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ON SWEDISH LEXICAL STRESS PATTERNS

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INTRODUCTION

Object of study

The Scandinavian languages, in particular Swedish and Norwegian are well known for their tonal word accents. In most of their dialects a word form takes either of two accents (accent I (acute) or accent II (grave)), provided it is prominent enough in the utterance context (cf. e.g. Elert, 1964, Gårding, 1977). The present study is about Swedish and this prominence itself, called stress, independent of the choice of accent. While the Swedish tonal accents have been approached from many different points of view and studied in considerable depth, it is striking that so relatively little attention has been paid to the study of Swedish stress. The obvious answer to the question why we find this state of affairs is that the accents are peculiar and exotic and therefore immediately tend to attract the attention, while stress is much more self-evident, as it is found in many of the world's languages, and thus may be relatively uninteresting.

From a rational point of view, however, it is clear that stress as a linguistic/phonetic category in Swedish is more important and fundamental than the accents. Stress occupies a key position in Swedish phonology and phonetics. This is seen among other things from the fact that a) stress (as part of the rhythmical structure of the language) determines the phonetic organization of utterances, i.e. the phonetic quality of vowels and consonants, b) all Swedish dialects have stress but not all of them have the accents, viz. the distinction between accent I and accent II, and c) the accents are dependent on stress which serves as an important line-up point for accentuation. Because of this fundamental role of stress, our understanding of the Swedish accents may even profit from a thorough study and understanding of stress.

The present account is descriptive and exploratory rather than theory oriented and exhaustive. The study will focus on the linguistic and phonological aspects of Swedish stress and particularly lexical stress assignment in Standard Swedish. The domain of stress is usually claimed to be the syllable. This is true of the phonetic realization of stress which typically affects both the onset and the rhyme of the syllable. For lexical stress assignment it appears to be the structure of the rhyme of the syllable which determines stress placement. An important point to be made is that stress assignment, being lexical, is categorically distinct from the assignment of phrasal rhythm, which is postlexical (cf. Hulst & Kooij, 1992). Lexical stress placement is determined by factors such as syllable weight, while phrasal rhythm is not. In the present paper phrasal rhythm will be taken into consideration only in so far as it is applicable at the word level, e.g. in compound words.

The basic idea of the present paper to be argued for is that stress placement in Swedish is not as early in a word as is generally assumed. It will be demonstrated that stress placement in Swedish is typically later than in English, and it is more similar to German

and Dutch (cf. Langeweg, 1988, Trommelen & Zonneveld, 1990, 1991) as well as Danish (cf. Rischel, 1969). The structure of the syllable rhyme appears to be the most important factor in determining stress location of a word.

Prominence levels

The diagram in Figure 1 illustrates how we conceive of the relation between the different prominence levels of Swedish. The system of prominence levels in Swedish is better regarded as multidimensional and built up of layers of prosodic categories, rather than as one-dimensional, i.e. as degrees of stress along the same phonetic dimension (cf. Bruce, 1977). It should be noted that the domain of prominence also becomes wider with increased level of prominence.

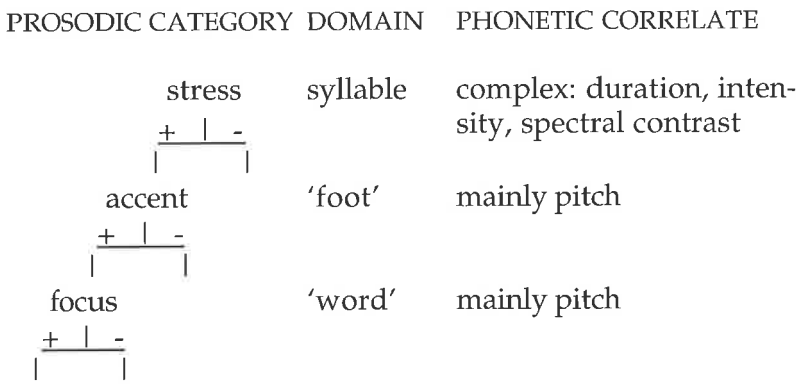

Figure 1. The structure of prominence levels in Swedish

There is a fundamental alternation between stressed and unstressed syllables which forms the basis of the rhythmical structure and the system of prominence levels in Swedish. Rhythm also appears to be basic in the organization of spoken language. That rhythm is basic is seen, among other things, from the fact that the rhythmical structure is maintained even in a deaccented, out of focus position of an utterance, which has no pitch prominence or other significant pitch variation. An important phonological characteristic of stressed syllables in Swedish is quantity. The rhyme of a stressed syllable contains either a long vowel followed by, at most a short consonant (V: or V:C) or a short vowel followed by a long consonant (VC:) or a consonant cluster (VCC, VCCC). There is a fairly complex phonetic cueing of stress involving specific duration and intensity relations in addition to spectral cues.

Accentual structure in Swedish is intimately related to rhythmical structure, and they may even be hard to separate. This means that rhythmic (stress group) boundaries are important points of coordination for accentual (tonal) gestures. The accentual structure can be divided into accent and focus (cf. Fig. 1). Accent is the next higher level of prominence. While stress is a relation between successive syllables, the domain of accent is the foot (stress group). A foot is often accompanied by an accentual gesture. However, in a so-called secondary stress position, a foot is typically characterized by the absence of accentuation (= deaccentuation). Accent as a higher prominence level than just stress is cued mainly by pitch, although an accented foot is usually also longer than an unaccented foot.

When a foot is accented, there is a choice between accent I (acute) and accent II (grave). This means that there is no difference in prominence level between accent I and accent II. Accent I and accent II are critically timed in relation to foot boundaries, i.e. stressed

syllables. In our analysis the two word accents appear to have a distinctively different timing of the same accentual gesture relative to the stressed syllable, accent I being timed earlier than accent II. The word accent distinction exists in most Swedish (and Norwegian) dialects. Exceptions are Finland Swedish, Far North Swedish, (North Norwegian) and a few other restricted areas. Although these accentless dialects have no accent I / accent II distinction, they do have accent distinct from stress as a different prominence level. For further information about dialect variation see Bruce & Gårding (1978), Bruce (1983).

The highest prominence level in the hierarchy assumed in our modelling is focal accentuation (focus). The domain of focus is the prosodic word. Words can thus be focussed or not focussed. Phonetically, focal accentuation is marked by a more complex accentual gesture. This extra pitch prominence is usually accompanied by increased duration of the actual word. This system of prominence levels for Swedish can thus account for three distinct, phonological levels of prominence, apart from totally unstressed.

We will use the term 'main stress' (1ary stress) to refer to stress with additional accent, i.e. accented stress, independent of the choice of accent (accent I/accent II) or whether it is focussed or not. Secondary stress (2ary stress) will be the term for stress without additional accent, i.e. stress only (cf. Fig 1).

STRESS IN NON-COMPOUND WORDS

General

There are two basic patterns of word stress in Swedish to be distinguished: the "non-compound" pattern and the "compound" pattern. The non-compound pattern is characterized by one stress (main stress), typically occurring on one of the three final syllables of a word stem. The compound pattern consists of two stresses: a main stress early in the word - in the 1st element of a compound (or equivalent word) - and a secondary stress late in the word - in the final element of a compound word. The basic regularities of stress placement (main and secondary stress) in the elements of a compound are the same as in non-compound words. The IPA symbols ['] and [,] have been added to the regular orthography to denote the location of main stress and secondary stress respectively in the examples below. In the phonetic transcription used the accent I / accent II distinction has not been included, because this is not a primary issue in the present study.

Phonemics

As an initial observation it can be stated that placement of stress in Swedish non-compound words is not fixed to a certain syllable of a word - as it is in e.g. Finnish, Czech (1st syllable) or Polish (penult syllable), and it is in this sense free. From a phonemic point of view we can establish a number of minimal pairs where the fundamental contrast is mainly one of stress placement. The quality of consonants and vowels are affected by stress to such an extent that it may be hard to claim that the only difference is stress placement. The following table contains a number of minimal disyllabic pairs, consisting of both inflected and uninflected forms, for the sake of illustration.

Table 1 Examples of minimal pairs of disyllabic words, where stress placement in Swedish words is distinctive

1	2
'formel (formula)	for'mell (formal)
'korset (the cross)	kor'sett (corset)
'banan (the track)	ba'nan (banana)
'armen (the arm)	ar'mén (the army)
'modern (the mother)	mo'dern (modern)
'sedan (then)	se'dan (sedan)
'boet (the nest)	bo'ett (watchcase)
'varan (the ware)	va'ran (kind of lizard)
'fasan (the horror)	fa'san (pheasant)
'kornet (the grain)	kor'nett (cornet)
'kaffe (coffee)	ka'fé (café)
'finnes (be found)	fi'ness (finesse)
'syntes (was seen)	syn'tes (synthesis)
'trumpet (sullenly)	trum'pet (trumpet)
'kantat (edged)	kan'tat (cantata)
'olle (sweater)	o'lé (olé)
'kanon (canon)	ka'non (gun)
'dior (viewgraphs)	Di'or (name)
'Callas (name)	ka'las (party)

Even if there are hardly any minimal triplets for trisyllabic words, the following table illustrates that the location of stress may be distinctive also in such words for at least two out of the three possible locations.

Table 2 Examples of pairs/triplets of three-syllabic words, where stress placement in Swedish words may be distinctive

1	2	3
'tekniker (technician)	tek'niker (techniques)	
'kritiker (critics)	kri'tiker (critiques)	
'fysiker (physicists)	fy'siker (physics (plur))	
'kliniker (clinician)	kli'niker (clinics)	
'Oliver (name)	o'liver (olives)	
'talaren (the speaker)	ta'laren (the gown)	
'likvida (liquid (noun))	li'kvida (liquid (adj.plur))	
	ma'skerad (masked)	maske'rad (masquerade)
	an'nonser (advertisements)	annon'sör (advertiser)
	pre'dikat (preached)	predi'kat (predicate)
	ide'alis(k)t (ideal)	idea'list (idealist)
	hy'sterisk (hysteric)	aste'risk (asterisk)
'positiv (positive)		posi'tiv (street organ)
'objektiv (objective (adj))		objek'tiv (objective (noun))
'destruktiv (destructive)	de'spotisk (despotic)	despe'rat (desperate)
'konstruktiv (constructive)	kon'centrisk (concentric)	konse'kvent (consequent)
'manikern (the maniac)	ma'nicken (the gadget)	mani'kén (the Manichean)
'Fallerath ((faked) name of possible German origin)	fal'lerat (failed)	faller'rat (the lalala)

It is interesting to note that words of the type 'objektiv, konstruktiv, destruktiv, positiv' typically have two stressed syllables (cf. Kjellin, 1978) and thus in terms of their stress pattern behave like a two word phrase, e.g. 'bättre liv' (better life). This is one example from the group of constructions where grammatical word and prosodic word do not coincide (cf. further compounds below).

There are also a number of words where stress placement is vacillating for dialectal, stylistic or other reasons: 'nylon, junior, senior, tombola'. A specific example is the name 'Carola', which stressed on the first syllable is the name of a ferry (between Helsingborg and Helsingør), and stressed on the second syllable is the name of a Swedish pop singer. Yet another category with variable stress location consists of words where stress appears to depend on rhythmical context - final vs. non-final phrase position, where the rhythm rule seems to apply with a iambic reversal as the result (cf. Horne, 1993). Examples are: 'förut (before), ändå (yet), ännu (still), omkring (around), intill (close to)'.

Lexicon and morphology

One prejudice about stress location in Swedish sometimes encountered is that it is almost impossible to predict the placement of stress in Swedish words, or at least not meaningful, because this has to be marked lexically anyway. I do not think that this position can be taken quite seriously, and I will use it here only as a reference to show that the predictability of stress placement in Swedish is still reasonably high.

Without yet going into specific detail, the most fundamental regularitites for lexical stress placement in Swedish appear to be the following:

inflectional suffixes do not take stress; i.e. stress ia in the stem of a word;
inflectional morphemes - e.g. plural ending and definite article - can occupy two syllables after stem; i.e they are real, extrametrical syllables (= do not count in stress assignment);

Ex:	'back - ar - na (the hills)	appa'rat - er - na (the machines)
	stem plur def	stem plur def

derivational morphology plays a major role: e.g. certain affixes attract stress, while others do not; some deprive the ROOT of the word of stress in the derivation, while others do not

syllable structure: syllable weight (open/closed syllable) plays a major role, e.g. whether the final syllable of the stem is open / closed

Ex:	bana-n ['bɑ:nan]	vs.	banan [ba'nɑ:n]
	(the track)		(banana)

Another prejudice to be taken more seriously is that Swedish words basically take initial stress, based on the fact that native Swedish words historically take initial stress. Alternatively it has been claimed that there are two basic regularities: Native words take INITIAL stress, while non-native, especially Romance words take FINAL stress (cf. Linell, 1972, Gårding, 1977).

Contrary to the wide-spread prejudice about 'initial stress' as fundamental and typical of Swedish words, a comparison with parallel words in English (my selection) shows the following in terms of stress location:

	English	Swedish	English	Swedish
Di-	'action	ak'tion	'pregnant	preg'nant
syll.	'phantom	fan'tom	'april	a'pril
	'column	ko'lumn	'moment	mo'ment
	'model	mo'dell	'system	sy'stem
	'formal	for'mell	'solid	so'lid
	'object	ob'jekt	'signal	sig'nal
	'syntax	syn'tax	'balance	ba'lans
	'nylon	ny'lon	'context	kon'text

	1 syll. diff.		2 syll. diff.	
≥ Tri	'calendar	ka'lender	uni'versity	universi'tet
syll.	funda'mental	fundamen'tal	'industry	indu'stri
	ca'thedral	kate'dral	'communist	kommu'nist
	op'ponent	oppo'nent	phi'losophy	filoso'fi
	Ko'rean	kore'an	'hooligan	hulli'gan
			'tomahawk	toma'håk

This is just a small selection of comparable words in the two languages from a much longer list making up several pages of similar examples. The obvious finding is that Swedish stress is often later than English stress in a word stem. The words involved are often of Romance origin, but the tendency to have later stress in Swedish does not seem to be restricted to this type of words but is probably of a much more general pattern. Even recent loan-words from English into Swedish like 'make-up', 'stand-by', 'time-out' have final stress in Swedish (unlike English). It should be emphasized that this is not to say that the comparable words are always different in stress placement. There are of course many polysyllabic words in the two languages that coincide in terms of stress location. There are also comparable words that are exceptions to the above tendency, i.e. where stress is earlier in Swedish than in English, but they are much more rare and hard to find.

Exceptions:	English	Swedish
	Ju'ly	'juli
	Ja'pan	'Japan
	sham'poo	'schampo
	ob'jective	'objektiv

It should be added, though, that looking not only at word stems but also at inflected word forms may give some support to the impression that stress placement in Swedish words is early, as inflectional morphemes often occupy two syllables after the stressed syllable, as in e.g.:

'back - ar - na (the hills)			sol'dat - er - na (the soldiers)	
stem	plur	def	stem	plur def

Basic regularities

The following is a list of the basic regularities that seem to hold for stress assignment in Swedish non-compound words. It is of course not meant to be exhaustive in any sense, but the idea is instead to identify some main determining factors. Counterexamples to the listed regularities are not hard to find. But it is likely that a further subdivision into more specific categories may account for some of the apparent counterexamples. This is, however, outside the scope of the present study. It should be further noted that there always seems to be a chicken and egg problem involved in the account of stress and syllable weight.

SIMPLEX WORDS:
- If the FINAL syllable of a word stem is closed (or otherwise heavy), this syllable typically attracts STRESS, e.g. tek'nik (technique), ma'nick (gadget), despe'rat (desperate), konse'kvent (consequent) , buffé (buffet);
EXCEPTIONS: a word stem ending (particularly) in -el, -er, -en (with fugitive vowel), e.g. 'fågel (bird), 'tiger (tiger), 'vatten (water) [cf. other forms like plural: 'fåglar, 'tigrar, or verb derivative 'vattna]

- If the FINAL syllable is open, STRESS is typically located earlier in a word stem
a) on the PENULT, if it is closed (or otherwise heavy), e.g. 'bana (track), 'dansa (dance), in'ferno (inferno), ven'detta (vendetta), va'luta (currency)

b) on the ANTEPENULT, if the penult is open (light), especially in hiatus for two final syllables, e.g. 'paprika (paprika), 'paria (pariah), 'orgie (orgy), 'video (video)

The regularities listed for derivatives below summarize the main possibilities, which are also found and are further exemplified in textbooks like Teleman (1970), Bannert (1978) and Garlén (1988). The main point to be made here is that affixes are different in stressability; some attract stress, while others repel it instead. As will be clear then, the grammatical category 'derivatives' is divided into words behaving prosodically like simplex words (having the "non-compound" pattern = one word stress) and words behaving like grammatical compounds (having the "compound" pattern = two word stresses). It should be noted that translation into English of the affixes listed below has not been undertaken, because some of the affixes are hard to translate while the translation of others are transparent enough not to need any translation. The occurrence of number of examples in the categories below has been denoted [many] or [few].

DERIVATIVES:
I. *Prefixes*
a) PREFIXES attracting stress, i.e. main stress, while secondary stress is in the ROOT / STEM; e.g. hyper-, kvasi-, miss-, o- , pseudo-, van- (= "compound" pattern) [many]. Example: 'hyper,känslig (hyper sensitive)

b) PREFIXES repelling stress, i.e. main stress is in the ROOT /STEM; e.g. be-, ent-, för-, re- [few]. Example: för'falla (decay)

II. *Suffixes*
a) SUFFIXES attracting stress and

1) also depriving the root /stem of its stress, e.g. -abel, -ant, -essa, -inna, -itet, -log, -ör [many]. Example: prin'sessa (princess)

2) not depriving the root / stem of its stress, e.g. -bar, -het, -dom, -sam, -skap (= "compound" pattern) [few]. Example: 'dår,skap (madness)

b) SUFFIXES repelling stress, i.e. stress is in the root /stem, e.g. -ande, -is, -isk, -(l)ig, -(n)ing, -na [many]. Example: 'springande (running)

It should be observed that the basic regularities presented above for simplex words in terms of syllable weight /open-closed syllable are also otherwise true of derivatives.

STRESS IN COMPOUND WORDS

As has been noted already above, the "compound" stress pattern consists of two stresses and pertains typically to grammatical compounds. This pattern is typical not only of grammatical compounds but also of other complex words like certain derivatives (categories Ia and IIa2 above) and so-called 'formal compounds' (see below). A further lack of correspondence between the morphology and prosody of words is found in constructions of the type: accent II verb + enclitic pronoun, i.e. two word phrases like "sätta sig" ['sɛtːaˌsɛj] (sit down), "testa honom" ['tɛstaˌhɔnːɔm] (try him), "krama henne" ['krɑːmaˌhɛnːə] (hug her), which typically appear with the "compound" stress pattern.

Phonemics and morphology

There are at least two stresses in a compound word: on the initial and final elements of a compound, where initial stress = 1ary stress, and final stress = 2ary stress.

Placement of stress is variable also in compounds:
Examples:

1st element (1ary stress)	'callas-vän ((Maria) Callas friend)	ka'las-vän (party friend)
final element (2ary stress)	jätte-ˌformel (super formula)	jätte-forˌmell (super formal)

The following minimal pairs are examples of distinction of stress (in 2ary stress position of compound) vs. no stress:

Examples:	bad-darren ['bɑːdˌdarːɛn] (the bathing tremor)	badaren ['bɑːdarɛn] (the bather)
	dans-skorna ['dansˌskuːɳa] (the dancing shoes)	danskorna ['danskuɳa] (the Danish women)

It can also be shown that the hierarchical structure of a ≥ 3 element compound is not important for 2ary stress placement in Swedish; the rule is that 2ary stress is always in the final element of the compound:

bo-lag ['buːˌlɑːg] (company)	olje-bo-lag ['ɔljɛbʊˌlɑːg] (oil company)
inne-danskorna ['inːɛˌdanskuɳa] (the Danish women who are in)	inne-dans-skorna ['inːɛdansˌskuːɳa] (the dancing shoes that are in)
t-förslag ['teːfœˌʃlɑːg] (t-prephase)	te-förslag ['teːfœˌʃlɑːg] (tea proposal)

It is interesting to note that the elements 'förˌslag (prephase) and förˈslag (proposal) respectively in the above compounds are distinctly stressed as separate words.

A possible explanation of 2ary stress occurring in the final element of a compound is clash avoidance, maybe an instance of the rhythm rule (reversed iambic reversal). Clash avoidance and rhythmic considerations may even be used to explain the placement of secondary stress on a syllable to the right of the final stress of the compound. Examples are: 'skolatˌlas (school atlas), 'förmidˌdan (the morning), 'guldbröllop (golden wedding), 'ispinˌnar (ice-lollipops), where 'atlas (atlas), middan (the noon), bröllop (wedding), pinnar (sticks)' have initial stress as separate words, while corresponding compounds without a stress clash do not seem to show this bahaviour: 'efterˌmiddan (the afternoon), 'silverˌbröllop (silver wedding). It may be speculated that there is some connection between stress placement in final elements of compounds and in simplex words, sharing the same tendency to late stress placement (see above).

In Danish and in Finland Swedish (unlike in Sweden Swedish) the hierarchical structure - the location of the internal word boundary - appears to be relevant for 2ary stress placement. Examples from Danish are: 'under-ˌsalgschef (lit. under-saleschief), 'udsalgsˌdame (lit. outsales-lady)(cf. Rischel, 1972, Basbøll, 1978) and from Finland Swedish: 'häst-ˌspårvagn (horse tram).

Formal compounds, i.e. words that behave like compounds but cannot be decomposed into elements in a transparent way, are for example: 'ar,bete (labour), 'hel,vete (hell), 'inge,fära (ginger), 'näkter,gal (nightingale) 'palster,nacka (parsnip), 'para,dis (paradise), 'även,tyr (adventure). They also behave prosodically like real compounds, as the secondary stress occurs in their final element in super-compounds like: 'kroppsar,bete (manual labour), 'krigsäven,tyr (war adventure).

Problem areas

There are a number of words vacillating between the "non-compound" pattern and the "compound" pattern, with either one stress (main stress) at the end [accent I], or two stresses [accent II]; e.g. 'bojkott (boycott), alkohol (alcohol), elände (misery), skomakare (shoemaker), konstnär (artist), allsmäktig (Almighty), otrolig (unbelievable), intresse (interest)'. It has to be further examined how this vacillation is determined by factors like idiolect, dialect, style, rhythm etc.

A subarea which deserves further attention and which has not been treated in the present study is lexicalized phrases and their prosodic behaviour (cf. Anward & Linell 1975).

Stress placement in acronyms is also an interesting and basically unexplored area. The following regularities appear:
- Disyllabic and highly established acronyms are more likely to take the compound pattern, e.g. 'L,O, 'P,M, 'D,N, 'F,N, 'U,D, 'AI,K, 'Essel,te.
- Vacillating in stress location (between the compound and the non-compound pattern) are also some well established acronyms like for example: KF'U,M, 'TC,O, 'SA,S or KFU'M, TC'O, SA'S.
- Newer and maybe more international ones take the non-compound pattern and never the compound pattern, e.g. PL'M, IB'M, IR'A, CN'N, OS'S.

An interesting minimal pair consisting of the distinction between the non-compound pattern (OS'S) vs. the corresponding compound pattern ('OS-,ess) was heard by a sports commentator: 'Det finns många OS-ess i OSS' (There are many aces at the Olympics in CIS [Commonwealth of Independent States]).

Another subarea of some interest here is stress placement in foreign names of Slavic origin consisting of four syllables. These are typically swedified to having initial stress, although this deviates from the stress placement of these names in the source language (Russian): 'Ivanova, 'Privalova, 'Smetanina, 'Koptjevskaja. A possible correspondence to this stress pattern in Swedish may be found in constructions consisting of disyllabic verb [accent I] + disyllabic enclitic pronoun , e.g. 'möter henne' (meets her), 'finner honom' (finds him), which although they consist of two grammatical words behave prosodically as one word.

CONCLUSION

In the present study we have tried to argue for the following main points, namely that:
- for Swedish words there is a basic choice between the "non-compound" stress pattern (one stress = main stress) and the "compound" stress pattern (two stresses = main stress & secondary stress)
- the location of (main) stress in Swedish words is generally later than what has been assumed
- it is possible (up to a point) to predict the location of (main) stress not only in derivatives but also in simplex words
- the tendency to a relatively late stress placement is typical also of secondary stress in compounds

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