

*A Contrastive Survey of Stress Assignment  
in Danish and Norwegian\**  
*Part 2 - Complex words*

Vladimir Naydenov

Статья имеет целью представить сопоставительное обозрение принципов, определяющих место ударения в так называемых продвинутом стандартном копенгагенском произношении датского и городском восточном произношении норвежского. Автор стремится определить, какие из видимых разниц и сходств присущи самим языкам, и какие являются следствием различия между собой анализов и теоретических трактовок, применявшихся к ним до сих пор. Часть вторая посвящена полиморфным словоформам, т.е. словам, образованным посредством аффиксации, а также сложным словам. Как и в случае с мономорфными словоформами, здесь тоже защищается тезис, что правила определения места ударения возможно моделировать сходным образом в обоих языках, следуя принципам метричной теории и при помощи фонологических ограничений (constraints). Наиболее примечательная разница в этой области констатируется в правилах, касающихся появления вторичных ударений в сложных словах.

This is the second part of a two-part article aiming to present a contrastive survey of stress assignment in Advanced Standard Copenhagen Danish and Urban East Norwegian<sup>1</sup>. The goal is to establish which of the apparent differences and similarities are inherent in the languages and which stem from the differences between the analyses and theoretical approaches that have been applied to them in existing descriptions. Part 2 deals with complex words, i.e. affixed forms and compounds. As in the case of simplex words, which were discussed in Part 1, it is argued that the rules governing stress placement can be modelled in similar ways, following a metrical and constraint-based approach. The most notable difference found here is the assignment of secondary stresses in compounds.

## **1. Introduction**

Since this is the second part of the paper, only a brief recapitulation of the relevant background information is presented here. For a more detailed introduction, one should consult Part 1.

Standard Danish and Norwegian Bokmål are very closely related languages. Both belong to the North Germanic branch of the Germanic languages, and in addition Bokmål in fact originated relatively recently as a regional form of Danish influenced by a Norwegian substrate and Norwegian dialect<sup>2</sup>. Nevertheless, there are significant phonological and phonetic differences between their spoken forms, including the two more-or-less standard spoken varieties, namely Advanced Standard Copenhagen Danish (as defined by Basbøll 1969, cited in Basbøll 2005:16) and Urban East Norwegian (as defined by Kristoffersen 2000:8-10). However, stress placement seems to display few surface differences. The most recent and prominent descriptions of stress assignment in these languages are Grønnum 1998,

---

\* I would like to thank Tomas Riad and Hristo Stamenov, who read preliminary versions of this paper and offered numerous constructive suggestions for improvement. Thanks are also due to Snezhana Dimitrova and Vladimir Zhobov, who read an early draft of the paper and provided feedback and valuable advice. All errors are mine. Some of the research reflected in the paper was made possible by a grant from the Swedish Institute.

1 The terms will be explained below. In much of the following text, the designations 'Danish' (abbreviated as dan.) and 'Norwegian' (abbreviated as nor.) are used for short.

2 Norway was part of the Danish state from the late 14<sup>th</sup> century until the early 19<sup>th</sup> century, and Danish became the official language of Norway roughly in the 16<sup>th</sup> century. During the Norwegian national revival in the 19<sup>th</sup> century, Bokmål arose by a gradual 'Norwegianization' of Danish, drawing upon local speech patterns and dialects. The other, much less used, official standard of present-day Norway is Nynorsk, which was also created in the 19<sup>th</sup> century, but this time exclusively on the basis of Norwegian rural dialects.

2001 and Basbøll 2005 for Danish and Kristoffersen 2000, Rice 2003 and 2006 for Norwegian<sup>3</sup>, and these are the primary descriptive sources used in this paper. Kristoffersen's (2000) description is couched within the framework of Lexical Phonology; an alternative OT analysis has been developed by Rice (1999, 2003, 2006) for simplex words, but for the complex forms discussed in this paper, Kristoffersen's (2000) account still remains the only recent one. Basbøll's (2005) theory of phonology is independent of most current approaches. Its main characteristics are an innovative model of morphological-and-phonological domains (based on productivity), an emphasis on psychological interpretability and closeness to phonetics and empirical observation.

The rest of this paper is structured as follows. Section 2 is devoted to affixed forms. First, the facts themselves are presented and several types of affixes are distinguished; the basic groups are shown to be the same in Danish and Norwegian (2.1). Next, the ways in which the properties of the affixes are formalized by Kristoffersen and Basbøll are outlined and compared (2.2.1-2.2.2) and various ways to model them in parallelist (Optimality Theoretic) terms are suggested (2.2.3). Section 3 is devoted to the so-called 'compound stress'. Again, the facts themselves are presented first (3.1) and the formalizations are discussed afterwards (3.2). Some differences between the existing analyses are highlighted (3.2.1-2) and a separate section is devoted to the special behaviour of Danish compounds (3.2.3). For reasons of space, stress patterns that occur on the phrase level are not discussed (chiefly reductions of stress that occur in tightly knit lexicalized word combinations).

## 2. Affixed forms

Normally, one would want to distinguish derivational and inflexional affixes, and that is also the way Basbøll (2005) organizes his exposition. In practice, however, stress-related properties are not congruent with this distinction - there is a large, possibly predominant subgroup of derivational affixes which are prosodically indistinguishable from the inflexional ones. I will therefore look directly into the classification of affixes based on their relation to stress, in a theory-neutral way<sup>4</sup>. Furthermore, in this case, the surface facts about both languages are so similar that it seems more suitable not to separate the two descriptions at the outset.

### 2.1. The facts

#### 2.1.1. Type 1 affixes

---

<sup>3</sup> For Norwegian, some less familiar works within Optimality Theory include Lorentz 1996, Lunden 2007 and Johnsen 2008. Unfortunately, they can only be addressed very briefly here. This may partly be justified by the fact that while each of them, while significant and insightful, relies crucially on a rather uncommon or problematic assumption. Thus, Lorentz (1996) employs an unusual constraint banning neutralization as such and predicts secondary stress in end-stressed words consisting of two heavy syllables such as *vul'kan* 'volcano', yet such stress is not observed in practice. Lunden (2007) assumes a constraint against stressing final open vowels on the basis that vowel length is not contrastive word-finally, yet both intuition and her own acoustic measurements suggest that words such as *me'ny* 'menu' do have a long vowel in the stressed syllable. Johnsen's (2008) analysis of Norwegian apparently posits a "count system" in the sense of van der Hulst (1999b), with a constraint hierarchy that predicts the exact place of main stress (at the right edge of the word) to depend on whether the word has an even or odd number of syllables - thus, words like *autodī'dakt* and *amino'plast* should receive penultimate stress in contrast to *kata'rakt* and *kloro'plast*; this is in fact not the case.

<sup>4</sup> In fact, the wordings used in the following are not entirely theory-neutral in that, while not biased in favour of either Kristoffersen's or Basbøll's accounts, they do, in a way, preclude the novel analysis suggested in Riad (2008) for Swedish (to be addressed later). They were chosen in spite of that simply because of their simplicity and intuitiveness.

In both languages, there is a large group of affixes that behave prosodically like lexical words and form stress domains of their own. They are referred to as “stem-like” by Basbøll (2005:465) and as “non-cohering” by Kristoffersen (2000:182); here, I will be calling them simply “Type 1” affixes (not to be confused with the so-called “Class I” affixes in English). Forms derived with them receive the typical compound stress to be dealt with in the next section: this entails that suffixes belonging to this group receive secondary stress, while word-initial prefixes belonging to this group receive the primary stress. Since they are stressed, they must contain either a long vowel or a long consonant in Norwegian, and may contain a long vowel and/or *stød* in Danish. An example is the suffix *-hed* [heðʔ] (Danish) / *-het* [he:t] (Norwegian), which combines with the adjective *sand* [ʰsanʔ] (Dan.) / *sann* [ʰsan:] (Nor.) ‘true’ to produce the word *sannhet* [ʰsan:,he:t] (Nor.) / *sandhed* [ʰsan,heðʔ] (Dan.) ‘truth’. Kristoffersen also adds to Type 1 several suffixes (*-ig*, *-lig*, *-som*) which don't seem to contain a long segment (to be discussed below).

### 2.1.2. Type 2 affixes - stress-neutral and stress-affecting subtypes

Most affixes do *not* behave prosodically as independent words (accordingly, they are called “non-stem-like” by Basbøll and “cohering” by Kristoffersen; I will be referring to them as Type 2 - again, not to be confused with the English “Class 2”). In this case, the simplest and most common type of behaviour is to not affect the stress of the stem at all. This holds true, in general, of all inflexional affixes, of most derivational suffixes of Germanic origin, as well as a few extremely common prefixes. Thus, *søn* [ʰsœn] (Dan.) / *sønn* [ʰsœn:] (Nor) ‘son’ receives the plural ending *-er* [ɐ] (Dan.) / [ər] (Nor.), rendering *sønner* [ʰsœnɐ] (Dan.) / [ʰsœn:ər] (Nor.); the homophonous Nomina Agentis suffix, added to *løbe* [ʰlø:bə] (Dan.) / *løpe* [ʰlø:pə] (Nor.) ‘to run’, produces *løber* [ʰlø:bɐ] (Dan.) / *løper* [ʰlø:pər] (Nor.) ‘runner’. These affixes are termed ‘not specified as [stress]’ by Basbøll (p.484) and ‘normal’ by Kristoffersen (p.170).

For Type 2 affixes that do affect the stress, the most common option is to (seemingly) attract primary stress onto themselves (these are called ‘specified as [stress]’ and ‘stressed’ by Basbøll - p.484 - and Kristoffersen - p.172 0 respectively); thus, intuitively, stressed is a suitable designation for them. These are only suffixes, typically of Romance origin. An example is *-tion/-sion* [ɕo:ʔn] (Dan.), *-sjon* [ʃu:n] (Nor.), producing from the verb *invadere* [enva:ðe:ʔe] (Dan.), [ɪnva:de:rə] (Nor.) ‘to invade’ (or perhaps simply from the root *inva[d]-*) the noun *invasion* [enva:ɕo:ʔn] (Dan.), *invasjon* [ɪnva:ʃu:n] (Nor.) ‘invasion’.

A smaller group of affixes appear to be pre-stressing, the most clear example being *-isk* [isǵ] (Dan.), [ɪsk] (Nor.): cf. *prosa* [pʰo:sa] (Dan.), [pʰru:sa] (Nor.) ‘prose’ - *prosaisk* [pʰo:sæ:ʔisǵ] (Dan.), [pʰru:sa:ɪsk] (Nor.) ‘prosaic’. (Basbøll 2005:486, Kristoffersen 2000:172)

The inventory of affix types is now largely exhausted. No significant differences between the two languages can be established; as the examples given above illustrate, not only are the types the same, but also the specific morphemes are nearly always cognate.

## 2.2. Formalizations

### 4.2.1. The major types

Basbøll (2005:465-466) regards Type 1 affixes as belonging to the same morphological

category as the stems of lexical words, namely “min-stems”, which are all assumed to exhibit the same behaviour as regards secondary stress. In Kristoffersen's account (2000:182), Type 1 affixes are lexically prespecified as forming prosodic words of their own. The two descriptions amount to the same thing, namely that a morpheme of this type constitutes a separate domain for stress assignment; the resulting “compound-like” prosodic pattern will be discussed in the next section. Type 2 affixes are usually, as stated above, either ‘unstressed’ or “stressed”. According to Basbøll, the ‘stressed’ ones have their vowels specified with the feature [stress], while the ‘unstressed’ ones do not. He doesn't explain the behaviour of words containing several “stressed” affixes (e.g. *nationali'sere* ‘nationalize’, containing both <-tion> and <-iser->), but one may assume another case of systematic occurrence of what he terms “prosodic lexicalization”. On the other hand, according to Kristoffersen's Lexical Phonology analysis, “stressed” suffixes are actually not stressed but cyclic: they don't attract stress *per se*, but merely cause the re-application of the usual stress rule that applies for monomorphemic words (see section 3). ‘Unstressed’ suffixes are, according to this view, non-cyclic and therefore don't affect the stress assigned previously to the base. This explanation has several obvious advantages over Basbøll's. It accounts for the apparent coincidence that forms with ‘stressed’ suffixes can be predicted by the same rule as the monomorphemic ones<sup>5</sup>, and it also explains in a more natural way the case of *nationali'sere*. In addition, cyclic suffixes that don't receive stress yet cause the usual stress rule to re-apply are well-known from languages such as English: compare *-ity* in *natio'hality*.

### 2.2.2. Two minor patterns

The “pre-stressing” suffixes are not as easy to account for as the other groups. In Kristoffersen (2000:172) it is reluctantly suggested that they are cyclic affixes that replace the usual moraic trochee at the right edge with a syllabic one, whereas Basbøll (2005:486-489) proposes no formal explanation and only observes that the derivatives reflect the stress of the relevant forms in the languages from which they were borrowed. In analyses of their English counterparts (*-ic* in *prosaic* - pro.'sa.i<c>; see e.g. Zamma 2002 for a useful survey), the final consonant is considered extrametrical. If one were to ‘borrow’ the same analysis here, the result would be more awkward; whereas final consonant extrametricality is the default in English, obtaining the correct stress pattern in Danish and Norwegian would require that /s/ should be extrametrical by means of lexical specification (/k/ is extrasyllabic because of Sonority Sequencing anyway). Marking the entire suffix as extraprosodic is duly rejected by Kristoffersen on the grounds of the fact that the suffix “assigns” stress even to open syllables ([<sup>1</sup>pru:sɑ] - [pru'sa:ɪsk], not \*[<sup>1</sup>pru:sɑɪsk]).

There is another problematic type of suffix. As mentioned above, Kristoffersen adds to Type 1 several suffixes (*-ig*, *-lig*, *-som*) which are in a sense “pre-stressing” and appear rather different from typical Type 1 morphemes. They don't have any obvious length or secondary stress and their chief characteristic is that, when added to a base with compound stress, they shift the stress to the last compound member preceding them (while otherwise it would have been on the first one). For example the verb *mistenke* [<sup>1</sup>mɪs:tɛŋ:kə] (Nor.) / *mistænke* [<sup>1</sup>mɪs:tɛŋ'gə] (Dan.) ‘to suspect’, when suffixed with the adjectival suffix *-lig*, renders *mistenkelig* [<sup>1</sup>mɪs:tɛŋ:kəlɪ] (Nor.) / *mistænkelig* [<sup>1</sup>mɪs:tɛŋ'gəlɪ] (Dan.) ‘suspicious (deserving or arousing suspicions)’. In Kristoffersen's opinion, these suffixes trigger an alternative version of the Compound Stress Rule (see section 4.2), directing stress to the right, *and* are lexically

5 The rule for assignment of primary stress in simplex words was discussed in detail in Part 1. Briefly, it can be described as “Stress the last syllable if it is closed, else the penultimate”, provided that vowel length is ignored; the specific formalizations and underlying mechanisms are debated.

specified as extraprosodic, which allows them to escape stress themselves. The latter option seems rather abstract, especially as their length is difficult to demonstrate; it seems that one may just as well regard them as triggering the alternative compound stress rule only, and not as belonging to Type 1. Furthermore, Johnsen (2008:35) observes that examples with suffixes other than *-elig* are unsystematic and can be regarded as cases of lexicalization, or "High Frequency Fusion" along the lines of Raffelsiefen 2007. Basbøll (2005:476) also views the corresponding Danish derivations as a case of what he calls "Prosodic Lexicalization". Both terms reflect the observation that the complex stem is treated as if it were simple, i.e. as a single unit prosodically. Still, in Danish as in Norwegian, the suffix *-elig* is apparently exceptional in that its stress-shifting effect seems to be obligator<sup>6</sup>. "Obligatory lexicalization" being somewhat of an oxymoron, this suffix would have to be lexically specified as a trigger of this stress pattern somehow: either roughly along the lines of Kristoffersen (2000), albeit as a Type 2 suffix, or, if no evidence of secondary stress on the compounds' first members can be found, as some kind of dominance effect.

### 2.2.3. Possible parallelist alternatives

While Kristoffersen's (2000) cyclic account of affix typology is, as a whole, more attractive than Basbøll's (2005), it is worth discussing ways to incorporate its insights within the currently prevalent non-cyclic (parallelist) framework, which is now espoused also by him.

#### 2.2.3.1. Some "standard" solutions

If we turn to OT analyses proposed for similar morpheme divisions in other Germanic languages such as English, Dutch and German, we find that the situation actually poses a significant problem for classical OT and the two best-known solutions used are both somewhat controversial. One involves the so-called Output-Output Correspondence (Benua 1997), essentially analogy between the base and the derivative, which is split into two constraints indexed for the former "cyclic" ('stressed') and "non-cyclic" ("unstressed" and "type 1") affixes respectively. The requirement that the stress of the base should be preserved in the derivative is ranked higher with the "non-cyclic" ones than with the "cyclic" ones (Alderete 1999:123), and the constraints leading to the main stress pattern are ranked in-between the two. Another approach is possible within so-called stratal OT (advocated by Bermúdez-Otero - e.g. 2003 - and Kiparsky - e.g. 2000), which re-introduces into OT the division into two or three levels typical of Lexical Phonology. As exemplified in Collie (2007), this approach assigns "cyclic" suffixes to an earlier stratum and "non-cyclic" suffixes to a later stratum, each stratum having its own constraint ranking. Both of these account easily for the Danish and Norwegian data. A third, less satisfactory but also less controversial possibility would be to somehow pre-specify the "unstressed" suffixes as extrametrical (in the worst case, through indexing of the NonFinality constraint); that would predict their stress-neutral behaviour, except when the affixation base itself has an extrametrical final syllable as in Kristoffersen's (2000) analysis of antepenultimate-stressed simplicia; in these cases, largely unattested stress alternation in inflection would be predicted, leading one to prefer Rice's (2005) "pre-specified length" account of this stress pattern.

---

<sup>6</sup> In fact, Basbøll's wording is not entirely clear on this; he states that this occurs "*obligatorily for lexicalized whole word forms containing the derivational ending /əli/ (emphasis added)*", so that it remains unclear whether this is viewed as an "obligatory" rule triggered by a specific morpheme or as a "lexicalized", unsystematic idiosyncrasy of the word forms.

### 2.2.3.2. A "domain-based" alternative

A different way of handling such affix divisions is to postulate new prosodic domains and domain boundaries to account for the stress patterns. As an example, one may mention the approach used by Chițoran (2001) for stress assignment in Romanian. She argues that stress in that language is assigned to the rightmost syllable of the prosodic word, and inflexional suffixes are not incorporated into the prosodic word and hence don't affect stress; this is expressed by attested constraints aligning prosodic and morphological constituents. In Danish and Norwegian, as argued earlier, it seems justified to posit more complex metrical patterns than mere "rightmost stress", but otherwise the same principle can apply as in Romanian<sup>7</sup>. Of course, it must be acknowledged that certain derivational suffixes pattern with the inflexional suffixes (a similar pattern is mentioned but not formalized in Chițoran 2001:46, 85); this can be attributed to lexical specification. The fact that both these exceptional derivational suffixes and Type 1 suffixes have the same effect, or rather lack of effect, on the main stress (and were hence grouped together as "post-cyclic" in Lexical Phonology), is to be viewed in connection with the diachronical origin of the former type from the latter type (see Riad 2003, 2003b for many examples of this process, beginning in Proto-Nordic). Those suffixes that originally formed their own prosodic words were, naturally, not incorporated in the prosodic word of the stem; even after they lost their prosodic word status, they continued to behave in the same way, this time as a lexical feature.

### 2.2.3.3. A "lexical" alternative

The innovative description advocated by Riad (2008) for Swedish regards "unstressed" suffixes as *lexically posttonic*, while "stressed"/"cyclic" suffixes as well as their usual (typically Greek or Romance) bases are lexically *unspecified*, and Type 1 affixes as well as the other (typically Germanic) roots are *lexically 'tonic'* and hence form new prosodic words. Thus, not only suffixes but also roots are split in two groups; an argument in favour of this is the tendency of (secondary) stress and/or length to be preserved in tonic roots even in those uncommon cases in which "stressed"/"cyclic" suffixes are attached to them (Swedish *bageri* [ˌbaːgeˈri:] "bakery", cf. *baka* [ˈbaːka] 'to bake'). A similar, though even more variable tendency seems to be present at least in Danish<sup>8</sup>. One potential alternative explanation of this pattern would be to analyse Riad's "tonic" morphemes as having lexically specified length (either of the vowel or of the consonant) and his "unspecified" morphemes as lacking it; however, this is made problematic by the fact that quantity isn't always predictable in unspecified morphemes either (compare -tion in *information* / *informasjon* with -ik/-ikk- in *grammatik* / *grammatikk* "grammar"), yet they don't preserve their length in the same way. Perhaps a more viable way to account for this difference would be an Output-Output Correspondence constraint indexed for the "tonic" morphemes; in fact, partly similar, variable

---

7 In fact, it is debatable whether "rightmost stress" is insufficient. The main reason for the metrical account is the basic tendency for stress to fall on a heavy ultima, else on the penultima. However, as mentioned earlier, it may be argued that many final light syllables are actually inflexional suffixes or desinences (see footnote 12) and that the rule is 'stress the rightmost syllable' in Danish and Norwegian as well. This is the approach taken for Swedish by Riad (2008) and, indeed, for Romanian nouns by Chițoran, despite the apparent presence of the same pattern in both languages. For other, rarer final vowels, such as -i and -u (e.g. dan./nor. *gummi* 'rubber'), this is not possible, so lexical marking is necessary. A less clear case is -o: some (uncommon) morphological alternations that were pointed out to me by Tomas Riad suggest that it may be a desinence: '*konto* "account (sb)" - *kon'tere* "account (vb)"'.

8 For instance, *bageri* is transcribed with length on the first syllable in ODS; not so in Basbøll 2005:477. *griseri* (from *gris*) has no length in ODS either, while *svineri* (from *svin*) is transcribed with optional length in brackets. Kristoffersen (2000) does not mention any similar pattern for Norwegian.

stress preservation tendencies in derivations with “cyclic” suffixes in English have been the focus of much study, and both output-output correspondence and stratal OT devices have been applied to it (see e.g. Collie 2007 and references therein).

#### 2.2.3.4. Syllabic and morphological structure

The approach proposed by van Oostendorp (2002) for Dutch argues that Type 2 “stressed” suffixes, as well as Type 1 suffixes, receive stress because they are morphological heads (one may recall that they are always derivational), while “unstressed” ones don't receive it because of the requirement that stress placement in the suffixed form should be determined within “the innermost prosodic word” - a prosodic domain which van Oostendorp posits and which is identical to the morphological base. These two constraints are, in his analysis, unranked to each other; thus the first group of suffixes (dan.&nor. 'sand,hed / 'sann,het, informa'tion / informa'sjon) satisfies the first constraint and the second group (dan.&nor. 'løber / <sup>2</sup>løper) satisfies the second one. As for the difference in behaviour between Type 1 suffixes (-hed / -het) and “stressed” Type 2 suffixes (-tion / -sjon), it is attributed to the fact that the former usually have onsets, while the latter lack onsets and have to be integrated in the prosodic word in order to get one (e.g. -al, -ist, -itet, possibly -ation / -asjon). However, there are exceptions from this tendency in syllable structure (Type 1 includes Du. -achtig / Da.-agtig / No. -aktig), and Graeco-Roman compounds like *agorafo'bi* need a separate explanation. Furthermore, it is somewhat counterintuitive to posit such a “low-level”, non-lexical synchronic explanation for a distinction that is so obviously rooted in historical borrowing.

### 3. Compound stress

Both languages can be said to have a characteristic “compound stress” pattern. It is typical of morphological compounds, i.e. of words composed of two or more independent words, but also of derivatives with certain affixes that behave like compound members, as well as of certain simplex words, where different syllables of the same word behave like compound members.

The reader may want to be reminded briefly about the levels of stress and their manifestations in the two languages. In Danish as analysed by Basbøll (2005), syllables with primary stress are reported to be recognizable by the presence of an intonational accent and larger segment duration. Syllables with secondary stress may have somewhat higher duration and intensity than syllables with no stress, but are distinguished from unstressed ones primarily on the basis of the fact that they allow the realization of lexical vowel length and stød (a type of lexically conditioned laryngealization). In Norwegian as analysed by Kristoffersen (2000), primary stressed syllables can reportedly be identified as such only due to the presence of a pitch accent (with one of the two lexically determined melodies). Secondary stressed syllables are distinguished from unstressed ones by being obligatorily heavy (bimoraic), and contain either a long vowel or a coda consonant (a geminate consonant, according to some analysts - Rice 2005).

#### 3.1. The facts

##### 3.1.1. Danish

In Danish, the first member of a compound normally receives primary stress. As pointed

out in section 2, everything beyond that is debatable. In Grønnum's (1998:205) description, it appears that all members but the primary receive secondary stress (assuming that the concept has any reality in the first place). For example, *fod* ['foð'] 'foot' + *bold* ['bɔl'ɔ] 'ball' -> *fodbold* ['foð,bɔl'ɔ] 'football'; likewise *ungdomsfodboldlandshold* ['ɔŋ,dɔms,foð,bɔld,lan's,hɔl'] lit. 'youth football national team'. In contrast, Basbøll (2005:489) considers that only some members receive secondary stress (characterized by the retention of length and *stød*) and proposes a complex formal system to predict it. In essence, the system always assigns secondary stress to the last compound member, and if more members are present, it may assign secondary stress to the initial members of "compounds inside the compound", whereas their non-initial members are completely unstressed. The expected pattern in the compound above would then be ['ɔŋ,dɔms,foðbɔld,lan's,hɔl'], explaining the loss of *stød* in the second and fourth members, while an alternative pattern would apparently be ['ɔŋ,dɔmsfoðbɔldlans,hɔl']. He refers to the latter realization as "prosodic lexicalization", a term that doesn't necessarily entail that the word has become an established lexeme, but rather has to do with the fact that the analysis of the compound word into its component parts is not expressed phonologically. In the non-"prosodically lexicalized" pattern, contrasts in morphological hierarchical relations are expressed: '*sommersalgsassi,stance* is [[sommersalgs]assistance] 'assistance in summer sales', while '*sommer,sal'gsassi,stance* is [sommer[salgsassistance]] 'sales assistance in summer'<sup>9</sup>.

Certain Danish compounds have primary stress on their last component, e.g. *skovmærke* [sɔv'mæɾgə] 'woodruff', lit. 'forest mark'; *Landbohøjskolen* [lanbo'hɔj,sɔo:lŋ] 'The Agricultural University' lit. 'The Country Dwellers' High School'. These are indeed lexicalized in the usual sense of the word and often non-transparent, as Basbøll convincingly argues. In the former example, the compound is essentially treated as a simplex word. In the latter, those compound members that are not analysed as such receive no stress.

Another small group of Danish compounds are characterized by primary stress on both compound members. These are chiefly expressive slang terms with an intensifying meaning *brandfarlig* ['brʌn'fa:lɪ] lit. 'fire-dangerous', i.e. 'very dangerous', combinations of adverbs and prepositions (*derfor* ['dɛɐ'fɔ] 'therefore') and a few other words (*juleaften* ['ju:lə'afɔŋ] 'Christmas Eve'). Basbøll explains them with conventionalized emphasis.

### 3.1.2. Norwegian

In Norwegian, the principles of compound stress are much simpler. Again, the first compound member is normally primary-stressed. According to Kristoffersen (2000:189), all others are secondary-stressed, with no influence of the internal hierarchical relations between morphological constituents. An ad hoc compound such as *ungdomsfotballag* 'youth football team' would then presumably be pronounced [ʔuŋ,dɔm:s,fu:t,bɔl:lɑ:g], and the likewise ad hoc <sup>2</sup>*sommer,salgsassi,stanse* can only be pronounced as indicated here. Kristoffersen also postulates (p.185) an alternative rule that stresses the last compound member and supplies the others with secondary stresses, e.g. in *skomaker* [sku:'mɑ:kər]. Some authors have the impression of stronger stress on the last compound member, but Kristoffersen explains this with the characteristic rise that occurs phrase-finally in East Norwegian intonation. Indeed, if Kristoffersen is correct in claiming that the pitch doesn't rise until the end of the phrase, then the final compound member has precisely the same tonal contour as it would have as an

<sup>9</sup> The example is from Grønnum (1998:205), although again she is unwilling to describe such contrasts in terms of secondary stress and merely notes the presence vs absence of *stød*; thus, the interpretation is based on Basbøll (2005).

independent primary-stressed pitch-accented word with tonal accent 1<sup>10</sup>. That may contribute to the impression of prominence. Note also that end-stressed compounds always receive accent 1, and that many Scandinavian dialects - such as Stockholm Swedish - do have an accent 1-like contour attached to the last secondary stress in initial-stressed compounds.

In general, it can be concluded that although the characteristics of secondary stress are very similar in both languages, the rules for its distribution are clearly different.

## **3.2. Formalizations**

### **3.2.1. End-stressed compounds**

The analysis of the end-stressed compounds calls for special attention. They occur in both languages. However, in Basbøll's description of Danish, they are simply lexicalized unanalyzable wholes with a single stress. In Kristoffersen's description of Norwegian, it is also admitted that they are very few and lexicalized, but the prosodic system still treats them as legitimate compounds and each compound member receives at least secondary stress. In Danish, it may be argued that they are obviously unstressed because they have lost length and *stød*, but let us not forget that the same thing may occur in primary stressed initial compound members in that language, as exemplified in section 2 (the latter fact can be explained diachronically with the hypothesis that these compounds were final-stressed before). In Norwegian, on the other hand, it is not entirely clear that the non-initial compound members really preserve their length: the quality of the vowels remains the same regardless of length, and there is no diagnostic feature dependent on vowel length such as Danish *stød*. In my opinion, the possibility of Basbøll's analysis of this stress pattern holding more or less true also of the equivalent pattern in Norwegian should not be ruled out, pending thorough experimental studies.

### **3.2.2. Formal compounds**

Another, purely formal difference between the two descriptions is that Kristoffersen derives the compound stress of formal compounds (p.187) in a way fairly close to the one used for true compounds and for derivatives with Type 1 affixes; both contain several prosodic words, although the former have their prosodic word structure lexically prespecified rather than assigned by rule on morphological grounds. In Basbøll's account of Danish, there is no similarity: true compounds and Type 1 derivatives contain several so-called 'min-stems' (a morphological - rather than prosodic - concept introduced by Basbøll), each of which must receive stress, while the stress pattern of formal compounds is merely the result of the need to preserve the lexically specified length of more than one vowel (length being impossible without stress - Basbøll 2005:470). However, as observed in section 3, examples of (native-speaker-perceived) formal compounds without long vowels are easy to find. In general, it seems preferable to derive the compound stress pattern in a more unified way, and that is an advantage of Kristoffersen's account. Of course, another kind of unified account may rely consistently on pre-specified vowel and consonant length to derive stress: the accompanying difficulties as regards Danish were described in some detail in section 3. Optimality Theory in particular would also be unable to accommodate the absence, in the input, of words lacking both vowel and consonant length.

---

10 Riad & Segerup (2008) argue this for the West Swedish dialect of Göteborg, but not for the East Norwegian dialect of Oslo, where the pitch is reported to rise smoothly, beginning from the stressed syllable. Kristoffersen uses recordings of his own Arendal dialect speech, which may differ from Oslo in that respect.

### 3.2.3. Branching in Danish compounds

For reasons of space, the specific formalisms which could be used to predict secondary stress in Danish compounds will only be touched upon briefly, and without discussing the intricacies of metrical tree and grid construction.

#### 3.2.3.1. Cross-linguistic parallels

It is clear that the behaviour, and hence the potential modelling, of Danish compounds is more similar to that of German, Finland Swedish, and even English compounds than to that of Norwegian. The pair '*sommersalgsassi,stance* [[sommersalgs]assistance] 'assistance in summer sales' vs '*sommer,sal'gsassi,stance* [sommer[salgsassistance]] 'sales assistance in summer' is very similar to the English pair '*kitchen towel ,rack* [[kitchen towel] rack] 'a rack for kitchen towels' vs '*kitchen 'towel rack* [kitchen [towel rack]] 'a towel rack in the kitchen' (e.g. Visch 1999:181, cf. also Zonneveld et al. 1999:490) and the German pair '*Stadtplanungsbü,ro* [[Stadtplanungs]büro] 'office for city planning' vs '*Stadt'planungsbüro* [Stadt[planungsbüro]] 'planning office of the city' (Wiese 2000:536)<sup>11</sup>. In all of these cases the first member of an embedded compound has its stress level boosted - the difference is that it receives the primary stress in English and German, but only secondary stress in Danish. In contrast, the relevant patterns are even closer to the Danish one in the more closely related Finland Swedish, e.g. '*poj,kslagslag* [pojks[lagslag]] 'a national team of boys' vs '*folkdans ,lag* [[folkdans]lag] 'a team for folk dances' (Bruce 2007:117-118). Here, what varies is secondary stress placement and the only difference vis-à-vis Danish is that there is no obvious requirement for secondary stress to be present on the last compound member.

A similar pattern is found in various dialects with contrastive tonal accent, which allow the locus of association of the so-called prominence tone (a pitch accent with intonational function) to be detached from the primary stressed syllable (e.g. the Finland Swedish dialect of Snappertuna - Selenius 1972:124, cited in Riad 2003 - and the Norwegian dialect of Sunnmøre - Abrahamsen 2003:193). In these dialects, the prominence tone is attracted to the initial member of an embedded compound: an example from Sunnmøre is the pair '*herrePELShuve* [herre[pelshuve]] 'fur hat for men' vs '*herrepelsHUVE* [[herrepels]huve] 'hat made of man fur' (capital letters designate the member that the prominence tone associates to). It is not clear whether this is an expression of stronger stress on the relevant compound member (unlike Danish and like Norwegian, the other members also preserve contrastive quantity in such varieties, so they, too, must have a degree of secondary stress), or whether the morphology affects tone association directly.

#### 3.2.3.2. Formalization

For English, the above-mentioned regularity has been expressed with the following oft-cited rule: "In two sister nodes [Na Nb], Nb is strong iff it branches" (Lieberman & Prince 1977)<sup>12</sup>. However, this does not reflect the facts of Danish and the other Scandinavian varieties, where the branching compound member in ['sommer[sal'gsassistance]] remains

---

11 The sources cited use numbers to identify degrees of stress, so their notations suggest something like "tertiary" and "quaternary" stress. I am taking into account only primary and secondary stress for reasons including compatibility with the analysis of Danish, with IPA transcription conventions, and with my own impression of which degrees of stress are distinguishable.

12 The reality of this rule in English has been recently questioned by Giegerich (2009).

weaker than the first one. A more recent formalization posited for English within a cyclic framework (e.g. Visch 1999:181, Zonneveld et al. 1999:490) states that the last word of each binary compound is extrametrical, and primary stress is assigned to the rightmost non-extrametrical word: [,kitchen ['towel rack]] is *kitchen towel* <rack>, while [['kitchen towel] ,rack] is *kitchen* <towel> <rack> (again, I have to abstract from the details of the grid construction here). If this is adopted for Danish, ['sommer[,sal'gsassi,stance]] would be *sommersalgs*<assistance>, while [['sommersalgs]assi,stance] would be *sommer*<salgs><assistance>; the *secondary* stress on the rightmost non-extrametrical word would result automatically from a column raising convention; however, primary stress is assigned to the *leftmost* member, and in addition the rightmost word obligatorily receives secondary stress, even though it is extrametrical in the last cycle<sup>13</sup>. This is more suitable than the original approach of Liberman and Prince (1977), but it is still rather odd that the final word is always extrametrical and nonetheless always receives secondary stress<sup>14</sup>.

However, there seem to be two main reasons to use extrametricality in the modelling of English compound stress, and it can be shown that neither is truly binding in this case. The first reason is that if one simply assumes the entire "supercompound" to be left/right-headed in English, one would predict either [['kitchen towel],rack] *and* ['kitchen [,towel rack]] (left-headed), or [[,kitchen towel] 'rack] *and* [,kitchen [ 'towel rack]] (right-headed). For Danish, this is not a problem, because the first option is almost precisely what we find there (the difference being the obligatory final secondary stress)<sup>15</sup>. The second reason is the assumption that whereas individual compound members constitute Prosodic Words, a compound as a whole constitutes a Phonological Phrase (from the perspective of the theory of the Prosodic Hierarchy proposed in Nespor and Vogel 1986). This is also the position taken by Nespor 1999 for English and other Germanic languages. Phrases in English and most Germanic languages are usually right-headed (cf the default or broad focus pronunciation "[three [red [SHIRTS]]]φ"), so extrametricality is needed to explain the left-headedness of compounds ([[KITCHEN <towel>]<rack>]φ). In fact, it is far from clear that these are comparable structures even in English (the need to maintain a distinction between stress and intonational pitch accent has already been discussed earlier in this paper), and compounds are even more distinct in the Scandinavian languages. Fortunately, this position is not the only possible one. For example, Frid (2001) preferred to identify the Swedish compound with another domain in Nespor & Vogel's hierarchy, the Clitic Group. An even more satisfactory alternative is made possible by a number of recent proposals that allow recursive constructions of up to three levels of prosodic words dominating each other (Itô and Mester 2007a,b, Riad 2008, see also van Oostendorp 2002, Kabak & Revithiadou 2007). In the case of Danish, three levels are precisely sufficient to make every compound and every embedded compound<sup>16</sup> a Prosodic Word ( $\omega$ ,  $\omega'$  and  $\omega_{\max}$  stand for minimal, intermediate and maximal prosodic word):

[[['sommer] <sub>$\omega$</sub> [[[,sal'gs] <sub>$\omega$</sub> [assi,stance] <sub>$\omega$</sub> ] <sub>$\omega'$</sub> ] <sub>$\omega_{\max}$</sub> , [[['sommer] <sub>$\omega$</sub> [salgs] <sub>$\omega$</sub> ] <sub>$\omega'$</sub> [assi,stance] <sub>$\omega$</sub> ] <sub>$\omega_{\max}$</sub>

13 Interestingly, these latter two rules are per se sufficient to describe the compound rule of Stockholm Swedish and many similar dialects - if "secondary stress" is replaced by "prominence tone association"; again, this reservation is necessary because, like Norwegian and unlike Danish, these varieties normally preserve segmental quantity in all compound members.

14 The influential exposition in Rischel 1972 differs from that of Basbøll 2005 in that it does not mention such final secondary stress; however, the criteria used to distinguish secondary from tertiary stress there are largely subjective and not based on the possibility of stød and vowel length like Basbøll's.

15 Another matter is that it may be desirable to replace extrametricality with some less abstract device in the other languages as well. It seems intuitively appealing to state directly that branching embedded compounds as such attract primary stress; they may be said to be "heavy", in a way.

16 In case of more levels of embedding, the morphological structure simply wouldn't be expressed prosodically (Rischel 1972:108).

While the obligatory secondary stress of the final member in Danish still has to be ensured with a separate rule/constraint, recursivity allows one to merely posit left-headedness for the embedded compounds *and* for the "supercompound" without appealing to extrametricality. Although this issue obviously requires more work, it seems clear that the Danish facts can be accounted for along such lines. As for Norwegian compounds, if the same method is applied to them, no intermediate prosodic words need to be postulated:

[['sommer]<sub>o</sub>[,salgs]<sub>o</sub>[assi,stanse]<sub>o</sub>]<sub>o</sub>max

#### 4. Conclusions

The above survey of stress assignment in Danish and Norwegian shows both remarkable similarities and surprising differences between what were, until one and a half a century ago, two spoken forms of the same written language. The place and level of stress itself is nearly identical in all areas with the exception of compounds. The phonological context, however, is not: this includes absence vs presence of features such as surface geminate consonants, stressed monomoraic syllables, and restrictions on vowel quality in unstressed and short syllables. Various challenges to the formal analysis of the two languages have been identified and possible solutions and directions for further research have been suggested. In general, it can be concluded that, despite certain difficulties, primary stress assignment in both Danish and Norwegian can be modelled in similar ways within a metrical framework. All things considered, it seems preferable to regard vowel quantity as primary in Danish, and consonant quantity as primary in Norwegian; this has implications for stress assignment as well.

#### References

- Abrahamsen 2003: J. E. A b r a h a m s e n. *Ein vestnorsk intonasjonsfonologi*. Dr. art. diss. Institutt for språk- og kommunikasjonsstudium. Noregs teknisk-naturvitenskapelige universitet, 2003.
- Basbøll 1969: H. B a s b ø l l. The phoneme system of advanced Standard Copenhagen. – *Annual Report of the Institute of Phonetics, University of Copenhagen* 3, 1969, pp. 33-54.
- Basbøll 2005: H. B a s b ø l l. *The Phonology of Danish*. Oxford University Press, 2005.
- Benua 1997 [1998]: L. B e n u a. *Transderivational Identity: Phonological Relations between Words*. Doctoral dissertation, University of Massachusetts, Amherst. [Amherst, MA: Graduate Linguistic Student Association, ROA-259-0498] 1997 [1998].
- Bermúdez-Otero 2003: R. B e r m ú d e z - O t e r o. *The acquisition of phonological opacity*. Ms., University of Manchester. [ROA-593-0403, Rutgers Optimality Archive, <http://roa.rutgers.edu/>] 2003.
- Bruce 2007: G. B r u c e. Accentuering i svenska sammansatta ord. – Torben Arboe (red.): *Nordisk dialektologi og sociolingvistik*. Århus, 2007.
- Collie 2007. S. C o l l i e. *English stress-preservation and Stratal Optimality Theory*. PhD thesis, University of Edinburgh, Edinburgh, 2007.
- van Els et al. 1984: T. v a n E l s. *Applied Linguistics and the Learning and Teaching of Foreign Languages*. London: Edward Arnold, 1984.
- Fischer-Jørgensen 1984: E. F i s c h e r - J ø r g e n s e n. The acoustic manifestation of stress in Danish with particular reference to the reduction of stress in compounds. *Annual*

- Reports of the Institute of Phonetics, University of Copenhagen* 18, 1984, 45-161.
- Frid 2001: J. Frid. Swedish word stress in optimality theory. *Working Papers* 48. Lund: Lund University, Dept. of Linguistics, 2001, 25–41.
- Giegerich 2009: H. Giegerich. *The English compound stress myth*. Ms., University of Edinburgh. Available online: [http://www.ling.ed.ac.uk/aboutus/people/heinz/english\\_compound\\_stress\\_myth.pdf](http://www.ling.ed.ac.uk/aboutus/people/heinz/english_compound_stress_myth.pdf)
- Gordon 1999: M. Gordon. *Syllable Weight: Phonetics, Phonology, and Typology*. Ph.D. dissertation, Los Angeles, University of California, 1999.
- Grønnum 1998, 2001. N. Grønnum. *Fonetik og fonologi, Almen og Dansk*. København, Akademisk Forlag, 1998, 2001.
- Hayes 1995: B. Hayes. *Metrical stress theory*. Chicago, University of Chicago Press, 1995.
- Hulst 1999: H. van der Hulst (ed.). *Word prosodic systems in the languages of Europe*. Berlin & New York, Mouton de Gruyter, 1999.
- Hulst 1999b: H. van der Hulst. Word accent. – Hulst, H. van der (1999) (ed.). *Word prosodic systems in the languages of Europe*. Berlin & New York, Mouton de Gruyter, 1999, 3-116
- Itô, Mester 2007a: J. Itô, A. Mester. *Categories and projections in prosodic structure*. Paper given at the Old World Conference in Phonology 4 (OCP4), Rhodes, 19 January 2007. Slides available at [http://people.ucsc.edu/~mester/papers/2007\\_ito\\_mester\\_OCP4\\_slides.pdf](http://people.ucsc.edu/~mester/papers/2007_ito_mester_OCP4_slides.pdf)
- Itô, Mester 2007b: J. Itô, A. Mester. Prosodic Adjunction in Japanese Compounds. – *Proceedings of Formal Approaches to Japanese Linguistics 4*, (MIT Working Papers in Linguistics) Osaka, 2007.
- James 1989: C. James. *Contrastive Analysis*. Harlow, Essex, Longman. First ed. 1980. 1989.
- Johnsen 2008: O. E. Johnsen. *Konstraint og analogier i det norske trykksystemet*. Mastergradsoppgave. Universitetet i Tromsø. Available online: <http://www.ub.uit.no/munin/bitstream/10037/1531/1/thesis.pdf>
- Kabak, Revithiadou 2007: B. Kabak, A. Revithiadou. *An interface approach to prosodic recursivity*. Paper presented at the 15th Manchester Phonology Meeting, 2007.
- Kiparsky 2000. P. Kiparsky. Opacity and cyclicity. *Linguistic Review* 17, 2000, 351-365.
- Kristoffersen 2000: G. Kristoffersen. *The Phonology of Norwegian*. Oxford University Press, 2000.
- Krzyszowski 1990: T. P. Krzyszowski. *Contrasting Languages: The Scope of Contrastive Linguistics*. Berlin: Mouton de Gruyter, 1990.
- Lieberman, Prince 1977: M. Lieberman, A. Prince. On stress and linguistic rhythm. *Linguistic Inquiry* 8, 1977, 249-336.
- Nespor, Vogel 1986: M. Nespor, I. Vogel. *Prosodic phonology*. Dordrecht: Foris Publications, 1986.
- Nespor 1999: M. Nespor. Stress domains. In Harry van der Hulst (ed.) *Word Prosodic Systems in the Languages of Europe*. Berlin: Mouton de Gruyter, 1999.
- ODS: *Ordbog over det danske Sprog - dansk i perioden 1700-1950*. Available online: <http://ordnet.dk/ods/>.
- van Oostendorp 2002: M. van Oostendorp. The Phonological and Morphological Status of the Prosodic Word Adjunct. In *Resolving Conflicts in Grammars: Optimality Theory in Syntax, Morphology, and Phonology*. G. Fanselow and C. Féry (eds.), Hamburg: Buske, 2002, 209-35.
- Prince, Smolensky 1993: A. Prince, P. Smolensky. *Optimality Theory: Constraint*

- Interaction in Generative Grammar*. Rutgers University Center for Cognitive Science Technical Report 2.
- Raffelsiefen 2007: R. R a f f e l s i e f e n. Morphological word structure in English and Swedish: the evidence from prosody. I: Booij, G., Fradin, B., Ralli, A. & S. Scalise (red.): *On-line Proceedings of the Fifth Mediterranean Morphology Meeting (MMM5)* Fréjus 15-18. September 2005, University of Bologna, 2007. Available online: [http://www.ids-mannheim.de/gra/texte/raf\\_mmm5.pdf](http://www.ids-mannheim.de/gra/texte/raf_mmm5.pdf)
- Riad 2003: T. R i a d. Diachrony of the Scandinavian accent typology. In: Fikkert, Paula and Haïke Jacobs (utg.) (2003). *Development in Prosodic Systems*. Berlin, New York: Mouton de Gruyter. S. 91-144
- Riad 2008: T. R i a d. *Prosodi i svenskans ordbildning*. Manuscript. Stockholm university.
- Rice 2003: C. R i c e. *Norwegian quantity and the richness of the base*. Manuscript. University of Tromsø, available at <http://www.hum.uit.no/a/rice>.
- Rice 2006: C. R i c e. Norwegian stress and quantity: The implications of loanwords. *Lingua* 116, pp. 1171–1194.
- Rischel 1972: J. R i s c h e l. Compound stress in Danish without a cycle. *Annual Reports of the Institute of Phonetics, University of Copenhagen* 6. P. 211-230
- Selenius 1972: E. S e l e n i u s. *Västnyländsk ordaccent*. (Studier i nordisk filologi 59). Helsingfors.
- Visch 1999: E. V i s c h. The rhythmic organization of compounds and phrases. In H. van der Hulst (ed.) (1999). *Word prosodic systems in the languages of Europe*. Berlin: Mouton de Gruyter. 161-233.
- Wiese 2000: R. W i e s e. *The Phonology of German*. Oxford University Press.
- Zamma 2002: H. Z a m m a. Suffixes and Stress/Accent Assignment in English and Japanese: More Than a Simple Dichotomy, in *Online Proceedings of Linguistics and Phonetics* 2002. Available online: [http://www.ne.jp/asahi/zamma/hideki/LP2002\\_Zamma\\_.pdf](http://www.ne.jp/asahi/zamma/hideki/LP2002_Zamma_.pdf)
- Zonneveld et al 1999: W. Z o n n e v e l d, M. T r o m m e l e n, M. J e s s e n, C. R i c e, G. B r u c e, K. Á r n a s o n. Word stress in West-Germanic and North-Germanic languages. In Harry van der Hulst (ed.) *Word Prosodic Systems in the Languages of Europe*. Berlin: Mouton de Gruyter. 478-603

*Съпоставително изследване на мястото на ударението  
в датския и норвежкия език  
Част II – Сложни думи*

Владимир Найденов

Настоящата статия разглежда в съпоставителен план принципите, определящи мястото на ударението в датския и норвежкия. Като основен източник се използват описанията на датския от Ханс Басбъл (2005) и Нина Грьонум (1998) и на норвежкия от Йерт Кристоферсен (2000) и Кърт Райс (2006). Във втора част се разглеждат принципите, определящи ударението в думите, образувани чрез афиксация, и в сложните думи.

В областта на словообразуването съществуващите описания различават няколко класа афикси. Въпреки разликите в гледните точки на авторите, демонстрира се, че в общи линии класовете в двата езика си съответстват едни на други. Така например датската група афикси, носещи ударение

според Басбьол, отговаря на норвежката група афикси, интегрирани в прозодичната дума преди определянето на ударението според Кристоферсен; при това се посочват доводи в полза на последната гледна точка. Преглеждат се различни начини за формално моделиране на разликата между афиксите в рамките на Теорията на оптималността.

Що се отнася до ударението на сложните думи, тук отново се откриват много сходства, но се установява и една от по-значителните разлики между двата езика: в датския - но не и в норвежкия - местата на вторичните ударения в сложни думи с повече от два компонента отразяват вътрешното семантично групиране на компонентите. Разглеждат се различни начини за формално представяне на подобни явления, предлагани за други езици. В крайна сметка за датския и за норвежкия се отдава предпочитание на репрезентации, базиращи се на хипотезата за рекурсивност в прозодичната йерархия.