

ON UNIT ACCENTUATION IN DANISH - AND THE DISTINCTION BETWEEN DEEP AND SURFACE PHONOLOGY*

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This paper outlines a hierarchical model of stress in Danish with special emphasis on phrasal accentuation. The model is essentially based on impressionistic data and phonological and syntactico-semantic analysis of data representing the author's own usage. The relationship between prosody and syntax is explored, and it is suggested that there is an abstract prosodic structure which is very directly coupled to syntax, whereas this is not true of the hierarchical structure found in surface phonology. A considerable shrinkage of structure from deep phonology to (low distinctness levels of) surface phonology is assumed as part of the overall model.

I. STRESS AND THE HIERARCHICAL APPROACH

It is no coincidence that the first part of the title of this paper is strongly reminiscent of that of a paper read by L. Hjelmslev before the Linguistic Circle of Copenhagen twenty-five years ago (Hjelmslev 1957). In spite of obvious affinities to "metrical phonology" the present paper is not directly coupled to the work of the MIT-school (the recent advances in "lexical phonology" are crucially relevant to the whole paper, but reached the author too late to be considered here). Rather, I am trying to summarize and follow up my previous work on the hierarchical nature of Danish stress, with special

* This is a pre-publication of a paper written for a section on "Prosody", edited by Hans Basbøll, which is to appear in *Folia Linguistica*, vol. XVII. - I am indebted to Hans Basbøll, Eli Fischer-Jørgensen, and Nina Thorsen for valuable discussions.

emphasis on certain issues which have vexed me since I was exposed to Hjelmslev's and Eli Fischer-Jørgensen's views on prosodic patterning in the late fifties (also cf. Fischer-Jørgensen 1961). At the same time, of course, I am drawing heavily on theoretical advances within generative phonology. In fact, the general setting within which I am dealing with stress, is generative, but I have preferred to stick to fairly loose formulations and a minimum of formal apparatus in agreement with my earlier work. I hope that the presentation is sufficiently explicit to make my points clear, though.

Probably the most important concession to be made is that my paper does not link to any particular, fully explicit theory of syntax and semantics. Quite generally speaking, I am adhering to the generative notion of surface syntax versus (some kind of) more abstract syntax, and I furthermore assume that lexical material is specified at a level on which the order of syntactic constituents may be somewhat different from that appearing "on the surface", but it is anything but clear to me what would be the most appropriate model (among those currently available) to link one's phonology to. (It may deserve mentioning in particular that I have stuck to traditional uses of labellings such as NP for noun phrase rather than using the X-Bar convention, and that I do not comment on the relevance of Trace Theory for the analysis of the interplay between syntax and phonology.)

Some of the topics dealt with in this paper are treated in more detail in earlier papers to which I refer for further information (Rischel 1964, 1970, 1972, 1975, 1980, 1981). In the present paper one major omission is made in order not to make the presentation unduly complex, viz. that a variety of discourse phenomena are disregarded (some phenomena belonging within this sphere are dealt with, under the common heading "emphasis", in Rischel 1981). Thus, the types of data referred to here are supposed to represent a neutral, colourless rendering of phrases and utterances, or, to quote Liberman and Prince (1977, p. 251), "the null-hypothesis patterns that emerge when there is no good reason to take some other option".

On the other hand, this paper differs from my earlier reports on Danish stress in that it attempts to deal more specifically with the relationship between underlying and surface prosodic patterns (see the last sections of this paper), which is really a challenging issue.

I hope that I shall succeed in demonstrating that Danish stress is interesting both typologically (a.o. because of the dissimilarity between English and Danish stress) and from the point of view of general phonological theory.

In approaching the analysis of stress patterns and stress mechanisms it may be advantageous to start with a consideration of surface patterns and move from there towards more abstract analyses.

A. THE THEORETICAL GROUNDWORK

It was one of the major advances in American phonological (at that time: phonemic) theory when N. Chomsky, M. Halle, and Fr. Lukoff introduced the derivation of degrees of stress from underlying representations with only a binary stress contrast plus a marking of ranked boundaries. Though not so often referred to today, this paper forms an important link between Bloomfieldian phonemics and generative phonology and helps to put into relief the close connection between the two trends. What is interesting in this context is that the paper offered a more fruitful alternative to a theory that posits several degrees of contrastive stress as members of one phonemic category (which had been an obstacle to an adequate handling of the functions of stress).

Within the Copenhagen school of structural linguistics it was recognized quite early that the inventory of Danish stress prosodies comprises just two members: /' / (manifested typically as strong stress) and / / (manifested typically as weak stress), cf. the contrasting patterns in ['bi li:sd] 'cheapest' and [bi 'li:sd] 'automobile driver', and that the various degrees of stress that one may attempt to distinguish in phonetic transcriptions are contextually determined variants ("varieties"). However, it was never shown in any detail what the rules of stress manifestation really look like. It was made quite explicit, though, that in defining the relevant context it is necessary to have recourse to what would be termed "higher level information" in the American tradition.

One of the important points in this approach is the emphasis on prosodic relations establishing units of different size (or, more precisely, different hierarchical rank). The relation between / / and /' / establishes a stress group or "expression junction" (comprising one stress-syllable flanked by zero, one, or several zero stress-syllables on either side). In addition to the relation between /' / and / / proper, there is also a relation involving reduction of /' / in constructions containing another /' /. Such stress reduction was recognized as a signal of an intimate union of consecutive constituents.

Hjelmslev, in dealing with the secondary stresses of compounds (such as Danish ['be:njknab] 'bone button') claimed that secondary stress here reflects a replacement of ' by / under the dominance of the other ' , i.e., on a higher level of abstraction there is a succession of two /' / in such a compound. Likewise, according to Hjelmslev, the weak stress of the first constituent in expression junctions such as [han 'kʌm'ʌ] 'he is coming' reflects a replacement of ' by / under the dominance of the other ' in the string (see, for example, Hjelmslev 1957, p. 203; 1973, p. 253, p. 260-261). It was not made very explicit how one can predict from the formal representation that it is the second of two consecutive ' that is replaced by / in compounds, but the first of the two in expression junctions, but it is important that the concept of stress reduction as a signal of close union was somehow built into the analysis.

This point was made in a congress paper by Fischer-Jørgensen as early as 1948 (although the Proceedings of the congress did not become available until 1961).

Fischer-Jørgensen's paper makes another important point, viz. that degrees of stress, as they occur in compounds, should be handled in terms of a hierarchical model. I shall quote one of the relevant passages of her brief paper:

"Especially in German very complicated examples of reduction may be found, e.g. ((('Kurz,waren),,händler)ver,,,ein), where it is possible to distinguish several degrees of reduction. But this can only be done for each group of this kind separately. It is not possible to identify the different degrees of stress from one group to the other, e.g. to decide if the stress of -macher [as part of another compound, viz. 'Hand,,schuh,macher or 'Hand,schuh,,macher] is the same as that of -händler or as that of -verein. And it is completely arbitrary to maintain that a language has 3 or 4 degrees of reduced stress. It is only a way of stating the syntactical possibilities of the language. The important thing is always a comparison between two members and two members only, but this may take place on different levels."

My own paper of twenty years ago (Rischel 1964) was an attempt to outline a fully hierarchical approach to prosodic structure (comprising at least stress and syllabicity) in a structuralist format, and with emphasis on autonomous structure.

So much for the pre-generativist basis of the approach to Danish stress which I shall outline here. The remainder of this paper will contain an exposition of certain components of an all-round description of Danish stress but with particular emphasis on the mechanism of stress reduction.

In generating stress patterns from underlying forms in Danish I have not found it very promising to use the approach of Standard Generative Phonology, as explicated in the sections on English word stress and the transformational cycle in SPE (Chomsky and Halle 1968). The complex rules involved do not make it very transparent what is the basic relationship between stress patterns and the remainder of the phonology on the one side, and between stress patterns and syntax on the other side.

The principle I apply is to start strictly from the bottom up in terms of grammatical structure, the components of such an approach being the following: (1) stress placement in individual morphemes, (2) downgrading in simplex wordforms, (3) downgrading in compounds, and (4) downgrading in phrases. The stress pattern of a complex string is supposed to be derivable from these components taken together, although - as

I shall show later - the relationship between the components is somewhat intriguing.

A note on terminology and transcription: throughout this paper I use terms such as "stress pattern" and "accentuation" rather indiscriminately (I would prefer to use Accent for the more abstract category, and Stress for the phonetic category, or rather the subjective experience of extrinsically determined syllable prominence, but this would presuppose a clarification of the distinction between abstraction levels which I do not think has been achieved so far). As for the notation of degrees of stress, I have earlier (Rischel 1972) expressed my scepticism about the phonetic meaning of these elements, at least for Danish, and in this paper I prefer to avoid the notation of degrees of secondary stress. In transcriptions I have simply indicated the placement of stresses that have not undergone reduction: in the (few) cases where phonetic transcription is used, these stresses are indicated by ['] before the syllable in question, but otherwise they are indicated by an acute accent over the vowel. The same mark (acute accent) is also used to mark lexical stresses in strings of morphemes in those cases where the prosodic structure is specified in terms of a tree structure with labelled branches; I hope that these two (mutually exclusive) uses of the accent mark do not cause confusion.

The term Prominence, as it is used in this paper, is an impressionistic term referring to a subjective assessment of how much a syllable stands out in relation to other syllables. Unfortunately, as is generally the case with the use of this term in phonology, it remains rather obscure what is the relation between this alleged parameter of prominence and, say, (a) the inherent syllable weight as determined by segmental structure, length and presence or absence of stød, (b) the extrinsic pitch which the syllable gets by virtue of its placement in an utterance with a specific intonation and a specific distribution of full stresses, and finally (c) linguistic stress (lexical and emphatic) on this particular syllable. I do not here take "prominence" to be an independent parameter, however.

Finally, there is the question of terminology referring to degrees of stress. There is a proliferation of terms referring either to stresses as such or to syllables, or both, and in part referring to the function of stress as a signal of subordinating constructions, cf. such pairs as "strong"- "weak", "heavy"- "light", "main stress"- "secondary stress". I have not strived at being strictly consistent in this paper, but whenever it is important to make

clear that I take stress gradation (outside of emphasis) to be a matter of reduction or downgrading, I refer to the unreduced stress as full stress and to all occurrences of an underlying stress that undergoes reduction, as reduced stress. Syllables whose stress is reduced to such an extent that they might just as well be underlyingly stressed, are said to have (reduction to) weak stress. The term zero stress is used in some cases to refer to lexical absence of stress, which comes out phonetically as weak stress, of course. In many cases, however, I have found it more convenient to speak of stressed versus unstressed.

B. MORPHEME STRESS

If one looks at individual morphemes (disregarding for the moment all stress gradings that are conditioned by the larger context), there are two basic questions to be asked about accentuation: (1) is the morpheme in question inherently stressed? and (2) if so, where is the inherent stress placed?

(1) As for the question of inherent stress, it is possible to start with the formulation of a phonological condition: a morpheme cannot be inherently stressed unless it contains at least one full vowel. This takes care of inflectional endings, which contain only consonants and schwa. There are also a couple of derivational suffixes, viz. *-(l)ig* and *-(n)ing*, which are unstressed (at least if they are not followed by one or more inflectional syllables) and which may be claimed to have schwa underlyingly, although they surface with a full vowel (respectively [i] and [e]); under this analysis (which, by the way, has been current in Danish structural dialectology) the absence of stress is straightforward. It is less simple, however, with other derivational affixes.

As for prefixes, I wish to contend that these are, as a rule, inherently stressed but undergo the process of Intra-Word Unit Accentuation dealt with in the next section. The inventory of items that count as prefixes in this sense includes a variety of roots and prefixes of Latin or Greek origin, a few (but highly frequent) prefixes of Low German origin, and at least one prefix of Danish origin, viz. *u-* 'non-'. Some of these items have a complex morphosyntactic and phonological behaviour in that they behave like root morphemes (forming compounds or quasi-compounds) in some cases but like prefixes (undergoing Intra-Word UA) in other cases; this very complex issue has to be left totally aside in the present paper. There are some other items, however, such as the Low German ones (e.g. *be-*) or Greek *filo-*, *antropo-*, *theo-*, etc., which do not normally occur under stress and which might thus be defined as inherently unstressed. If, however, such items are put in relief for the sake of contrast with other prefixal material, the stress invariably falls on one specific syllable (unless it is some other syllable, rather than the whole item that is put into

relief): *jeg sagde "antroposof, ikke "theosof"* 'I said a., not th.' (without such relief, both words have a main stress on the last syllable). Thus, it is relevant to know where to put the emphatic stress in such cases, in casu on the first syllable of the item in question.

This raises the question whether the specification to be made here, viz. for inherent stress placement, presupposes inherent stress or not. It depends, of course, on the definition of these concepts, and I am not sure what is the best solution. At present I am assuming, however, that the concept of inherent stress should be extended to cover not only morphemes that actually surface with a stress degree above "zero stress" but in fact all morphemes with a full vowel. "Inherent stress" then, does not imply that the morpheme in question typically occurs with a main stress but rather that there is a unique syllable within this morpheme serving as the carrier of potential stress and that the morpheme appears with a main stress unless it enters a construction conditioning some other accentuation. - Some morphemes, then, rarely or never occur under conditions where a normal main stress can occur, but they may still have inherent stress in this weaker sense.

Suffixes containing a full vowel syllable are inherently stressed, and as with prefixes, there are some idiosyncracies of word formation associated with individual suffixes. No attempt will be made here to account for these idiosyncracies. It can be mentioned, however, that there are just a couple of suffixes that behave phonologically like root morphemes, i.e. which form quasi-compounds (this set includes *-dom, -hed, -skab*, cf. German *-tum, -heit, -schaft*), and that these suffixes consistently do so. Otherwise, the vast majority of suffixes enter into a proper simplex word construction with the preceding material so that the rule for simplex word accentuation (Intra-Word UA) applies. I refer to an earlier paper (Rischel 1970) for a more detailed discussion (including the special pattern of accentuation exhibited by lexical cognates such as *mekanik, mekanisk, mekaniker*).

As for root morphemes, it would be perfectly possible to claim that some function words are inherently unstressed. This would not be true of all the "small" words that are normally unstressed, however. If we take a pronoun such as *mig* 'me', it certainly is the case that this item mostly occurs with a weak stress, cf. *han besøgte mig* 'he visited me', but it should be noted that the pronoun is stressed as part of a complex noun phrase even if there is no additional emphasis: *han besøgte Pêter og mig* 'he visited Peter and me'. However, it is true of certain conjunctions and of certain modal particles (such as *skam* 'certainly') that they occur with weak stress under all normal syntactical conditions (conjunctions may be emphasized, however), so that their situation resembles that of prefixes like *be-* or *filo-* (to the extent that these are synchronically morphemes at all).

Generalising the notion of inherent stress to comprise all morphemes with a full vowel might seem to create a descriptive problem, viz. that of accounting for the difference between those morphemes that actually do emerge with a main stress in phonetic strings, and those that do not (under normal conditions). However, this problem turns up anyhow: if certain lexical items are inherently unstressed, we have to try to account for that fact; if they are considered inherently stressed, the fact that they normally occur with a weak stress will largely follow from a description of the types of constructions into which they enter, which must be supplied in a complete grammar anyway. - Still, I wish to leave it open whether one should exploit the possibility of distinguishing between morphemes with and morphemes without inherent stress in formulating stress rules.

(2) Now, for morphemes with more than one syllable with a full vowel, the next question is to what extent the placement of stress on a particular syllable is predictable. The morphemes in question are almost all borrowings such as *violin*, *diamant* ('diamond'), *alabaster*, *petroleum*, *jeremiade*, but there are also a few fossilized compounds of Old Danish origin such as *vindu(e)* ('window', from *vind* 'wind' and *øghæ* 'eye'). Moreover, there are numerous items which more or less transparently consist of a prefixal part and a remainder. Among those that are historically formed with a Low German prefix there are many which are readily analysable, although they are lexicalized with a more or less unpredictable shade of meaning, e.g. *beholde* 'keep' (cf. *holde* 'hold'), whereas others contain no meaningful stem after the prefix (e.g. *begynde* 'begin': there is no **gynde*). It is obviously true of many of these borrowings from Low German (or in some cases from High German) that they form a transitional area between straightforward derivations and monomorphemic stems. The same is true of complex formations containing Greek or Latin material such as the above mentioned examples *antroposof*, *filosof*, *teosof*. Technically, there is evidence enough for a synchronic analysis into constituents, cf. that *-sof* contrasts with *-log* in *antropolog*, *filolog*, *teolog*, but again, such items are typically lexicalized with specialized meanings, and there is no sharp limit between synchronically complex and monomorphemic items of this kind.

This is well known from other languages as well. The important thing is that the stress rules must be designed in such a way that the words come out right even if they are taken to be monomorphemic; it must simply be allowed for that some speakers lexicalize them as complexes, and others as monomorphemic items.

As shown in detail elsewhere (though in a very provisional format: Rischel 1970, p. 119-130), stress placement is to a considerable extent predictable from surface segmental structure.¹ The strongest generalization is that if one syllable has a long vowel, the stress falls on this syllable. Otherwise there is a rank-ordering so that (with the exception of certain loans from French) a closed syllable takes precedence over an open

syllable in attracting the stress. If an inter-vocalic consonant is supposed to go with the following syllable from the point of view of stress assignment (which, by the way, may be in conflict with the role of syllabification in segmental phonology), the second principle takes care of the final stress in forms such as *paríjk* 'wig', *stakít* 'railing', *parasól*, but there is a more general prevalence of final stress if the last syllable is closed, cf. *komplót* 'plot', *bandít* 'rascal' (this is certainly not without numerous exceptions, however). If the final syllable is open (and the vowel short), the stress is non-final: *fóto*, *gállá* (with a short *l*), with the exception of French loans such as *coupé* ([ku'pɛ] as a designation of a shape of a car, but *kupé* [ku'pɛ:] in the sense of 'compartment').

The accentuation of a variety of structure types is thus predictable, cf. the following examples (note that *-er* of *alabaster* and *-e* of *jeremiade* are schwa-syllables, spelled - as is regularly done - with *e*): *violí:'n*, *diamán't*, *alabáster*, *petró:'leum*, *jeremiá:de*, *víndu*, etc.).

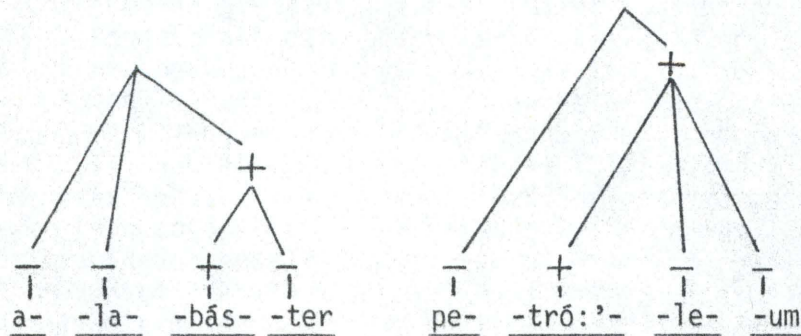
It is interesting that there is a tendency in low-standard Danish toward initial stress in root morphemes; this tendency manifests itself only sporadically but typically in cases where it is in direct conflict with the very strongest generalization concerning syllable structure and stress placement, viz. that a long vowel has stress. One such example is *remoulade*, in standard pronunciation with stress on the penultimate, which contains a long vowel: *remu-lá:de*, but in a low-standard usage with initial stress: *rémula:de*. It is conceivable that one should speak here of a restructuring into the prosodic structure of compounds; anyway, this tendency (possibly toward quasi-compounding) does not invalidate the stress placement rules as such, since it hits only sporadically.

The accentuation of wordforms that surface with more than one long vowel is not defined by such criteria as those above; the generalisation here is that the wordform behaves like a compound (see section I.E), and this happens also with some wordforms which do not syntactically qualify as compounds (quasi-compounding). Another problem is raised by stems with alternating placement of vowel length and hence of stress, e.g. *mó:tor*, pl. *motó:rer* (cf. Rischel 1970, p. 134-136).

Now, simple principles like those outlined above (or the more elaborate set given in Rischel 1972 without reference to syllable boundaries) predict a good proportion of the word stresses, but they are contradicted by several forms such as *abrupt* (versus *mástiks* 'mastic'), *dámask*, *Cán'ada*, *basíl'ikum*. It is possible to exploit the differential placement of syllable boundaries in clusters (thus refining the concept of "light" versus "heavy" syllable), but there will be a residue anyway,

C. THE HIERARCHICAL MODEL

As it will appear from the generalisations about morpheme stress above, a monomorphemic lexical item may contain both pretonic and posttonic zero-stress syllables. Is there in this case a simple concatenation of syllables in a linear arrangement, or do they enter a hierarchical arrangement? It is dubious whether there is any evidence for such a hierarchy as far as stress is concerned. If some syllables among the unstressed ones are felt to be more prominent than others, this is probably ascribable to two factors, viz. (1) that each syllable has an inherent degree of prominence, which is a function of its phonological make-up (closed syllables having more prominence than open syllables, and syllables with a full vowel more prominence than syllables with schwa), and (2) that the pitch contour associated with a full stress (Thorsen 1980) supplies each syllable with a tone level (Fo level) which contributes to the impression of more prominence or less prominence. I have not considered it useful to build such considerations into the assignment of hierarchical structure to a clustering of zero-stress syllables around a full-stress syllable (and my model therefore comes to look somewhat different from those posited for English in recent work such as Liberman and Prince 1977 and Selkirk 1980). However, there seems to be more of a break between the pretonic part and the remainder than between the posttonic part and the syllables preceding it; this appears in that it is possible to hesitate between the (last) pretonic syllable and the stress-syllable rather than elsewhere, and that there may be an extremely sharp intonational break here. I therefore venture to suggest a hierarchical arrangement as follows, where each branch that has the stress-syllable as one of its ultimate constituents is supplied with the label "plus", and all other branches are supplied with the label "minus" (corresponding, respectively, to the labels *s* = "strong" and *w* = "weak" of the nomenclature used in metrical phonology):



It appears from these examples that there is a redundancy built into such a hierarchical representation, since the plus-labelling is associated with the presence of lexical stress /´/. It has been argued recently by Selkirk (Selkirk 1980) that the feature of stress, as something distinct from the labelling of the hierarchical trees, can and should be eliminated from phonological theory. This approach obviously eliminates both the

redundancy and certain well-formedness conditions such as the following: "only a stressed syllable may be the strong element of a metrical foot" (Lieberman and Prince 1977, p. 265, also see p. 279-280).

However, I prefer to preserve the distinction between inherent stress (in the sense in which it has been defined above) and the labelling of prosodic trees, since the properties are essentially different. Inherent stress has to do with the fact that there is a syllable which can occur with a full stress, and whose presence is a condition on the well-formedness of a hierarchical structure of a certain type. In turn, there are well-formedness conditions on syllables with inherent stress saying, for example, that such a syllable must have a full vowel. It is possible to collapse these findings into one complex set of conditions on the well-formedness of hierarchical structures, but it should be noted that lexical (inherent) stress is not fully predictable, so that some syllables must be underlyingly marked for stress anyway. Thus, it seems to me that it is more meaningful to say that the hierarchical organization refers to inherent stresses in all cases, and that there are redundancy conditions predicting where these stresses are located in a great many cases.

D. INTRA-WORD UNIT ACCENTUATION

Examples such as *plastik*, *bilist* illustrate the basic mechanism of Unit Accentuation (UA), as it operates on sequences of stressed morphemes to produce simplex wordforms with one single full stress.

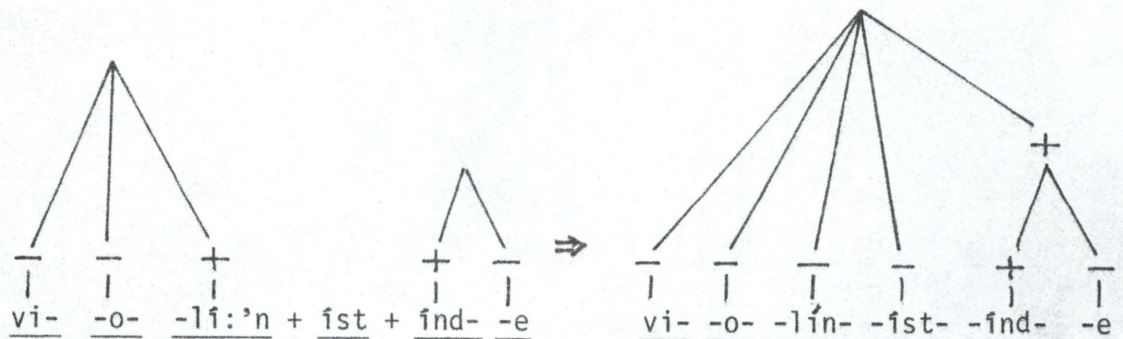
In accordance with tradition (including O. Jespersen's insightful contributions to the understanding of how Danish stress functions) I use the term Unit Accentuation (UA) about stress reduction as a function of hierarchical patterning (in contradistinction to, say, the lower prominence associated with backgrounding under certain discourse conditions, or stress enhancement due to emphasis for contrast). It is traditionally used in Danish phonetics about phrasal stress, but I use it also about the stress mechanism in simplex words consisting of several, inherently stressed morphemes (whereas I use the term "compound stress" for the pattern of compound, although this is also a matter of unit accentuation, albeit of a different kind). The term UA is more directly suggestive of the actual function of this stress mechanism (as I see it) than other terms which are more current in phonological literature ("nuclear stress" focusses on some alleged enhancement of a stressed syllable, not on stress gradation as a signal of the union per se, and the term "phrasal stress" is obviously more restrictive than the term I have adopted here).

Like the nuclear stress rule of Chomsky and Halle (1968) this rule of word internal stress reduction simply downgrades all non-final stresses. However, provided that the impression of syllable prominence as a function of pitch contours and inherent sonority is taken care of separately, there seems to be no need for a grading of stresses beyond the distinction between full stress and weak stress (= zero stress): all non-final syllables simply appear as pretonic ones. Thus it is perfectly possible to formulate the rule of Intra-Word UA like this: delete all inherent morpheme stresses except for the last one within the wordform. Example:

viol:'n 'violin'
viol:'n+*ist* → *violinist* 'violinist'
viol:'n+*ist*+*inde* → *violinistinde* 'female violinist'

This approach has the attractive property that the output of the rule looks exactly like a monomorphemic lexical item. Thus the theory does not force the analyst to generate the accentuation of such derivatives by rule: they come out the same way if they are taken to be lexicalized as monomorphemic items (though the inherent stress on the last syllable with a full vowel is then only in part structurally predictable).

It is also possible, however, to handle the operation of this UA rule in terms of stress trees. The trees for individual morphemes are then taken to be united by the application of UA (i.e., UA is a structure transformation), the rightmost inherent stress being the determinant for the selection of the resultant highest "plus" branch:



This somewhat more complex way of handling the process has the advantage that the output fits directly into the prosodic tree that will be needed anyway; it just requires a convention to the effect that pretonic occurrences of inherent stress, i.e. /' / occurring under left branches labelled "minus", are neglected in the phonetic interpretation of the surface representation (as are the boundaries between the constituent morphemes).

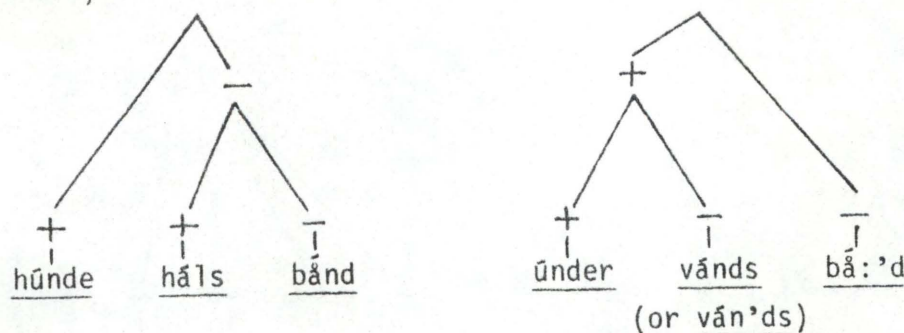
In this paper I do not go into the question whether boundary symbols have a status in phonological representations except insofar as they mark the bound-

aries of a unit of a certain rank in the prosodic hierarchy (cf. Selkirk 1980, p. 580 for arguments against the separate relevance of grammatical boundaries in phonological representations). It is obvious, however, that grammatical structure is relevant to prosodic structuring, though there is non-conformity between the two. In the representations below I indicate morpheme boundaries and certain other boundaries, whenever it seems useful to make the type of construction clear.

E. COMPOUND STRESS

The next step is the generation of compound stress. I demonstrated in an earlier paper (Rischel 1972) what a hierarchical model of compound stress may look like for Danish. I shall just summarize the main points here without going into much detail (especially since the model I am using is quite similar to that of recent metrical phonology, and since the basic mechanism of compound stress is the same as in English). (See Basbøll 1978 for an alternative approach with 3 stress degrees.)

A tree structure being defined in accordance with the syntactic constituent structure of the compound (with or without certain adjustments), the resulting syntactic tree is matched by a prosodic tree in which the leftmost constituent on each level hangs under a branch labelled "plus", whereas all other branches are assigned the label "minus", cf. *hundehalsbånd* 'dog's collar' and *undervandsbåd* 'submarine' (literally: 'under-water boat'):



The relative degree of stress is, then, a function of this structure, there being an interpretive convention looking at the ranks of nodes and saying something to the effect that (1) a minus branch implies weaker stress than a plus branch under the same node, and (2) a minus branch under a node of rank X implies weaker stress than a minus branch under a node of rank X-1. (It is open to much debate how one should formulate such an interpretive convention; first of all, it depends on what "degree of stress" really means, but I shall not go into that here.) Accordingly, in the first example *bånd* has weaker stress than *hals*, and both of these items weaker stress than *hund*; in the second example *vands* has weaker stress than *under* and *båd*, and *båd* in turn has weaker stress than *under*.

In transcription with stronger and weaker secondary stresses:
 ['hunə₁ | hals₁ | bæn'] ['ɔn₁ | vans₁ | bɔ:'ð].

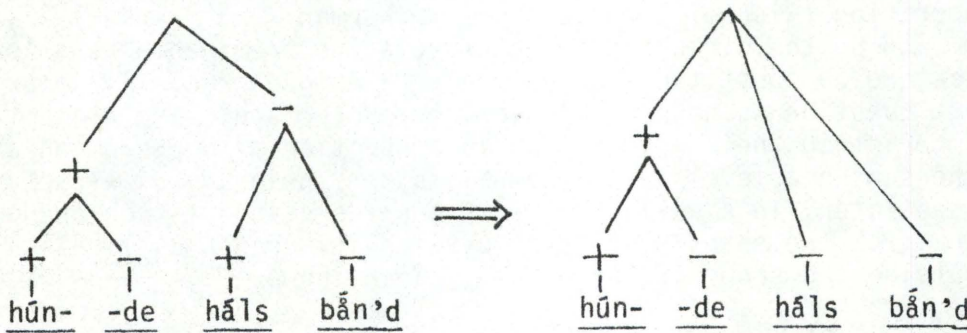
It is typologically relevant to mention that this scheme generalizes to the vast majority of Danish compounds. It was mentioned above that basically, the prosodic mechanism of compounding is similar to that of English, but it differs in having a very much stronger preference for plus-minus (= strong-weak) rather than weak-strong marking on sister branches (the opposite, i.e. stronger stress on the rightmost constituent, occurs only in a small set of compounds typically belonging to specialized spheres of usage).

There has been some discussion as to whether such a model of accentuation makes it possible to assign stress without the use of a phonological cycle. This is an extremely important theoretical issue since the alleged cyclicity of (English) stress assignment has been used as a main argument for the very existence of such a thing as a phonological cycle. I do not wish to challenge the view that hierarchical structure assignment involves cyclic application of rules (cf. Kiparsky 1979); Liberman and Prince (1977) show the existence of "trans-lexical" regularities in English which invite a treatment in terms of cyclicity. But in the present context the essential thing is that the specification of phonetic stress on the basis of a hierarchical representation is accomplished in one complex operation (Rischel 1972, also cf. Liberman and Prince 1977, p. 258 on the direct encoding of relative prominence as a local feature on constituent structure). - A more crucially important question is how phonological rules (prosodic and segmental) interact in their application in connection with phenomena at the sentence level such as emphasis or "shrinkage of structure" (see later) in casual speech. A consideration of such phenomena from the point of view of cyclicity or non-cyclicity is outside the scope of the present paper, however.

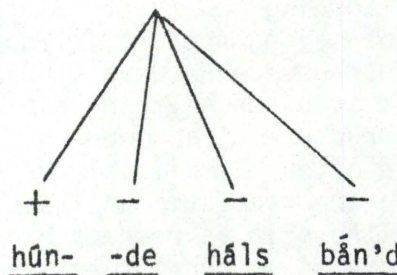
Returning now to the hierarchical model as such, it goes without saying that it is too simplistic to posit a one-to-one correspondence between syntactic and prosodic trees. For one thing, it is often anything but evident what is the internal syntactic structure of a compound. In actual practice the stress pattern is often - implicitly or explicitly - taken into consideration in the syntactic analysis. This is perfectly legitimate (stress is as respectable a cue to syntactic constituent structure as is constituent order), but of course such an approach means that no additional insight is gained by explaining the prosodic hierarchy in terms of syntax. Another thing is that the accentuation of Danish compounds often reflects a tree structure that is in conflict with an intuitively reasonable IC analysis. It must, then, be the case that certain structure transformations (STs) are involved in defining the relationship between syntactic and prosodic trees, unless the compound in question is lexicalized with an idiosyncratically aberrant syntactic structure (or no such structure at all). - As for compounds exhibiting no structural idiosyncracies there are

several ways in which these may be handled in a linguistic description, since (1) the syntactic constituent structure may be lexically stored or generated by rule, and (2) the prosodic structure may likewise be part of the lexical representation or derived by rule. Under the assumption that we are dealing with productive patterns I prefer to assume that the relevant structural generalisations and mapping rules all exist in duplicate form: as rules for productive compound formation and as redundancy conditions on lexicalized items.

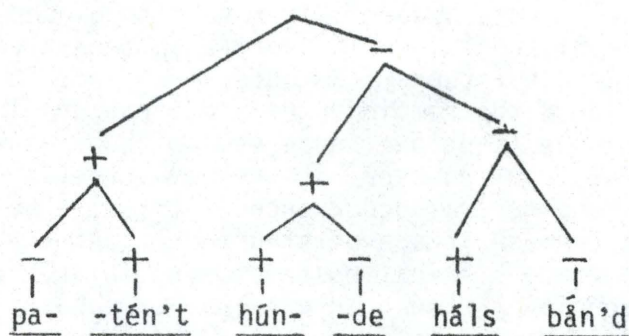
The most important ST is loss of ranking differences or, put differently, shrinkage of structure (the hierarchy ultimately collapsing into a simple concatenation). There is in Danish an overwhelmingly strong tendency to lower all but the two highest degrees of stress (as predicted from the hierarchical representation) to the lowest level, and there is even a strong tendency to lower the next highest degree of stress ("secondary" stress) in right-branching structures. What remains, then, is a sequence of weakly stressed syllables, whose relative prominence is a function of properties of the string which are not included in the labelled tree as such. If these are disregarded, the structure of *hundehalsbånd* above looks as follows if shrunk (for clarity, the branching within each lexical constituent is indicated here as well, in contradistinction to the simplified representation above):



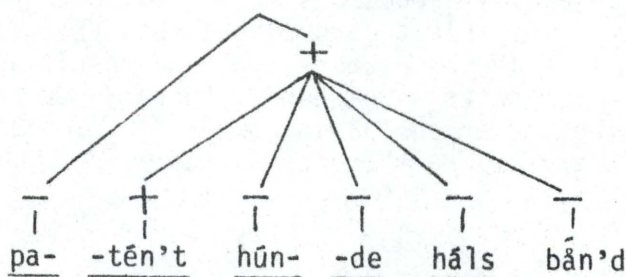
and with further shrinkage into



The same applies to more complex compounds such as *patent-hundehalsbånd* 'patented dog's collar' (possibly not in current use, but a perfectly well-formed compound):



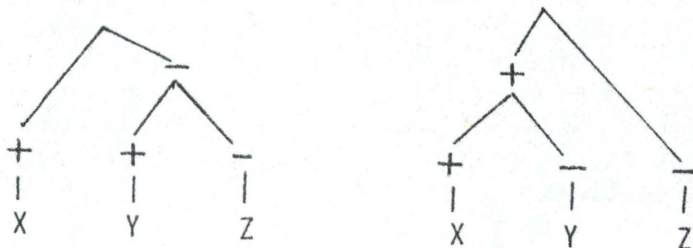
possibly with shrinkage into:



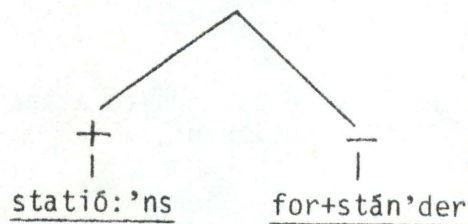
(the pretonic syllable is here assumed to attach to the reduced structure as an immediate constituent, which may not be an adequate analysis).

Left-branching structures such as that of *undervandsbåd*, on the other hand, are less likely to shrink to structures of minimum complexity, but may do so in allegro speech.

In some instances it is difficult to decide whether we really have a shrinkage of structure or a change in the assignment of branches to nodes. There may be a tendency to swing a branch that branches off to the left under a right branch and to attach it so that it branches off to the right under a left branch:



Maybe the ST involved - if this occurs - is rather to be conceived as affecting the rightmost constituent (Z in the structure above), moving this constituent from under the lower node and Chomsky-adjoining it to the remainder of the structure in terms of a new, higher node (the lower node vanishing by convention). The basic question, however, is whether there is empirical evidence for the general occurrence of this mechanism (as something distinct from shrinkage of structure). At any rate, it may be the source of lexical restructuring in several compounds with the adverbial *for* such as *stationsforstander* 'station master'. This compound is formed on *forstander* 'master' (literally 'fore-stander') with full stress on *for-*, and accordingly one would expect the right-branching prosodic structure of *hundehalsbånd*, but what actually occurs is a stress pattern with more prominence on the third constituent than on the second (unless all reduced stresses are downgraded to weak stress). It is possible to argue that this is an instance of the ST outlined above; however, the end result is rather lexical restructuring to a compound with only two word-level constituents, the latter containing prefixal *for-* (I disregard the fine structure of the hierarchy here):



Restructuring is not surprising in this very type, since adverbial (and inherently stressed) *for* is easily confused with prefixal *for-* (from Low German); in the particular example under consideration it may even have been supported by the spurious similarity with formations such as *forstán'd* (meaning 'wit' and being semantically quite unrelated to the noun *forstander*).

Otherwise there may not be very much restructuring of this kind, and on the whole, the accentuation of Danish compounds does not seem to require much machinery for its specification. So far I have found no compelling evidence for operating with rhythmic perturbations which are determined by the word structure itself, but then the phonetic details of Danish stress await closer investigation.

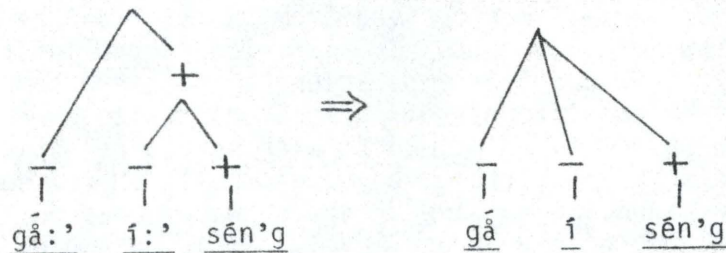
F. PHRASAL UNIT ACCENTUATION

The last component to be dealt with in this package of stress assignment mechanisms is Phrasal UA (Unit Accentuation). This operates according to the same principle as Intra-Word UA, i.e. all but the rightmost constituent hang under minus branches,

and the expected hierarchical structure typically shrinks to a one-node structure, cf.

gǎ:' í:' sɛn'g → *gǎ i sɛn'g*

or, in the tree structure model:



Except for a high level of distinctness, the difference between inherent /˘/ and zero stress seems to be ignored in such constructions, but it is an open question whether there is a structure-independent impression of differences in prominence between syllables with a full vowel and syllables with schwa (whatever its surface reflex), e.g. between the underlying full-vowel syllable *gǎ* and the underlying schwa-syllable *-ger* ([gɔ] versus [gʌ]) in

hun vil gǎ i seng [hun ve gɔ i 'sɛŋ'] 'she intends to go to bed'

hun ligger i sengen [hun lɛgʌ i 'sɛŋ'n] 'she is in bed (as a patient)'

This whole area awaits further phonetic study.

I shall state the conditions for Phrasal UA in considerable detail later in this paper. For the moment the above remarks may suffice.

At this point I wish to comment on another issue, viz. the necessity for operating with a "metrical grid" as posited in Liberman and Prince (1977). One of the interesting mechanisms handled in terms of a metrical grid is "iambic reversal" (p. 319). We do find a phenomenon of this kind in Danish, but interestingly enough, it does not seem to be crucially dependent on whether the constituent in question is inherently stressed, so one may question whether the conditions set up for "iambic reversal" are really met in Danish, cf. that the prefix syllable *be-* (which never occurs with a full stress) may perhaps be experienced as more prominent than the root syllable *gǎ* in phrases such as *begǎ selvmord* (with stress on *selvmord*) 'commit suicide', although the wordform *begǎ* in itself invariably has stress on the root syllable. Maybe we have here a more general tendency toward a gradual downstepping in a series of pretonic syllables, which should perhaps be kept apart from the specification of the hierarchical structure proper.

G. HOW ARE THE COMPONENTS OF STRESS ASSIGNMENT RANKED?

We have seen that UA operates both within simplex words and within phrases, and that there is a compound stress mechanism (with the reversed marking of sister branches in terms of "plus" and "minus") operating on compounds in the widest sense. Now, each part of a compound may be a derivative undergoing Intra-Word UA (cf. *violinist* derived from *violī:'n+ist* as occurring in compounds such as *hofviolinist* 'court violinist' and *violinistkonkurrence* 'v. competition'), and since compounds may also occur as constituents of phrases undergoing phrasal UA (cf. the compound *indføre* 'import' with stress reduction in the phrase *indføre våben* '(to) import weapons'), there seems to be no way of avoiding to have UA apply twice: once on the word level and once on the phrase level. It is possible, however, to claim that the results of both types of UA are collapsed into one structure, and that this is true even if the last constituent of the phrase in question is a compound, as in *hun vil til violinistkonkurrence* 'she intends to go to a violinists' competition'. This implies that the highest-ranked branching in such a construction is between all material up to the boundary between the two (immediate) constituents of the compound on the one hand, and the second (immediate) constituent of the compound on the other, i.e. that the compound boundary has a higher rank than other phrase-internal boundaries (this point has been made by H. Basbøll (1977)).

There may well be a level of phonological specification for which this yields the most adequate representation. However, in surface phonology a basic rearrangement seems to take place, the syllables grouping now in clusters defined by an initial full stress. Nina Thorsen, who has demonstrated the relevance of this segmentation in connection with the specification of intonation contours, refers to such clusters as "stress groups". I shall here venture to speak of a foot, although this certainly does not fall in with the use of this term in, say, Selkirk's work (Selkirk 1980). - It will be shown toward the end of this paper how this concept of foot structure in Danish surface phonology can be reconciled with the model(s) outlined so far. As I shall argue later, this is basically a matter of more abstract versus more surfacy levels of specification. The status of Phrasal UA is crucial for the understanding of such differences in level of abstraction. I shall, therefore, consider the conditions for application of this mechanism in some detail before returning to the theoretical discussion of models of phonological description in section IV. (Section II takes stock of the phrase types in which UA occurs in Danish and hopefully demonstrates that the distribution of Phrasal UA in this language is very different from that of the other Germanic languages that have been within the sphere of interest in recent discussion. Section III deals with the accentual pattern of phrases which have become disrupted by movement transformations.)

II. SYNTACTIC AND SEMANTIC CONDITIONS FOR DANISH PHRASAL UA

Looking at phrases devoid of emphatic stress (in the widest sense), what are the basic generalisations to be made about UA?² We shall consider first certain modifiers with idiosyncratic behaviour, then noun phrases with a noun as head of the construction, then phrases with an adjective or adverb as head, then prepositional phrases, then auxiliary plus main verb, then verb phrases with an object, a "subject-object" (Diderichsen's term), or a subject or object predicate. Needless to say, this survey has to be very brief, and numerous problems must be left totally aside. One major omission is made for the sake of space and clarity of exposition: fixed idiomatic phrases which exhibit unit accentuation but do so without conforming to the general pattern, are here for the most part ignored, the point being to describe the productive pattern of accentuation of ordinary grammatical constructions, not to give an exhaustive account of the whimsies of lexicalized phrases.

A. A SURVEY OF PHRASE TYPES WITH UNIT ACCENTUATION

1. MINOR CATEGORIES OF WORDS WHICH NORMALLY UNDERGO STRESS REDUCTION

In order not to complicate later parts of this survey, it is necessary to start by mentioning the existence of certain restricted sets of words which normally occur with weak stress (when not emphasized), and whose lack of a full stress may be ascribed to a more generalized application of UA than the types listed below. The words in question fall into two main groups.

One group consists of certain words ranging in syntactic function and semantic content from an article-like status over a more general quantifier status to clearly adverbial, numeral or pronominal status. It comprises, for example, such items as *en* 'a, one' (neuter *et*), *lidt* 'a little', *nogen* 'some' (neuter *noget*, plural *nogen/nogle*), and personal pronouns: *jeg* 'I' (cf. section I.B above), etc. The generalisation is that these items have stress reduction to weak stress if they occur as the leftmost immediate constituent of a syntactic construction of which they are not the head (that is, the item in question must either be a modifier, or IC of an exocentric construction). Examples: *en mand* 'a man', *lidt mere* 'a little more', *lidt sent* 'a little late', *noget ost* 'some cheese'. This occurs only if the item is semantically reduced to an indefinite article or article-like quantifier or is used anaphorically (not deictically). Accordingly, there is a difference between *en mand* 'a man' and *én mand* 'one man (numeral)' and between *nogen (nogle) mennesker* 'a few persons' and *nógen (nógle) mennesker* 'certain people' or 'quite a few people'.

There are obviously three ways of accounting for such contrastive pairs. One is to say that *en* and *én* are simply distinct lexical items (and similarly for the other pairs), and that some such items are inherently unstressed, others stressed. Another possibility is to take them as distinct lexical items but to claim that all these items take stress underlyingly, although one subset (definable on semantic grounds) normally appears with weak stress due to UA. Finally, one may use the same explanation in terms of stress reduction due to UA, but attempt to group the forms with and without susceptibility of UA as pairwise variants of one lexical item each. The question of how to handle such phenomena lexically is of course outside the scope of this paper; I shall just point to the possibility of speaking of UA even in these cases.

With the personal pronouns there are additional generalisations to be made, however, since weakly stressed forms occur also finally in constructions: *han sér mig* 'he sees me', *han gik efter hende* 'he followed her' (literally: 'went after her'), i.e., stress reduction occurs as a general feature of these items unless a syntactic or semantic condition blocks stress reduction. One syntactic feature blocking it is occurrence in construction with a sister constituent, cf. *han sér mig og Péter* 'he sees me and Peter', and one semantic feature blocking it is distinctly deictic function.

The other main group comprises certain conjunctions such as *og* 'and', *at* 'that'. I shall confine myself to just stating that these are normally weakly stressed, as are certain modal particles such as *skam* 'certainly' (which are probably inherently unstressed, cf. I.B above).

2. NOUN PHRASES

Although most types of NPs do not exhibit UA, there are some that do (in addition to those containing the items mentioned above). This is true of constructions indicating unit of measure + species: *en sum penge* 'a sum of money', etc. Quantifiers not belonging to the category mentioned in A.1 are not included in the domain of UA, however, cf. *tré* in *tré liter mælk* 'three litres of milk', *dénne* 'this' in *dénne liter mælk*. - The measure nouns are stressed outside such constructions, i.e. phrase finally: *en (stór) sum*, *en (hálv) liter*, or if the following constituent is not of NP status: *et kilo af dét dér* 'a kilo of that'.

Other such noun phrases likewise take UA. Various subgroups may be distinguished, depending on whether the constituent parts are proper names or not, and depending on the type of reference involved (unique reference or other), cf. such subsets as:

(a) *Anker Jørgensen*,³ (b) *Dronning Margræthe* 'Queen Margrethe', (c) *Margrethe den Anden* 'Margrethe the Second', (d) *linie tól* '(bus) no. 12', *hjerter dâne* 'queen of hearts', (e) *pastor eméritus* 'retired clergyman'.

A considerably more complex situation is found with clearly hypotactical proper names, viz. those consisting of modifier plus head. If the second constituent is in itself a compound, the general rhythmical tendencies favour UA: *Kongens Nýtorv* ('the King's New Square', a place name in Copenhagen), *Østre Låndsret* 'the High Court of East Denmark' (*østre* means 'eastern'). We can also recognize UA in several proper names consisting of an N in the genitive plus a (not otherwise determined) simplex N. Such names are normally written as single words, although they fit perfectly into the pattern of two-word phrases and in spite of their being in conflict with the regular accentuation of compounds; an example is *Christiansborg* (literally: 'Christian's Castle'), as against the regular compound type *Christianskirken* 'Christian's Church', *Fólketinget* 'The Parliament' (note the definite article on these compounds!). - Note that proper names whose second constituent is a simplex common N, do not normally exhibit UA but rather occur with compound accentuation like *Christianskirken* (with or without this phonological compounding being reflected in spelling).

Complex noun phrases other than the types mentioned above but consisting of separate nouns and/or adjectives (i.e. not compounds) fail to exhibit UA. If there is no emphasis, there simply is not any stress gradation. Unlike the alleged pattern of English, for example, the adjective and the noun have equal stresses in phrases such as *en gammel mând* 'an old man'.

The most general statement about noun phrases, then, is that UA does not apply except in certain rather well-defined types of constructions.

3. PHRASES WITH AN A OR ADV AS HEAD

Modifiers of type A.1 above left aside, such constructions do not normally exhibit UA. (There is a marginal exception, viz. the type *derhénne* 'over there', *herínde* 'in here', with a largely anaphoric function, as against the overtly deictic *dérhénne* 'over there', *hérínde* 'in here'.)

4. PREPOSITIONAL PHRASES

The statements below only refer to the accentual relationship between preposition and remainder, the latter constituent being in itself an NP (which follows the rules of accentuation as outlined in A.2 above, if the head is a noun).

The "remainder", i.e. the constituent part governed by the preposition, is in itself fully accented. As for the preposition,

it is true of most of the frequent, monosyllabic prepositions that these trigger the application of UA in prepositional phrases, provided that the preposition is immediately followed by the material it governs. Prepositions seem to have a very different susceptibility to stress reduction, however. This is in part a matter of their phonological "heaviness", inherently short syllables being more strongly affected than long syllables, and monosyllables more so than bisyllables (this scale may be exemplified by *ved*, *bag* [bæ:'i], *bagved*: *ved åen* 'at the river', *båg/bag húset*, *bågved húset* 'behind the house'. Semantic factors are also involved, although their role is still poorly understood (cf. that there may be a discernible difference in meaning between *han sprang over åen* and *han sprang óver åen*, both literally meaning 'he jumped across the river', but with the possible difference that the former focuses on the route, and the latter rather on the accomplishment of crossing the river).

The generalisation above about UA is contradicted by the occurrence of two types of constructions, in which the preposition does not undergo stress reduction.

One of these types is defined by the occurrence of only a "light" pronoun in the NP slot of the PrepP. Light pronouns include personal pronouns and the (closely related) anaphoric *den* 'it', neuter *det*, plural *de* 'they' (also in suppletion with the third person personal pronouns). Such pronominal forms as NPs are weakly stressed in anaphorical function and acquire stress only under emphasis. A PrepP consisting of a preposition and such a pronoun accordingly preserves the inherent word stress of the preposition: *på mig* 'on me', *med ham* 'with him', *fóran hende* 'in front of her', etc. (note that these phrases agree with phrases with normal UA by having only one main stress). If there is additional, heavier material in the NP slot, however, UA applies instantly: *på mig selv* 'on myself', *på os begge* 'on both of us', and if the function is not strictly anaphoric (but more or less clearly deictic), the pronoun takes word stress, and UA applies as expected: *med hám* 'with him (over there)'; also cf. *med hám vi besøgte* 'with the one we visited'.

The other type is defined by the occurrence of an infinitival or sentential construction after the preposition, and with no pronominal constituent intervening. In this case there are, as pointed out by Hansen (1977, p. 161), two options: the preposition may lose its main stress by UA, or the stress may be retained:

tænker Óle på/på at réjse? 'Is Ole thinking of leaving?'
tror dú på/på at han har gjórt det? 'Do you think he did it?'

Now, why is this? Hansen suggests that diachronically speaking, the construction is moving from an earlier type in which the infinitival or sentential constituent is in extraposition, towards a modern type in which that constituent is incorporated

in the preceding sentence (viz. as the material governed by the preposition). The occurrence of UA with stress reduction on the preposition, then, represents the latter type, while the stressed preposition reflects the former type, being stressed by virtue of its standing alone as an adverbial phrase.

Old Danish had a construction with the preposition governing pronominal *det* 'it' followed by the remainder in extraposition. This would be literally reflected in Modern Danish as something like

tænker Ole på det at rejse? (stresses ignored)
tror du på det at han har gjort det?

According to Hansen's explanation, the option with a stressed (adverbial) preposition before *at* reflects an intermediate step between this old construction and the expected construction with UA uniting the preposition and all of the remainder.

It seems to me that this is plausible enough, and in synchronic grammar it seems indeed warranted to seek a description along these lines.

5. AUXILIARY PLUS MAIN VERB

The normal pattern with sequences of auxiliary verb(s) plus one main verb (not carrying emphasis) is to have UA involving all verb forms (disregarding the infinitive particle *at* 'to'):

(hvåð ér det vi) skål? '(what are we) supposed to do?'
(hvåð ér det vi) skal háve? '(what are we) supposed to get?'
(hvåð ér det vi) skal have at spíse? '(what are we) supposed to have to eat?'

also cf.

(du) skal lade vére 'don't do it' (literally: 'you shall let be')
(jeg) fik skrévet (artíklen) '(I) managed to write (the paper)'

and even comprising stretches such as

(det) skulle kunne have været gjórt 'it should have been possible to do (it)'

There is, on the other hand, no phrase formation with UA comprising the sequences of verb forms in examples such as

vi pléjer at spíse hér 'we usually eat here'
hun élsker at sýnge 'she loves to sing'.

The difference obviously is that UA occurs with auxiliary plus main verb but not with main verb plus main verb. (This generalisation requires, of course, that the distinction between auxiliary and main verb is well defined, and that we have independent evidence for claiming that such verbs as *lade* 'let', *få* 'get' are auxiliaries in some constructions.)

6. VERB PHRASES WITH ADVERBIAL COMPLEMENTS

This is probably the most difficult pattern to account for. There are specific problems associated with the verb 'to be', which will be left aside here. But even so, generalisations are difficult to make, especially because there is such an enormous number of fixed phrases with UA that it is difficult to test such generalisations empirically without all the time running into the question of what can be labelled a fixed phrase.

UA, as in *gå hjem* 'go home', occurs in extremely many instances. The most conspicuous (and well-known) regularity is that constructions indicating translocation of an object (be it the sentence subject or the sentence object) exhibit UA, whereas related constructions which do not involve such a change of location, fail to take UA. Examples:

(han) *svømmer dérhen* '(he) is swimming towards that place over there'

(han) *svømmer dérhenne* '(he) is swimming (about) over there'.

In such cases the difference in meaning is reflected not only by the accentuation but also by the quasi-inflection of the adverb. There is a small class of place adverbs which are monosyllabic when they have an allative meaning, but take an augment *-e* (phonologically /-ə/ when they have a locative meaning, and *hen* - *henne* is one of these adverbs."

Needless to say, the adverbial complement may instead be one that takes no such "inflection", be it an adverb proper or a PrepP. It then occurs that the only difference is one of accentuation (there being no difference in the orthography), cf.

(han) *faldt i vandet* '(he) fell into the water'

(han) *fåldt i vandet* '(he) fell (while walking) in the water'

or

(det var de penge han) *smed i vandet* '(that is the money he) threw into the water'

(det var de penge han) *sméd i vandet* '(that is the money he) chucked away while (he was) in the water'.

7. VERB PHRASES WITH AN OBJECT, "SUBJECT-OBJECT",
OR SUBJECT PREDICATE

Constructions involving verb plus a "naked" object noun take UA in Danish: *køb hus* 'buy a house' in contradistinction to constructions with an article accompanying the object noun: *køb et hus* 'buy a house' (note that in this case the meaning is so alike that it is not self-evident how to reflect it when translating), or *køb huset* 'buy the house'.

Examples are legio. It is interesting to observe how the indefinite and the definite article function alike in blocking UA, independently of the status of the article as a separate wordform preceding the noun or as an enclitic form:

kan du rede séng? 'do you know how to make a bed
arrange the sheets, etc.)?'

kan du réde en séng? (same meaning, but perhaps indicating a slight scepticism on the part of the speaker as against the neutral question above)

kan du réde séngen? 'do you know how to make the bed?'
(this construction is also possible as a command).

The construction also occurs with mass nouns. Here there is no contrasting alternative with an indefinite article unless the mass noun is used in the sense of species:

han købte óst 'he bought some cheese'

han købte en óst med húller 'he bought a cheese with
holes in it'

jeg pléjer at købe vín fra Bordeaux-distriktet
'I usually buy wine from the Bordeaux district'

jeg pléjer at købe en vín fra Bordeaux-distriktet
'I usually buy a wine from the Bordeaux district'

or, unless the sense of a standardized quantity (a bottle, a package, or the like) is understood:

han bestilte øl 'he ordered some beer'

han bestilte en øl 'he ordered a beer'

However, there is a certain semantic equivalence between the indefinite *en, et* and the form *noget* 'some', the latter occurring before mass nouns:

han købte noget óst 'he bought some cheese'⁵

In the plural another form of the same word, viz. *nogle* (or *nogen*) performs the function of indefinite article. We thus get contrasts like:

han solgte huse 'he was selling some houses' (or 'he was a house-seller)

han solgte nogle huse 'he sold some houses'

han solgte huse 'he sold the houses'.

It is a difficulty in the analysis of such data that the difference of meaning between constructions with and without the indefinite article (including the suppletive *noget*, *nogen/nogle*) is often extremely subtle (and virtually untranslatable into English). To the extent that there is a clear difference of meaning, the construction without the article is used when a more or less standardized type of action is referred to, and when it is the action or the result, rather than the object of this action, that is talked about.

Viewed from a slightly different angle, the constructions with an article (or *noget*, etc.) involve some kind of reference, unless the object is to be understood as generic. Thus, in the examples above, not only the definite object nouns but also *en seng*, *en øl*, *noget ost*, *nogle huse* may be said to have reference, albeit of a totally indefinite kind, since the existence of some particular specimen(s) or quantity somewhere in the world is implied in these cases.

Syntactically speaking, however, the overt difference is that UA occurs if there is no article, but is blocked if there is an article in the wide sense in which this term is used above.

As shown in Rischel (1980), this finding can be generalized to a syntactically much more interesting statement, viz. that UA occurs whenever the object NP is devoid of a determiner.

That is, UA is not blocked by the occurrence of modifiers before the object noun (cf. *købe nyt hus* 'buy a new house', *købe flere huse* 'buy additional houses') but only if such a modifier has the function of a determiner.

This statement hinges on the independently motivated contention that proper nouns are inherently [+Det], cf. that UA fails to apply in (*han*) *hentede Péter* '(he) fetched Peter' versus (*han*) *hentede øl* '(he) fetched some beer'. It also hinges on the contention that some quantifiers have determiner status, others not, and that still others have determiner status in some cases and not in other cases, cf.

(*de*) *købte forskelligt tøj* '(they) bought various clothes'

(*de*) *købte forskelligt tøj* '(they) bought different clothes'

with *forskelligt* having a syntactico-semantic feature [+Det] in the first but not in the second case. (For further examples and discussions, see Rischel 1980.)

The same generalisation applies to the type of construction exemplified by the following two examples:

(*der*) *bor mennesker (i hulerne)* '(the caves) are inhabited by human beings'

(*der*) *bór nogle mennesker (i hulerne)* '(there) are some persons who live (in the caves)'

(again with a rather subtle difference of meaning). Diderichsen (1946) called such a constituent of sentential subject function but occurring in object position a "subject-object" (not to be confused with a normal subject occurring after the verb because of inversion).⁶

There are exceptions to this rule about UA occurring if the object NP (or subject-object) contains no Det. Quite a few of these seem explicable if we assume that generic meaning blocks UA, cf. (*han*) *elsker ost* '(he) loves cheese' (i.e. cheese as such, not just some particular cheese), (*det*) *ligner mig* '(it) looks like mould'. Incidentally, this statement may help to explain why a sequence of verb plus (ordinary) subject NP without a Det fails to exhibit UA: the point is that in Danish a subject NP without an (explicit or implicit) Det is (almost invariably) generic: *regnorme lever af blade* 'earthworms live on leaves' and with inversion: *sådan lever regnorme* 'that is how earthworms live', or: *ost fremstilles af mælk* 'cheese is made from milk', and with inversion: *sådan fremstilles ost* 'that is how cheese is made'. It is, however, not all that obvious that there is a difference in genericness between the subject of the just mentioned sentence and the object of the following: *det er sådan man fremstiller/fremstiller ost* (same, active construction). Maybe it is rather a difference of degree, the subject NP without a Det being distinctively [+Generic], whereas the "naked" object NP is rather neutral with respect to genericness. There is an obvious problem here, which has not been properly solved, and whose solution may lie elsewhere.

Finally, we shall briefly consider what happens in constructions with a subject or object predicate. The generalisation here is that, unlike verb phrases with an object, those involving a subject or object predicate have UA (removing the full stress from the verb) obligatorily, irrespective of the status of these constituents in terms of [\pm Det] or [\pm Generic]. Examples are:

han blev læge 'he became a doctor'

han bliver en dygtig læge 'he will become a competent doctor'

han fandt katten død på gulvet 'he found the cat dead on the floor'

de kaldte pigen Ida 'they called the girl Ida'

han kaldte drengen et fjols 'he called the boy a fool'

han gjorde hende rask 'he cured her' (literally: made her well')

B. GENERALISATIONS ABOUT PHRASAL UA

Looking at the data presented above and the coarse generalisations made, is it now possible to arrive at some generalised statement about all occurrences of UA in Danish?

It was pointed out by Jespersen (1934, § 13.6,3) that constructions with stress on their final constituents always denote "a single concept", and he substantiated this by showing that nominalizations (involving compounding) occur as possible transforms of verb + object constructions with UA, cf.

læse románer '(to) read novels'

románlæsning 'reading of novels'

or

købe hús '(to) buy a house'

húskøb 'purchase of a house'

(similarly, participial compounds occur such as *románlæsende* 'reading novels', although these are mostly confined to strictly literary language).

Such nominalizations are not possible in the case of constructions without UA: there is no way of forming a nominal compound indicating the type of specificity and definiteness implied by constructions such as *købe et hús* 'buy a house', *købe húset* 'buy the house'. I do not want to challenge Jespersen's insightful characterization of phrases of verb plus object with UA: it is clearly true that such a construction forms a close-knit semantic unit in the instances with UA. This basic notion of semantic unity may be extended also to phrases consisting of verb plus adverbial complement and to noun phrases with UA such as *en sum penge*, *linie tólv*, *Kongens Njtorv* (cf. A.2 above). It is a question whether it suffices to characterize all and only the phrases with UA (see later), but it is worth pointing out that it agrees beautifully with the occurrence of UA in a wide variety of fixed phrases, including such that are in conflict with the statement that determiners block UA in constructions of verb plus object (see A.7 above). In such cases UA often occurs as an option, with considerable variation in usage among Danish speakers. The following examples are in agreement with my own usage (which may be more in favour of UA with violation of the [+Det]-constraint than that of most younger speakers of Danish), and it should be kept in mind that the notation of UA in these instances refers to the possibility of UA rather than obligatory UA.

One of Jespersen's examples is:

har du hørt mágen 'have you ever heard such a thing?'

Jespersen uses the co-occurrence of UA with the definite article in constructions of the type exemplified here as evidence against the generalisation pointed out in A.7 above, viz. that

the occurrence or absence of a determiner is crucial in the case of verb + object constructions. However, although I agree that phrases such as *hørt mågen* point to a connection between semantically close-knit construction and phonological UA, I cannot agree that they constitute evidence against the generalisation involving the feature [+Det]. It is important to note that there are counter-examples, but the most interesting ones are such that have to do with standardized actions, cf. *tage tóget* 'take the train'. Similarly with phrases referring to the (experience of) performances of plays or compositions, and the like (inherently [+Det]): *vi skal se Elverhøj* 'we are going to see (the play) Elverhøj' versus *vi skal sé Elverhøj* 'we are going to see (the locality) Elverhøj'.

Most of the examples given by Jespersen are obvious idioms, however. If UA is a signal of semantic tightness or unity, this is indeed a type in which one may expect UA, so it is reasonable enough to include idioms from that point of view. However, it must be taken into consideration that the determiner has lost its separate semantic content in such cases. This is true of *hørt mågen* above. Now, since *magen* is morphologically a definite form consisting of *mage* 'mate' (formerly also: 'something matching') and the enclitic article *-(e)n*, it is also possible to conceive of a different reading of the typographical stretch *har du hørt magen*. This may seem far-fetched, but it is not totally unlikely that somebody might utter this very stretch in a context in which the singing of some bird is at issue. In this case it is impossible to have UA:

har du hørt mågen? 'have you heard its mate?'

(The full stress on *hørt* vanishes only if the verb forms a phrase with UA together with some later constituent, such as the verb *syng* in *har du hørt mågen syng*? 'have you heard its mate singing?'; such discontinuous phrases with UA are dealt with elsewhere in this paper.)

Thus, on the literal reading of *magen* its determiner effectively blocks UA, which shows that this blocking effect is not a matter of morphology but rather of the function of the morphological material.

Moreover, UA does not occur in all idiomatic expressions containing verb + object. For example, UA is absent in some of those referring to dying (like the English *kick the bucket*), cf. *stille træskoene* ('take off the clogs') or *tage billétten* ('take the ticket'). These expressions are certainly no less close-knit semantically than *hørt mågen* and the like, on their metaphorical reading. Thus UA is a possible but hardly a necessary accompaniment of semantic unity.

The idiom status of examples like these is evident from the impossibility of moving the object NP out of the VP: cleft sentences splitting up the VP make sense only on their literal reading. However, there is no similar indivisibility in the case of certain other verb-object constructions with UA:

- købe øl* '(to) buy some beer'
du skal også købe øl 'you must buy some beer, too'
øl skal du også købe (the same with explicit focus on
han købte ikke øl 'he did not buy beer' 'beer')
øl købte han ikke (the same with explicit focus on
'beer').

There is a similar mobility in the case of a "subject-object":

- der står mælk i køleskabet* 'there is some milk in the re-
frigerator'
mælk står der også (i køleskabet) 'there is some milk,
too (in the refrigerator)'

Syntactically, then, it is not very obvious that UA accompanies a specific type of construction, since the criterion of divisibility distinguishes between idioms and free constructions rather than between constructions susceptible to UA and others. What then about semantic or syntactico-semantic properties such as selectional restrictions?

In the case of a "naked" object one may claim that the object NP must denote something that can go with the verb in question, but that still leaves us with an open set of verb plus object constructions which can - and indeed do - take UA if no determiner is present, i.e., a totally productive type of construction. It cannot be the semantic relation between the basic meaning of the verb and that of the object that is decisive; the alleged semantic unity must be a function of the construction as such, not of the constellation of individual word meanings. In the case of verb plus "subject-object", the number of verbs possible is very limited unless they are passive in form: they are otherwise motoric or situative verbs. On the other hand, anything that can be situated somewhere may occur as "subject-object", so that the productivity is again in principle unlimited. It is hard to see what would be implied by claiming that the construction signals some particularly close-knit unit of meaning, any more than constructions involving subject and verb do quite generally.

If we look at the total array of constructions with UA (noun phrases, prepositional phrases, and various kinds of verb phrases, to mention the main categories), there is something intuitively very attractive in Jespersen's statement about UA constructions denoting a "single concept", at least for constructions with verb + object or complement. But as I have tried to demonstrate, this criterion is not generally valid unless it is formulated in such vague terms that it can hardly be considered an operational criterion.

It should be noted, nevertheless, that there are various rather solid generalisations to be made about the individual types of phrases taking UA, as shown in A.1-7 above. Thus, since UA

goes with absence of object determiner in verb phrases, we have at our disposal not only a quasi-explanation of why there is UA but - what is perhaps more interesting - a criterion which can be used in syntactico-semantic analysis, viz. in the analysis of quantifiers. Similar kinds of criteria may be established for other types of constructions with UA.

From the point of view of phonology it is essential to determine to what extent phrase formation with UA reflects syntactic phrase formation of a specific and well-defined kind. Is there any difference in syntactic gross structure between sentences such as, on the one hand

han købte hús 'he bought a house'

han faldt i vándet 'he fell into the water'

and, on the other hand

han købte et hús 'he bought a house'

han købte húset 'he bought the house'

han faldt i vándet 'he fell (while he was) in the water'

and, if so, on what level of abstraction? I would like to suggest that such phenomena be accounted for in terms of syntactic structure, since it is otherwise hard to see how reasonably generalized phonological rules can be worked out. This means that there must be a rather surfacy syntactic process of phrase adjustment establishing close-knit phrases under a number of semantico-syntactic conditions (absence of [+Det] in sequences like *købte hús* being just one among several such conditions). This solution may seem like pushing a phonological problem into some other compartment of grammar in order to obtain a spurious simplicity, but I hope to demonstrate below that the problems do belong in syntax, and as shown already, there is really quite a few solid statements to be made even at the present state of research. I assume that what really need to be done is for syntacticians to make full use of the important evidence furnished by UA as a reflex of syntactic structure.

III. UNIT ACCENTUATION AND DISCONTINUOUS CONSTITUENTS

The next question is: why should UA be analysed as a reflex of syntactic structure rather than a property of an autonomous phonological hierarchy?

If we look at the examples given earlier in this paper, it will be apparent that the phrases with UA are in some cases broken up by syntactically extraneous material. This is in fact quite normal, although it may render it somewhat obscure what the phrase limits really are. Among Jespersen's examples adduced to demonstrate that UA may apply in spite of presence of a definite article is *ta hatten 'av* 'take off your hat!' (in my

system of notation: *tag håtten áf*, since there are two essentially equal main stresses if there is no special emphasis). Here it is not a matter of idiom formation, cf.

tag frákken på 'put on your coat!'

læg bógen væk 'put the book aside!'

and so on. The type is perfectly productive, but still it does not contradict the rule about [+Det] blocking UA. The reason for UA is obviously that verb and adverb form a phrase on a more abstract level, cf. that these occur adjacently in examples like

hvád skal jeg tage på? 'what shall I put on?'

Danish has simply generalized a word order according to which the object NP must intervene between verb and adverb if it is not placed frontally in the sentence.

More generally, it holds true that a string exhibiting UA may be broken up by extraneous material without the accentual pattern being disturbed (except insofar as certain rhythmical adjustments may apply if, for example, the resulting sequence contains an awkward sequence of unstressed items). Let us start with another example of the same type as those above:

dén skal du tage méd 'take that one with you'

det er dén bóg du skal tage méd 'that is the book you are supposed to take with you'.

These examples show the unbroken phrase *tage méd* (literally: 'take with'), which can then be made discontinuous by, say, an intervening object NP:

du skal tage bógen méd 'take the book with you'

or, with more material intervening:

du skal tage dén bóg der står dérhenne méd

'take the book (standing) over there with you'

The lack of stress on *tage* is still directly dependent on the construction *tage méd*, cf. that UA fails to apply the moment there is no such adverb in the construction:

du skal tage den bóg der står dérhenne

'take the book (standing) over there'

since now we have a simple verb + object construction with an object NP containing [+Det] and hence blocking UA.

Now let us look at another type:

du skal tage med den hånd 'you are supposed to use that hand (when putting something on your plate)'.
 (The accent is on *hånd*.)

Here we have UA in PrepP introduced by *med*. In this case a still more drastic rupture of the unity of the phrase is possible, since the NP governed by the preposition may be moved out of the phrase (as in English):

det er den hånd du skal tage med 'that is the hand you are supposed to use'.
 (The accent is on *hånd*.)

The effect of such movement transformations on accentuation has been discussed for English by Bresnan (1972) and others. Thus, there is nothing novel in pointing to the fact that accentual patterns may survive such moving around of constituents, but it is important to emphasize that such observations must be somehow integrated into a general model of accentuation. Obviously, if we say that UA is dependent on a surface-syntactic phrase adjustment, this statement must be modified so that it refers to a level of abstraction beyond that of movement transformations ("root transformations") of the type exemplified by the last mentioned example. Maybe that is the level that is sometimes referred to as "shallow surface syntax".

Finally, let us look at a construction involving phrase formation with UA on two levels. A verb indicating transposition followed by an adverbial phrase undergoes stress reduction by UA, as shown in A.6 above. As for the adverbial phrase, this may be implemented as a PrepP with UA within its own bonds. Similarly, there may be a sequence of auxiliary and main verbs exhibiting UA. We see the operation of three such applications of UA (V+V, Prep + N, V + PrepP) in the following examples:

du skal tage med bussen 'you must go by bus'
du skal tage med den bus 'you must take that bus'.
 (The accents are on *bussen* and *bus*.)

Again, as above, the phrase (or phrases) may be made discontinuous by movement transformations, cf.

det er den bus du skal tage med 'that is the bus you are supposed to take'.
 (The accent is on *bus*.)

Now it may be useful to confront the phonological results to be expected from these three kinds of phrase manipulation, viz.

det er den bog du skal tage med
det er den hånd du skal tage med
det er den bus du skal tage med.
 (The accents are on *bog*, *hånd*, and *bus*.)

These are the accentuations that would be predicted from a simple application of UA (as long as we stick to just marking main stresses), and indeed, it is perfectly possible to make an ac-

centual difference along these lines. On the syntactic surface the sequences look suspiciously alike as long as we disregard phonology, since they are perfectly analogous in terms of lexical material. From the point of view of phonology, in turn, there is no way of accounting for the accentual differences unless we have recourse to a more abstract level of syntax. I think the inevitable conclusion must be that the relevant phrasal structurings originate somewhere at a level more abstract than surface syntax, that they are reflected as partly discontinuous phrasal constituents of a special type in surface syntax (although such constituency has been more or less neglected in syntax based on written language), and finally that they trigger the occurrence of UA.

So much for accentuation as directly dependent on syntax or syntactico-semantic features and structurings. It should be added that the last sentence above will tend to be uttered with some degree of stress on *med* which makes this word more prominent than *tage*, there being a range of possible prominence all the way from a weak stress to a main stress as in *méd* of the first sentence. That is, the first and last sequence may optionally sound alike, due to the range of variation possible in the last sentence. Another option is to have less stress reduction on *tage*, with the result that the last sentence becomes more similar in accentuation to the second rather than to the first one.

We see here that the application of UA, combined with movement transformations, may cause a string of weakly stressed wordforms to occur in succession without any main stress following, and that in such cases there is a tendency to remedy the situation by restoring the main stress to a greater or lesser extent on one of the wordforms. What is at stake here is probably some rhythmical constraint, which of course deserves closer scrutiny in a comprehensive analysis of Danish accentuation.

IV. DEEP AND SURFACE PHONOLOGY: PHRASE STRUCTURE AND FOOT STRUCTURE

A. MOVEMENT TRANSFORMATIONS AND PHRASE CONTINGENCY

Let us now take stock of the types of structurings that emerge at various levels of abstraction.

- (1) At some syntactic level the constructions which eventually exhibit UA must be established as a specifically marked type of phrase. Furthermore, the last constituent that has a lexical stress (predictable by rule or not) is marked as such.
- (2) At some level UA operates in accordance with the information about underlying phrase structure.
- (3) At a quite surfacy syntactic level there may be a perturbation of word order, but information about the more abstract phrase structure is preserved.

Now the next important question is whether these more or less perturbed phrases provide the basis for surface-phonological rhythmicization, or whether there is a separate, purely phonological mechanism of foot formation, or the like, in Danish. I think there is, and I think that this is the very unit which Thorsen has found useful as a unit of reference in describing Danish intonation (cf. her contribution to this volume). The stress-correlated pitch contour in Danish starts with a stressed syllable and comprises all material up to the next stressed syllable, unless there are major syntactic breaks signalled as such. This provides us with a further relevant level:

(4) At a rather surfacy phonological level, the phonological material is divided up into consecutive feet, each comprising a syllable with main stress plus some number (from zero upwards) of syllables with lower stress.

This foot, of course, divides up the sequence of syllables in a way which may be totally at variance with the phrase structuring responsible for UA, cf.

Phrase marking:	<i>Péter</i>	<i>fáldt i vándet</i>
UA:	<i>Péter</i>	<i>faldt i vandet</i>
Foot marking:	<i>Péter faldt i</i>	<i>vándet</i>

'Peter fell into the water'

or, with a moved constituent:

Phrase marking:	<i>Jóan</i>	<i>kán følges</i>	<i>méd hám</i>		
UA:	<i>Jóan</i>	<i>kan følges</i>	<i>med hám</i>		
Perturbation:	<i>Hám</i>	<i>kan</i>	<i>Jóan</i>	<i>følges</i>	<i>med</i>
Foot marking:	<i>Hám kan</i>	<i>Jóan</i>	<i>følges med</i>		

'Joan can accompany him'

In the last example the two underlying phrases *kan følges* and *med hám* have been split up so that no phrase is left quite intact except for the one-word phrase *Jóan*. One may speculate whether there is a way of dividing the surface sequence of words into linear stretches such that each corresponds to a phonological phrase; this is possible only if we take the last word to form an unstressed tail, which is at variance with the generalization about phrase-final stress:

Hám kan Jóan følges med

I doubt that it is useful to posit a phonological level of description at which there are such intermediate phrases. Anyway, the surface structure emerging is the one that is organized in terms of stress initial feet, as shown above.

In the exposition above the operation of UA is inserted between a more abstract and a less abstract level of syntactic specification. This is certainly a possibility (cf. the argumentation in Bresnan 1972), but it should be noted that this really amounts to assuming that UA requires for its operation that the constituents of the phrase in question occur in a linear sequence without discontinuities (cf. the phrases *kan følges* and *med ham* above). That may be a meaningful assumption, but in fact the fulfilment of this requirement is possible only if one permits linear orderings of constituents on a non-surfacy level which are quite remote from the orderings that actually can surface in the language. Let us see what happens in sentences containing sentential *ikke* 'not':

Péter købte ikke hús 'Peter did not buy a house'

Here, the phrase taking UA is obviously *købte hús*, not *købte ikke*, cf.

Péter købte hús 'Peter bought a house'

Péter købte ikke 'Peter did not buy'

but there is no way to place the two words of this phrase *købte ... hús* adjacent to each other unless one is willing to claim that UA operates at an extremely abstract and remote level at which *ikke* stands outside the remainder of the sentence (as an immediate constituent of the whole sentence).

To me it seems more attractive to start from the observation that *købte hús* is a discontinuous phrase and to assume that its constituents are nevertheless syntactically marked as belonging together in one phrase. UA, then, operates on such phrases, regardless of whether they are discontinuous or not, and each phrase affected by UA thus acquires final stress. Further, if UA applies after surfacy movement transformations, we can only uphold this principle of phrase-final stress if the constituent that is underlyingly phrase-final, preserves some positional marker in spite of the moving around of constituents. This amounts to saying (cf. Bresnan 1972) that the diacritic marking of tree structures for UA is part of syntax, although the actual implementation of stresses is of course a matter of phonology.

B. THE TOTAL SCENARIO OF PROSODIC STRUCTURING IN DEEP AND SURFACE PHONOLOGY

Let us return now to the question of how the various mechanisms of (non-emphatic) accentuation in Danish cooperate or interact to form an accentual output. The mechanisms involved are:

(1) Morpheme Stress by Rule, (2) Intra-Word UA, (3) Compound Stress by Rule, and (4) Phrasal UA (see sections I.A-F above).

It is necessary to consider first to what extent these mechanisms belong to an abstract level in the sense that they are associated with syntactic structures occurring only at not

quite surfacy levels. This was shown above to be the case for Phrasal UA. What about the other mechanisms?

Although the inherent accentuation of morphemes (i.e., whether a morpheme is accented or not) has a connection with syntactic categorization, Morpheme Stress by Rule obviously presupposes a specification of the phonological structure of the morpheme in terms of syllable number and syllable structure. Intra-Word UA, in turn, operates on morpheme stresses in the string it applies to. This just tells us that both of these mechanisms presuppose the occurrence of specific lexical material in syntactic slots; they might for that matter be quite surfacy processes. On the other hand, these two mechanisms are closely associated with the lexical component in the sense that there is a structural and functional equivalence between stress redundancy conditions and these stress insertion mechanisms. If a given lexical item has irregular stress placement, this must of course be part of the underlying phonological representation in the lexicon of Danish, but if the stress placement is regular, there are obviously two ways in which this accentuation can be implemented: (a) it may be part of the underlying lexical representation, although its presence is predictable, or (b) it may be inserted by rule. I think it is important to emphasize this dual access to intra-word accentuation as an important aspect of language: the language is designed in such a way that the specification of intra-word accentual patterns is possible, but alternatively, it is possible to arrive at the same result by rule. Obviously, in studying the way language is actually mastered, and the ways in which lexical material is actually retrieved in language use, one must operate with both of these options, and one must reckon with the possibility that a given word is handled differently by different speakers of the language, or differently at different stages in one speaker's linguistic development.

This means assuming that the accentual mechanisms in question are part of an abstract sub-component of phonology which is associated with - and in fact integrated in - certain morpho-syntactic mechanisms (word formation).

As for Compound Stress by Rule, the same line of reasoning is valid. In this case it is further supported by the occurrence of modifications such as shrinking of accentual tree structure and rhythmic perturbations (cf. the *stationsforstander* case, section I.E above), suggesting that the full hierarchy of binary accentual contrasts which can be predicted from the syntactic structure of the compound, belongs to a relatively abstract level of phonology.

Finally, Phrasal UA operates on word stresses in the string it applies to (cf. the relationship between Morpheme Stress and Intra-Word UA, as mentioned above). Since it seems clear that Phrasal UA belongs to a level more abstract than surface syntax, we may conclude that the specification of word stress belongs to such an abstract level as well. Thus, all the evi-

dence points in one direction: there is an abstract component of phonology which is presupposed by surface syntax, and to which both the specification of (morpheme and) word stress and phrasal UA belong.

It may be necessary to forestall a possible objection to the line of reasoning pursued above, viz. that it is not strictly compelling with regard to the specification of intra-word accentual patterns by rule. It would be possible, in principle, to argue that the properties of the strings which allow us to insert stresses by rule also allow us to predict on what structures UA can operate, i.e. that it is possible in principle to formulate UA in such a way that it blocks stress insertion in certain morphemes or words rather than performing a stress reduction. Stress insertion would then operate afterwards, inserting stresses according to rule except in cases where the UA has added a diacritic mark blocking stress insertion. However, apart from the fact that this is a rather roundabout way to account for accentuation, it has one major drawback: it fails to account for the fact that there are some (in fact several) stresses which must by necessity be present underlyingly as part of lexical representations, since they are unpredictable. As for these, they must be processed anyway in connection with the application of Intra-Word or Phrasal UA, and thus it is a most undesirable complication to handle the stresses inserted by rule in a different format. I take it that this is strong enough evidence in favour of the contention that UA implies a full stress specification of each of the constituents in the string it applies to (be it Intra-Word or Phrasal UA).

We have seen that there is an implicational relationship between stress insertion rules and UA rules. Is it possible to set up a full chain of implications among the four mechanisms listed above? The keypoint in this context is Compound Stress.

Compound stress is generated in terms of various separate structures and mechanisms: (a) a hierarchical structure furnished by syntax and/or the lexical representation of the compound, (b) a phonological marking of right branches as + (or "strong") and left branches as - (or "weak"), (c) phonologically conditioned modifications of the hierarchical structure (to the extent that aberrations from the underlying hierarchical structure are not lexically represented), and finally (d) interpretive rules (and conventions) for translating the surface representation into a phonetic representation. Of these components, the first (a) and the second (b) do not seem to presuppose diacritic markings showing what lexical items are capable of carrying stress, and what lexical items are able to qualify as separate constituents of such a structure.⁷

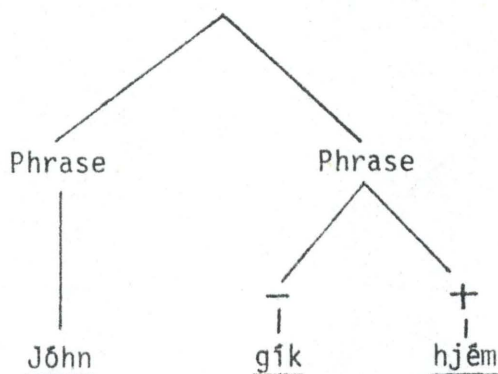
I do not think that there is any unique answer to the question whether the basic hierarchical structure of compounds is generated "before" or "after" the specification of morpheme stresses and the application of Intra-Word UA. As for components (c) and (d) of Compound Stress by Rule, however, these

evidently presuppose morpheme stress assignment and UA at the word level. Further modifications occur as a result of UA at the phrase level, as a result of syntactic movement transformations, and finally as a result of foot assignment. (The prosodic behaviour of compounds as a consequence of such conditioning has not been studied in any detail, however.) Thus, the mechanism of compound stress generation is a complex, ranging from the most abstract level to the most concrete level of phonology.

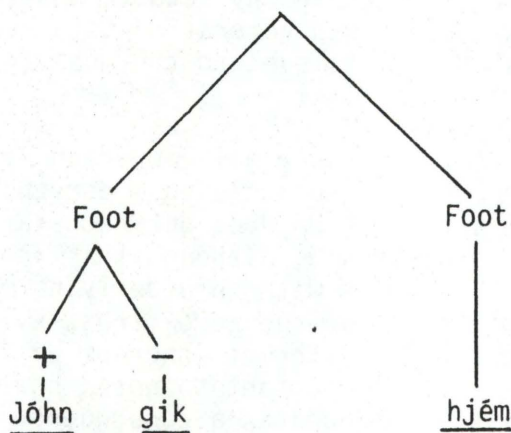
Phrasal UA is, in a sense, equally all-embracing if all components of stress adjustment are included under this heading. As noted earlier, this type of UA does not necessarily convert full stresses into "zero stress", although this is very often the case in Danish. Syllables with an underlying main stress may remain more prominent than true zero-stress-syllables, but this is to a large extent a matter of inherent differences in segmental structure. It is important to note, however, that syllables whose stress is reduced as a consequence of Phrasal UA, may retain their *stød* (except if it is a matter of a word-final open syllable, since vowel shortening occurs regularly in such cases), see Basbøll 1972, 1978 for details.

The most important readjustments are those having to do with foot structure. As said earlier, the Danish foot starts with a fully stressed syllable and comprises the following syllables up to the next fully stressed syllable. A "minus-branch" of a phrase that has undergone UA may come to stand finally in such a foot because of movement transformations, cf. such examples as cited above, and in that case there is optionally the possibility of giving the syllable in question added prominence. This clearly shows that the status of the word in question as underlyingly stressed is not lost at this stage.

It is different if the placement of such a syllable in the tail of a foot is not a matter of movement transformations but of readjustment of the phonological hierarchy as such, cf. *gik* in *Jóhn gik hjém* 'John went home', in phrase structure:



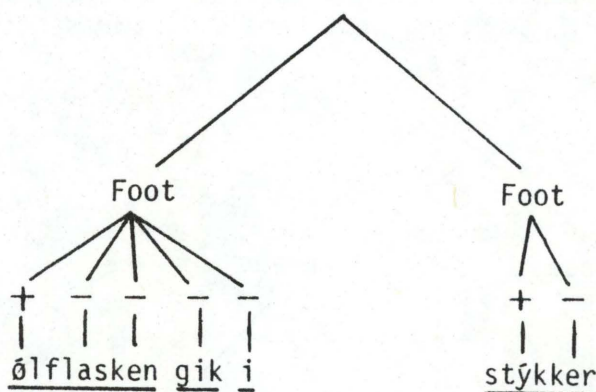
but in foot structure the sequence is reorganized into the following (lexical stresses are here erased under minus-branches, although the implications of such erasure are not dealt with):



In this case the tendency for such syllables that have been re-assigned to a different structural unit is to behave like syllables that are underlyingly devoid of stress. The same is true of the reduced stress-syllable of the second part of a compound, although the distinction "stressed" : "unstressed" may be quite resistive to such shrinkage of structure, being possibly upheld by durational relationships in particular.⁶ Thus, in

Ølflasken gik i stykker 'the beer bottle broke'

the normal rendering in casual speech is probably with a tail of weakly stressed syllables forming a foot together with the first syllable, i.e., the structure ends up as something like



Let us see, finally, how a more complex sentence involving both compounding and intra-word and phrasal UA undergoes a stepwise metamorphosis from the syntax-based phrase structure to a foot-

based surface structure. The example is

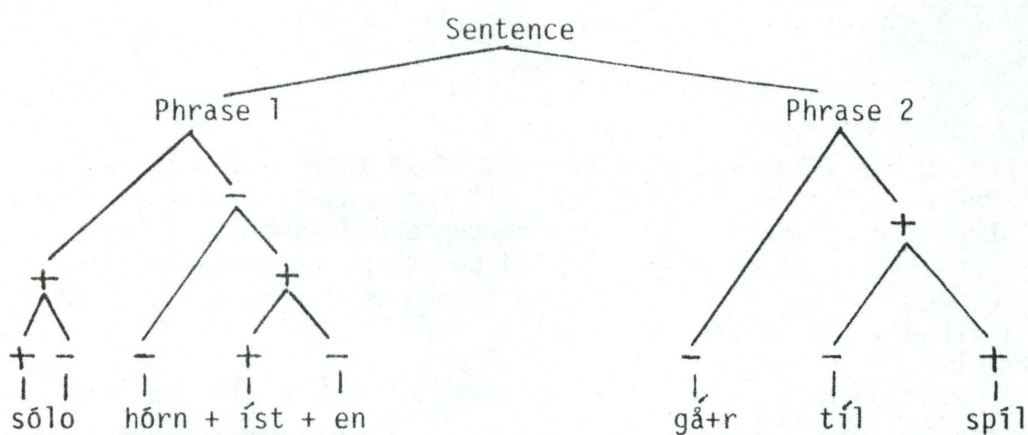
sólhornisten går til spíl 'the solo horn-player takes music lessons'

Here we have firstly a compound whose second constituent: *hornisten* is in itself an example of Intra-Word UA, the main stress being on the second syllable according to the UA rule:

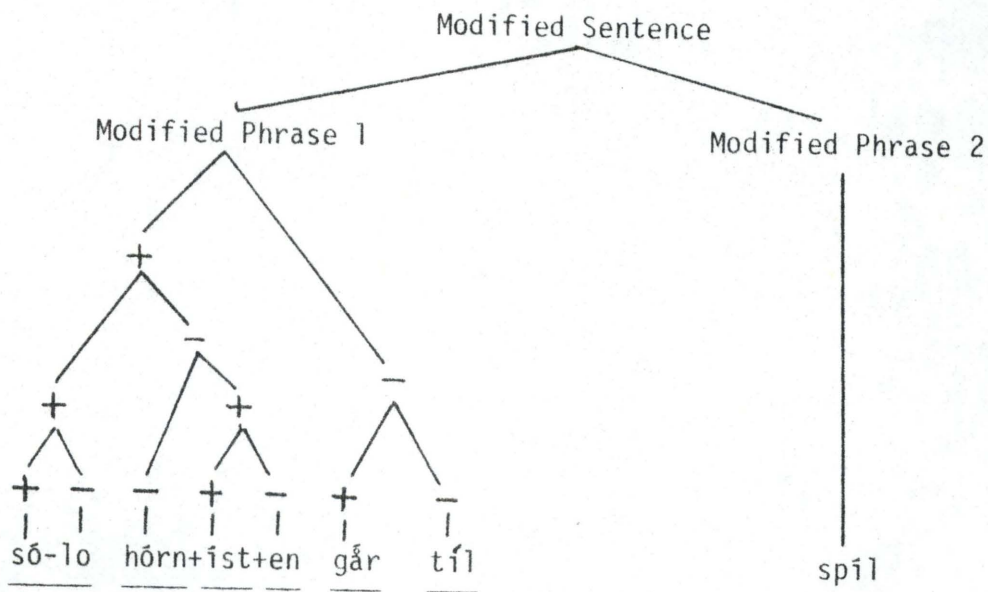
hörn+íst+en → *hornísten*

(This stress may or may not be audible in the surface rendering of the string above.)

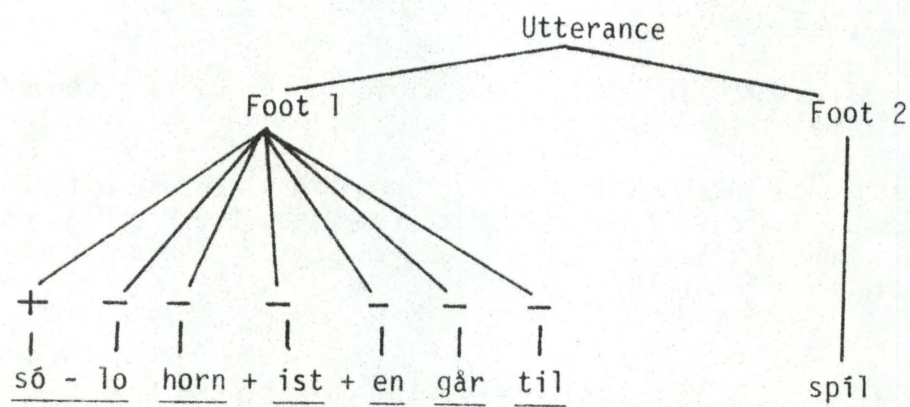
The sentence further contains a prepositional phrase with UA: *til spíl*, and a verb phrase (which comprises the PrepP as one constituent), likewise with UA: *går til spíl*. The abstract structure is something like:



If this were transformed into a sequence of two hierarchies in which the "pretonic" syllables of Phrase 2 are attached to Phrase 1 with preservation of their mutual ranking by a plus-minus labelling, we would get the following:

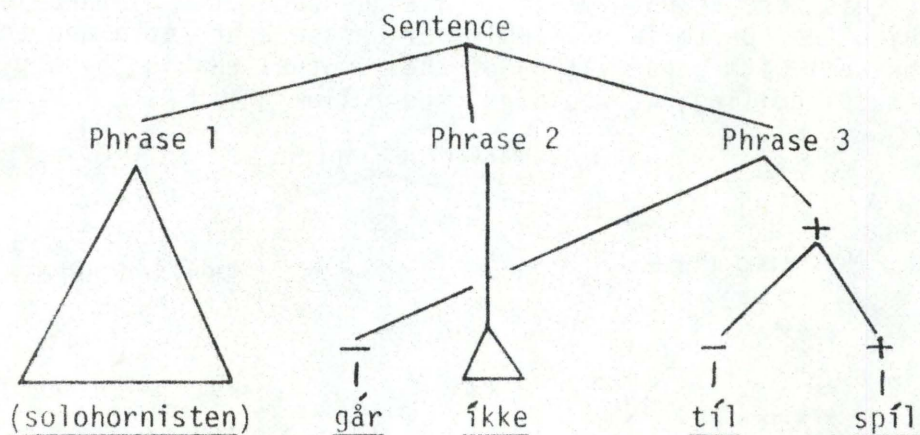


In actual rendering, this structure is shrunk, however, and this may possibly be done to the extent that all syllables between the first and the last are unstressed (taking into account the inherent differences of prominence associated with segmental structure). Thus, with the strongest reduction that is conceivable, the underlying sentence with its phrase constituency may appear as an utterance with the foot constituency illustrated below:

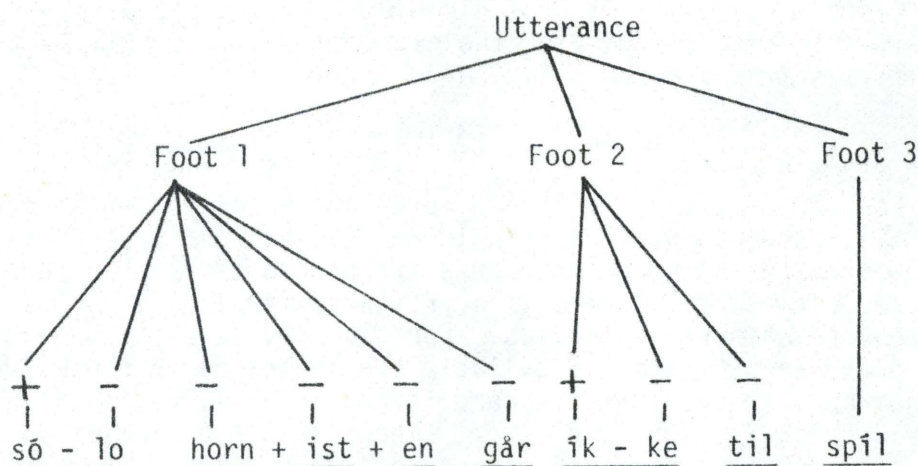


Let us see, finally, what happens if we introduce a sentential adverb such as *ikke* 'not'. At all the syntactic levels of abstraction with which we are here concerned, such a constituent turns out to stand in an awkward position, pushing itself in between the two parts of the verb phrase *går til spíl*, which is thus a discontinuous phrase:

sólhornisten går ikke til spíl 'the s.h.pl. does not take music lessons'



When transformed into an utterance with foot structure, however, the whole hierarchy regains well-formedness in terms of non-crossing branches. It is here rendered with maximum shrinkage of structure like the examples above:



V. CONCLUDING REMARKS

One may dispute the proper formalization of the mechanism of accentuation in Danish. I hope, however, that the exposition given in this paper suffices to show that irrespective of formalization there are some basic points to be made which are typologically and theoretically important.

Typologically it is interesting that Phrasal UA in Danish is largely confined to certain types of phrases, so that for instance most noun phrases do not take UA. This has the effect that Danish is characterized by sometimes very close succession of heavy stresses, an effect that is further enhanced because Danish, as pointed out by Thorsen (see the paper in this volume), has no "sentence accent". It is perfectly possible to have rather long utterances without any single focal point signalled by prosodic means.

The other typologically interesting feature is that the foot in Danish goes from a stressed syllable up to the next syllable, and that the preferred internal structure is the prosodically most reduced one, i.e. with just an initial stress-syllable followed by unstressed syllables.

Since there is a glaring non-conformity between the underlying phrase-based hierarchy and the surface hierarchy, quite heavy readjustments are necessary to get from one representation to the other. The nature of the transformations involved is so far somewhat obscure, but it seems obvious that the gap between these two representations speaks in favour of a distinc-

tion between a level of deep phonology and a level of surface phonology, at least with regard to prosody. - Thus, the evidence of Danish stress suggests not only that one should recognize a self-contained prosodic hierarchy, but that there are different hierarchical organizations on different phonological levels of abstraction. Surface prosody is phonology not syntax; the abstract prosodic hierarchy, on the other hand, is an integral part of the expression side of (sign-based) syntax and word formation.

VI. NOTES

1. For convenience, the Danish forms are mostly given in normal orthography, which should not cause trouble if it is remembered that double consonants are pronounced short, and *ld, nd, rd* mostly as short *l, n, r*. Word final *e, en, er* are in most cases schwa-syllables. For clarity, vowel length and the presence of *stød* in a syllable are indicated in these orthographic renderings by : and ', respectively (this is only done in Section I, however, since it is not crucial in the later discussions). By doing so I do not imply anything about the role of the *stød* in the phonology of Danish, an issue which I have preferred to keep entirely out of consideration in this paper (see Basbøll 1972 and elsewhere for an analysis of this aspect of Danish phonology).
2. This account is extremely sketchy. A detailed description of the conditions under which words appear with a full stress in Danish, will soon be available in a forthcoming monograph by Erik Hansen and Jørn Lund. Unfortunately, their manuscript became available to me only too late to be utilized in the text of this paper, except for this and the following footnotes.
3. UA does not always occur in the rendering of personal names (see further Erik Hansen and Jørn Lund, forthcoming), but it is definitely a possible option.
4. As pointed out to me by Erik Hansen, it requires a more explicit syntactic analysis of the relation between the verb and other sentence members than the one I have employed here, to account for the accentuation of the verb, cf. that *er* 'is' is stressed differently in the following two sentences:

den ér óppe på lófttet 'it is (to be found) up there in the attic'

han er óppe på lófttet 'he is (temporarily) up in the attic'

 (note, however, that even in this pair a movement is implied in the case with weak stress). - Unfortunately, I cannot incorporate the necessary elaborations and corrections in the present paper.

5. As pointed out by Hansen and Lund (forthcoming), this applies also to constructions with *lidt* 'a little', and even if this word occurs adverbially as in *han fik lidt bedre tid* 'he became somewhat less pressed for time' versus *han fik bedre tid* 'he got less pressed', which is really intriguing.
6. The difference between "subject-object" and a true subject appears overtly in that an adverbial constituent such as *ikke* 'not' always appears before the subject-object: *der bor ikke mennesker i hulerne* 'the caves are not inhabited by human beings', or *hvórfor bor der ikke mennesker i hulerne?* 'why aren't the caves inhabited by human beings?', whereas it comes after the true subject in the case of inverted word order: *mennesker kan ikke leve af græs* 'humans cannot live on grass (as a nourishment)', *hvórfor kan mennesker ikke leve af græs?* 'why cannot humans live on grass?', *hvórfor lever mennesker ikke af græs?* 'why don't humans live on grass?' (incidentally, the verb *leve(r)* may not be fully stressed in these constructions, which is immaterial in the present context, however).
7. The existence of "quasi-compounds" which are syntactically and semantically derivatives, has been touched upon above. One suffix behaving (regularly) in this way is *-hed* '-ness', cf. that it patterns just like the adjective *hed* 'hot' in examples such as
- ['døgd₁ |₁ he: 'ð] *dygtighed* 'cleverness'
 ['fe: 'b₁ |₁ he: 'ð] *feberhed* 'burning with fever'.
8. According to an ongoing instrumental investigation by Eli Fischer-Jørgensen secondary stress and weak stress in otherwise analogous words (occurring in short utterances read from a list) are distinguished by duration and in part also by tone. The phenomena occurring at lower levels of distinctness have not been instrumentally investigated. (Personal communication.)

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