R. Plapp, C. Ringen and S. Szentgyörgyi. 2006. Voice and aspiration: Evidence from Russian, Hungarian, German, Swedish and Turkish. *The Linguistic Review* 23: 1-35.

Pierrehumbert, J. B. and M. E. Beckman (1988) Japanese Tone Structure, *Linguistic Inquiry Monograph* 15, MIT Press, Cambridge.

Riad, T. 1996. Remarks on the Scandinavian tone accent typology. *Nordlyd* 24, 129-156. Papers from the 2nd Workshop on Comparative Germanic Phonology.

Riad, T. 2000. The Rise and Fall of Scandinavian Accent. In G. Thórhallsdóttir (ed.), *The Nordic Languages and Modern Linguistics* 10: 15-33.

Rice, C. 1992. *Binarity and ternarity in metrical theory: parametric extensions*. Ph.D. Dissertation, Universtity of Texas at Austin.

Rice, C. 2006a. Optimizing gender. *Lingua* 116: 1394-1417.

Rice, C. 2006b. Norwegian stress and quantity: The implications of loanwords. *Lingua* 116: 1171-1194

Selkirk, E. (1984). *Phonology and syntax: the relation between sound and structure*. Cambridge, MA: MIT Press.

Walshe, M.O'C.: *Introduction to the Scandinavian Languages*, London: Andre Deutsch, 1965.

Witting, C. 1977. *Studies in Swedish generative phonology*. Stockholm.