

NATURAL PHONOLOGY AND SOME COMPETING PARADIGMS,
WITH PARTICULAR REFERENCE TO SYLLABIFICATION

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ABSTRACT

In my written contribution, the focus is on syllabification rules, rather than on competing paradigms. Three different kinds of syllabification principles are considered, and the importance of the syllabic peaks are discussed, particularly in terms of vowel strength. Syllabification structures are illustrated, synchronically with examples from Danish and French, diachronically with the Nordic i-Umlaut.

INTRODUCTORY REMARKS ON COMPETING PARADIGMS

Simon C. Dik, /1/, has classified linguistic paradigms into two main types, viz. formal and functional paradigms, the former being represented notably by Chomskyan linguistics, and the latter e.g. by Dik's own "Functional Grammar". In recent years, the importance of work being done within different kinds of functional paradigms in the broadest sense has been increasing. Some important paradigms are, in addition to Dik's "Functional Grammar" already mentioned, Halliday's "Functional Grammar", Givón's work on functional-typological syntax, and Langacker's "Cognitive Grammar". Just to mention a few names and trends. These paradigms all represent a reaction against Chomskyan linguistics, and they use much more space to emphasize in which way they differ from the transformational-generative paradigm than to define their relation to other functional paradigms in the broad sense. Within the Chomskyan paradigm, on the other hand, very little attention is paid to functional paradigms.

The examples of functional paradigms mentioned so far have paid little attention to phonology. The most important functional paradigm within phonology must today be considered Natural Phonology, in my view, as represented in Dressler's huge integrative effort, /2/. The term 'functional' is in this context vague, of course, but there seems to me to be important common traits, e.g. in the foundation on basic principles outside linguistics proper, and in their use of plurifunc-

tionality and conflicting goals. An integration of insights from different functional paradigms, which have largely been occupied with different aspects of linguistic structure, seems a promising enterprise.

Within prosody, the distinction between the two basic paradigms has not been as sharp as e.g. within syntax or "morphology". But this of course does not mean that no differences in paradigm can be distinguished within prosody. In my oral contribution I intend to discuss how the syllabificational problems and structures I present in this paper can be handled within different phonological paradigms.

SYLLABIFICATIONAL PROBLEMS AND EVIDENCE

Theo Vennemann, /3/, sees it as a serious mistake to talk about syllabification rules, i.e. rules which syllabify a string of segments, technically e.g. by introducing syllable boundaries: syllabification cannot be due to universal rules, since different languages may syllabify the same string of segments differently, nor to language specific rules, since "in manchen Sprachen Silbenstruktur kontrastiv sein kann". Instead he talks about "Prferenzgesetze" (preferential laws). I agree with the two premises quoted, but not with the conclusion (but this may be mainly a terminological matter). In the many cases where syllable boundaries cannot be contrastive, I think structure building rules and constraints may be alternative appropriate formalisms, and they should at any rate be combined with markedness or preferential principles etc. The problem with the latter type is, of course, their interaction. The difference here is one of view-point, just as whether one prefers to talk about grammatical boundaries which determine syllable boundaries, or about marked syllabification signalling a grammatical boundary: either the speaker or the hearer defines the perspective.

One specific syllabificational problem in Danish (as in many other languages) is whether the division of an interlude into a possible coda followed by a possible onset is a basic principle, or whether the

division follows from general principles (e.g. relating to sonority, see below) without the necessity to refer to specific word-marginal clusters (which are, of course, "hard linguistic facts" to a higher degree than syllable-marginal clusters which are word-medial). In Danish, the answer is clear, I think, if we want to account for phonetic syllabification and not just for a phonological syllabification, as I have done earlier, /4/. Compare words like *blomstre* 'flourish' and *kunstlet* 'artificial'. There is scarcely doubt that, phonetically, the syllable boundary does not occur at similar positions: *blom\$stre* vs. *kunst\$let*. One might say that in *kunst\$let*, the marked syllabification signals that a grammatical boundary cooccurs with \$, but why does \$ in *blomstre* not occur with the morpheme boundary? (Cf. *blomst* 'flower'). The answer is, of course, that *str* is a possible onset, but neither *stl* nor *tl* nor *dl*.

I try to take the strongest possible stand on what will count as evidence for syllabification, viz. not only the phonetic (phenomenological and manifestation) syllable boundaries, but also the choice of "main variants" of the phonemes /p t k d g v r j/ (i.e. whether they are reduced to [b d g ð] (/i/u) u ʒ i], as they are in "final" position, or not), and whether short /a o/ occur with their particular variants before tautosyllabic consonants or not; in brief, the whole set of evidence which has earlier been used, in addition to the phonetic evidence.

Finally, I try to stay within a coherent general framework as far as prosodic structures are concerned. In the following, I shall consider syllables as composed directly of segments. This is a deliberate simplification, however, since I take there to be a tier with Weight Units, or 'morae' in between, as proposed by Hyman, /5/. In addition to Hyman's evidence, Danish *stød* and stress offer good evidence in favour of such a model, in my view, much more than for the now traditional division into onset plus rhyme (notice that I do not accept the argument that every time there is some systematic phonotactic restriction, it must be mirrored in the prosodic tree structure). In agreement with Hyman's model, I take a C to be universally adjoined to an immediately following V. Therefore the intervocalic C in words like *bade* [bæ:ðə] 'bathe' is taken to be ambisyllabic: the "weak d" seems to belong to the second syllable phonetically, but its manifestation is nevertheless "final" (see above). But notice that if only phonological (as opposed to phonetic) criteria are taken into account, intervocalic consonants before schwa are clearly "final" and not "initial".

PRINCIPLES OF SYLLABIFICATION

It is obvious that there are syllabification principles of different kinds. These principles in their simplest, most general (completely unrestricted) form may correspond to processes of Natural Phonology, whereas the syllabification rules found in different languages are phonological in nature. The syllabification rules in certain languages are thus restricted in particular ways, both concerning each rule by itself and also the way in which different rules interact.

I shall classify the syllabification principles into three different kinds, forming a sort of hierarchy, as follows:

1) SYLLABIFICATION DEPENDS ON PHONOLOGICAL DOMAINS. This principle is probably not controversial (except for the specific formulation, perhaps). Within a framework of phonological (ly relevant grammatical) boundaries (partly dependent on, but not isomorphic with, the morpho-syntactic boundaries), the principle can be stated as follows: certain phonological (ly relevant grammatical) boundaries are obligatorily syllable boundaries too. Within a framework of phonological domains, /6/, the principle can be stated instead: Syllabification applies within a certain domain. This domain is language-dependent, e.g. syllabification ignores more boundaries in Romance languages than in Germanic. It also depends on formality level etc. And if syllabification is taken to occur at more than one level, its domains will increase during the derivation (the latter part is highly theory-dependent, e.g. in Natural Phonology there will be prelexical syllabification applying to morphemes, and resyllabification, as when morphemes are combined, /2/). The least restricted form of this principle is what you find in low-level phonetic syllabification; i.e. the phonetic syllabification is universally unmarked as against phonological syllabification. Except for a few remarks in the section on Phonological Syllabification in French, I shall not discuss this kind of syllabification principles here.

2) SYLLABIFICATION DEPENDS ON THE SYLLABIC PEAKS. If syllabification is taken to result in a syllable boundary occurring somewhere between any syllabic peak (hereafter abbreviated V, as non-peaks are abbreviated C) and the next one, it may seem quite trivial to point out that syllabification depends on the syllabic peaks. But the claim is, naturally, more interesting, since at least the following three subtypes of this principle can be distinguished:

2a) A following V "attracts" more Cs than a preceding V. This principle is universally accepted, I think: CV-syllables are considered to be the maximally unmarked syllable type, and a string ...VCVCVCV... will have ...VSCV\$CV\$CV... as its unmarked

syllabification. But it is going too far, in my view, when many phonologists explicitly or implicitly claim that the natural syllabification of a string VCV containing no grammatical boundaries is always V\$CV, regardless of the nature of the vowels in question, since there are at least two competing principles:

2b) A "stronger" V "attracts" more Cs than a "weaker" V. Exactly what counts as a "stronger" or "weaker" V may be different in different languages. I shall argue that the difference between a fully stressed full vowel and an unstressed neutral vowel ("schwa") is prototypical for this distinction, and that a distinction of this sort has consequences for the syllabification in French and Danish. Notice that in many languages, such a distinction does not occur at all (and in these languages principle 2b thus can play no role), whereas the distinction in principle 2a is of course universal. Consequences of principle 2b will be investigated in the following sections on syllabification in Danish and French, respectively.

2c) A short stressed V "attracts" a following C more than a long stressed V, cf. the notions of "close and loose contact", respectively. This principle is related to what Vennemann, /3/ (p. 39), terms "PRO-KOSCHS GESETZ: Eine (dynamisch) akzentuierte Silbe ist um so stärker bevorzugt, je näher ihr Gewicht bei zwei Moren liegt", cf. the vowel lengthening and shortening in Middle German etc. *ne.men>nē.men* and *dāh.te>dah.te*, where the result is (still according to Vennemann) a bimoric stressed syllable, viz. consisting of short V plus C, or long V. The syllabification principle proposed in the present paper also has the consequence of letting the stressed short vowel be followed by a tautosyllabic consonant (although this will not necessarily be a bimoric syllable, according to my view). In the section on Nordic i-Umlaut and Syllabification, I shall illustrate principle 2c. Notice that the formulation of this principle presupposes a distinction between long and short vowels, and thus this principle, like principle 2b, in many languages cannot apply. Perhaps one reason for the recurrent (but by no means general, of course) neglect of something like principles 2b and 2c in the literature is exactly the fact that these principles, in contradistinction to principle 2a on the precedence relation, only apply to certain language types.

It is clear that all three subprinciples of 2 may interact. The situation with most tendency towards syllabification to the right will occur when the V to the left is stressed vowel and the V to the right the weak neutral vowel (schwa) (principle 2b), and where the former V is also short (principle 2c). Since syllabification to the right is not so generally recognized as syllabification to the left (the latter

having sequences of open syllables as the prototypical case), I shall in the following sections illustrate exactly this kind of syllabification.

3) SYLLABIFICATION DEPENDS ON THE CONSONANTS. No one would probably deny this proposition, and a wealth of such subprinciples have been discussed in the literature. I shall limit myself to a few general remarks on the subject.

First of all, opinions differ wildly as regards the relation between the phonotactics of the syllable, the morpheme and the word. My own position is the following. The sonority hierarchy is basic; it is derived from the only universal redundancy restrictions for segment types there are: [-cons]²[+son]²[+voi] (i.e. non-consonantal segments, = Pike's vocoids, are necessarily sonorant, and sonorants are necessarily voiced), see fig. 1 at the end of the paper. Conceived not as a set of more and more inclusive segment types, but as a linear order (when you draw a diameter through all the circles), it predicts the following sonority hierarchy: vocoids, sonorants, voiced obstruents, voiceless obstruents. Notice that this model is forced to treat e.g. [sp] in onsets and [ps] in codas as non-violations of sonority, whereas it excludes e.g. [bs] in onsets and [sb] in codas (where [b] is voiced and [s] is voiceless); the model cannot be adjusted in any way to treat these clusters differently, and this is the result I would want (for empirical reasons). For further aspects of this model, e.g. its treatment of nasals and laterals, see /7/ with references. Whereas sonority underlies phonotactics, in my view (together with other principles, of course, e.g. concerning heterogeneity of certain adjacent segments), the distinction between syllable-onsets and word-onsets, for example, is not crucial, since the prototypical clusters are those which are in words that are syllables, and morphemes too, at the same time, /2/. I take the notion 'possible initial cluster' to be important to the native speaker, and more important than the notion 'possible final cluster', at least in languages like Danish where we have many endings, but no prefixes, consisting of consonants only. I shall therefore use 'possible initial cluster' as a relevant notion in the principles of syllabification in Danish to be presented in the next section. Another corollary of my view of sonority is that intervocalic consonant clusters would be expected never to violate the sonority hierarchy just presented (in the obvious sense of sonority decrease followed by sonority increase). Among the more specific syllabification principles I have used earlier in my account of Danish, /4/, is that two segments in certain contexts "count" as one with respect to syllabification, viz. /s/ plus plosive and plosive plus liquid. This device is not needed in the present system

of syllabification in Danish. The only consonant to be mentioned specifically in the principles is /g/ (which is manifested as a plosive initially, but as a continuant, a semivowel or zero finally), the weak Danish consonant par excellence (cf. plosive hierarchies proposed with [g] as their weakest member).

SYLLABIFICATION OF DANISH CONSONANTS BETWEEN A SHORT STRESSED VOWEL AND SCHWA

The material for this section is all such clusters registered by Basbøll and Wagner, /8/, departing from Dansk Retrogradordbog and Retskrivningsordbog.

The following syllabification rules are proposed here:

- i) The first C is adjoined to the syllable of the preceding V. This is a syllabification rule which is specific to the context before a weak syllable.
- ii) The last C is adjoined to the syllable of the following V. This principle, which is probably universal, has the consequence, together with principle i, that a single C between a short stressed V and a schwa is ambisyllabic (cf. the section on Syllabificational Problems and Evidence).
- iii) /g/ is adjoined to the syllable of the preceding V. This syllabification rule, like i above, is specific to the context before a weak syllable, and it has the consequence, together with principle ii above, that a postconsonantal /g/ before a schwa will be ambisyllabic. No other consonants in clusters are ambisyllabic, according to the present proposal (recall that ambisyllabic means weak and in practice final as its main manifestation is concerned, see below).
- iv) Non-adjoined Cs are adjoined to the syllable of the following V if they form a 'possible initial cluster' together with all immediately following Cs. This principle is by no means specific to the position before a schwa, in contradistinction to principles i and iii. Otherwise to the preceding V.

Recall (from the section on Syllabificational Problems and Evidence) that any C that is final (i.e. is part of the syllable of the preceding V, thus including ambisyllabic Cs under the heading 'final') undergoes consonant gradation if it belongs to the set /p t k d g v r j/ (resulting in [b d g ʒ ʃ (i/u) ɰ ɰ j], respectively). Notice, however, that non-final /p t k/ in schwa-syllables may be pronounced [b d g] (this is, in fact, the general pronunciation in Advanced Standard Danish); but its classification as non-final is justified by the possibility of a contrast between /p t/ and /b d/ in this position, where non-final /b d g/ are always pronounced as plosives. I thus try to describe all contrasts in the Conservative Standard, which makes the model much easier to falsify (and thus its

empirical content higher). Observe also that short /a/ before a final grave C is grave ([ɑ]), and that short /o/ is [ɔ] before a final C, i.e. in closed syllables. Also the phonetic syllable boundaries (both in a phenomenological and a manifestation sense) are claimed to be reconcilable with the structures proposed, i.e. there is no alternative place which is more justified for the phonetic syllable boundaries. Thus the empirical coverage of the principles is much larger than by alternative principles which I know of, including those which I have formulated myself, /4/. I should add that plosives immediately following /s/ are generally not aspirated, but I cannot go into this here.

In fig. 2, at the end of the paper, a number of syllabification structures representative of the whole material are given. Notice that the principles apply correctly to abstract structures like ængste /ɛngstə/, but that they do not presuppose such abstractness (cf. the alternative /ɛngstə/). The only case (of the more than 140 clusters tested) where the syllabification rules do not immediately give the desired result is fylgje pronounced [fɛlgjə], a completely isolated loan word as far as its interlude is concerned. If we would give it a phonological structure with /lkj/ we would suppose that it might be pronounced with [k] in distinct pronunciation in Conservative Standards, at least by speakers not knowing the word. The phonological structure /lgj/ would predict e.g. a pronunciation without /g/ (or with [ɰ], in very Conservative Standards). I do not know of any data illuminating the factual pronunciation of this isolated loan word, and I do not consider the problem important. Notice also that words like mugne [mɔgnə] must be posited with the phonological structure /mɔknə/, but this has nothing to do with syllabification problems, since the isolated root mug is also pronounced [mɔg], and similarly in other cases with written g after short vowels (this is thus, in my analysis, simply an incongruity in the phonology-orthography-relation).

FRENCH E-ADJUSTMENT AS A CONSEQUENCE OF SYLLABIFICATION

Since I have treated this subject elsewhere, /9/, although not within quite the same framework as the one here proposed, I shall just give what I consider to be the relevant syllabification rules and structures. The syllabification rules apply within the domain delineated by #-boundaries according to my earlier proposals on French word structure. Notice that suffixes are more integrated with the stem than prefixes, and enclitic subjects more than enclitic non-subjects, according to this model. The syllabification here is of

course phonological rather than phonetic since phonological rules in certain cases will change some of the conditioning factors, thereby leading to a resyllabification (according to the same principles, however).

The distinction between strong and weak V is simple at this stage of syllabification: final schwas in polysyllables are weak, all other Vs are strong (this distinction is related to the notion of 'accentuability'). At the phonetic surface, all Vs that remain (in Standard French) are strong, which leads to a resyllabification.

The following syllabification rules are proposed here (the rules underdetermine the syllabification structure in complicated clusters, but this problem is irrelevant for E-adjustment, and I do not want to take any strong stand on phonetic syllabification in French here).

- A) The last C is adjoined to the syllable of the following V. This principle is probably a universal, as already stated.
- B) A plosive immediately followed by a liquid is adjoined to the syllable of the following V. This is a case of "two close-knit-segments count as one with respect to syllabification", already alluded to.
- C) If the preceding V is strong and the following weak (see above), the first C is adjoined to the syllable of the former V.
- D) If the first C is unadjoined, it is adjoined to the syllable of the preceding V. These principles give rise to syllabification structures like those of fig. 3, at the end of this paper. E-adjustment can thus be formulated simply like this: {e, ə, ɛ} are neutralized in favour of [ɛ] in closed syllables. {e, ə, ɛ} form a natural class in the technical sense according to my distinctive feature analysis in /10/.

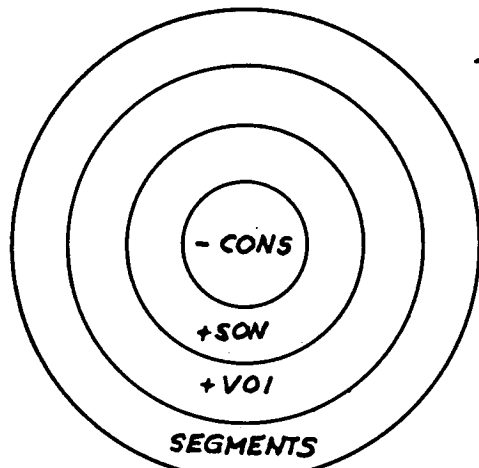
NORDIC I-UMLAUT AND SYLLABIFICATION

Several philologists have discussed the importance of syllabification in relation to the Nordic i-Umlaut, /11/. Here, I can only briefly state my own view, viz. that different syllabification may account for the basic difference (perhaps the crux) between long-syllable stems which as a rule undergo i-Umlaut under the influence of a (syncopated) /i/ in the following syllable, and short-syllable stems which do not, compare gastiR to gæstR and dōmiR to dōmR, but staðir to staðR. The important syllabificational principle in this context is 2c, which has the consequence that a C is adjoined to an immediately preceding short stressed V; thus the first syllable of the three examples would be gasʃ, dōʃ, staðʃ. The account presupposes two phonological rules or processes (see

below): a C is palatalized before a tautosyllabic /i/ (perhaps only in weak syllables, which would be natural for such a coarticulation process or rule), and: a segment is palatalized before a palatal(ized) C. The latter process or rule is "stronger" than the former in the sense that it applies across syllable boundaries (this agrees well with the fact that palatal Cs like /j R/ in Nordic generally cause i-Umlaut of preceding short-syllable stems as well as long ones). I have been vague with respect to the processual or phonological nature of the "change"; anyhow, the account does not presuppose that the palatalizations involved are phonological, the i-Umlaut will be phonological when the conditioning factors are lost. The fact that short-syllable stems with secondary stress in general undergo i-Umlaut, agrees well with the syllabification involved: the first V is not so heavy as in the normal case. Notice also that if the intervocalic C in a case like staðir is taken to be ambisyllabic, it nevertheless cannot be palatalized by the following /i/; thus the crucial phonological distinction goes between "final" and "non-final" C, just as in the Danish and French examples discussed above.

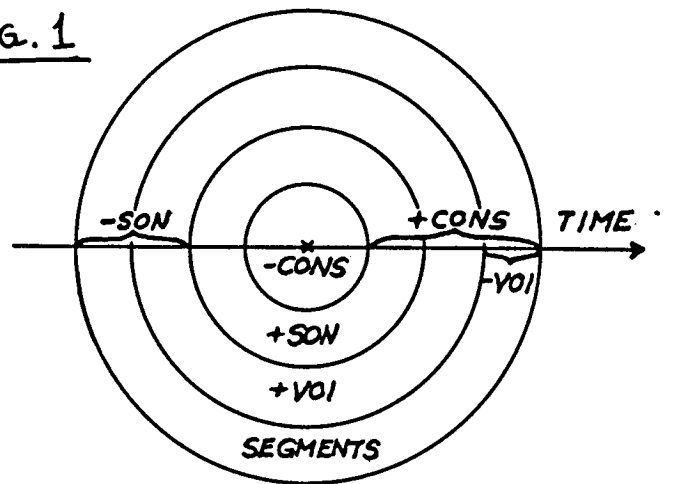
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segment types

FIG. 1



the syllable

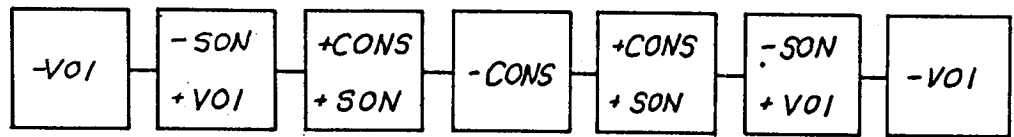
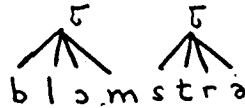


FIG. 2

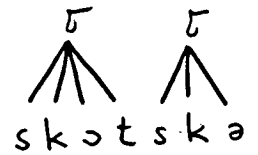
2a)



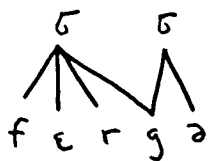
2b)



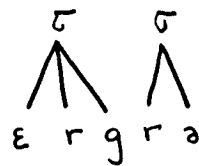
2c)



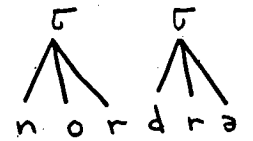
2d)



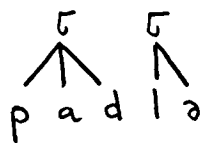
2e)



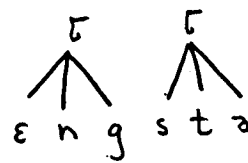
2f)



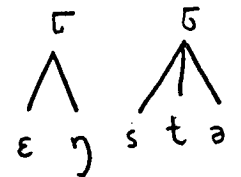
2g)



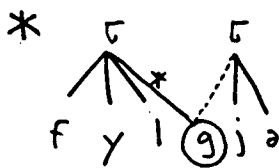
2h)



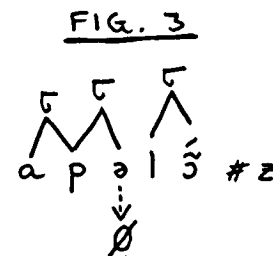
2h')



2i)



3a)



3b)

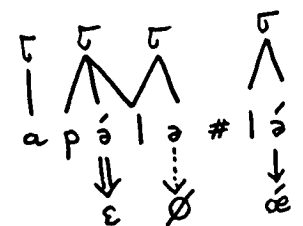


FIG. 3