A COMMENT ON BASBØLL'S PHONOLOGICAL SYLLABIFICATION
AS APPLIED TO DANISH

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Abstract: Basbøll's principles for syllabifying phonological
strings in Danish are discussed. Certain counter-
examples to the predictions of these principles are
presented, and it is argued that certain structural
properties of Danish words cannot be adequately ac-
counted for by Basbøll's syllabification strategy in
its present form.

1. Introduction

In an important paper, Basbøll (1972) launched the idea that
the inclusion of a syllable concept in a (generative) phonology of
Standard Danish (henceforth SD) would explain (or at least connect
in a natural way) quite a few seemingly disparate facts of the
surface or near-surface phonological structure of SD. Basbøll's
main finding was that a unique set of syllabification principles
would supply the sufficient conditions for a simple account of the
distribution of allophones of certain phonemes (or, within a gen-
erative phonological framework, the surface phonological behaviour
of certain phonological segments). Of the distributional state-
ments permitted by the introduction of syllabification, the most
important were the following: Short /a/ is pronounced [ɑ][1] before
homosyllabic non-coronal consonants, otherwise it is [a]. Short
/o/ is pronounced [o] in open syllables and [ɔ] in closed syllables.

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1) My phonetic transcription of Danish word-forms is in agreement
    with Basbøll (1969), except that I use [p t k] for [b̥ʰ d̥ˢʰ g̊ʰ]
and [b d g] for [b̥ d̥ g̊]. [ɑ] denotes a low vowel half-way between
cardinal vowels 4 ([a]) and 5 ([ɑ]).

/p t k d g r/ are pronounced [p t k d g ʁ] in syllable initial po-
sition and [b d g ð γ ɒ̂]¹ in syllable final position, except that
/d/ is dropped after homosyllabic sonorant consonants, and /g/ is
dropped after homosyllabic nasals. (For further details, see Bas-
bøll (1972, p. 187 ff, and 1974, p. 40ff.)

        In Basbøll (1973c and 1974), this idea is further developed,
and some principles for syllabifying phonological strings (at a
certain level, cf. below) in SD are given (in the 1974 paper in
connection with a more general discussion of the role of syllables
and syllabification within the framework of generative phonology).

        The present paper is mainly inspired by Basbøll's work. In
section 2 we shall discuss the principles of syllabification given
in Basbøll (1974) and Basbøll's use of "phonological" syllables
and syllabification from a general point of view.

        In section 3 we shall develop our main theme, viz. an evalua-
tion of the observational adequacy of Basbøll's principles.

2. Basbøll's principles of syllabification

        As mentioned above, several surface-phonological phenomena
can be accounted for in a rather simple way if syllable boundaries
(marking the domain, i.e. the syllable, of the relevant rules) are
inserted in phonological strings according to a judiciously se-
lected set of syllabification principles. The advantage of re-
ferring to syllables and syllabification in the description of the
so-called consonant gradation in SD - i.e. roughly the alternations
p-b, t-d, k-g, d-ð, g-γ, and ʁ-ɒ̂ - and certain others, cf. Basbøll
(1974, p. 42-43) and Rischel (1970) - is described by Basbøll in
the following way: "Now it is very interesting that all these
alternations can be subsumed under a single principle, viz. the
well-known one of <u>consonant weakening in syllable final position</u>"
(1974, p. 43). On p. 44 he goes on to state that "...it is clear

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1) In most younger standards, [γ] has developed to [i] after front
   vowels and [l] and to [u] after back vowels and [ɒ̂]. Where
this development is relevant to the topic of this paper, it will
be further discussed.

that the value of the above mentioned principle depends on whether there can be given <u>explicit</u> (and not unnatural) principles of the location of syllable boundaries that can account for all of the above mentioned phenomena [consonant gradation and the behaviour of short /a/ and /o/; PMH] without giving rise to complications elsewhere in the phonology. This will be attempted ... below."

In this section, Basbøll's principles of syllabification, as formulated in his 1974 paper, will be evaluated both from the point of view of their explicitness and from the point of view of their naturalness.

In section 2.1 we shall discuss whether Basbøll's principles of syllabification are sufficiently explicit for their predictions to be compared with phonological data in SD, i.e. whether or not ambiguities may arise when they are actually applied to phonological strings; this discussion thus concerns neither the naturalness nor the motivation of Basbøll's principles. These matters will be discussed in section 2.2.

In the remainder of this paper the symbol $ designates a syllable boundary.

2.1 Are Basbøll's principles sufficiently explicit?

After discussing several factors (grammatical boundaries, initial and final segment combinations in grammatical units of different size, stress, surrounding vowels, sequences of consonants) which may interact in different ways in different languages to determine the location of syllable boundaries, Basbøll sets up a hierarchy of three principles "which seem, by and large, to account for the phonological syllabification in Danish" (1974, p. 82). These principles may be paraphrased as follows (but the reader should check this paraphrase against Basbøll's own formulations on p. 84-91):

(i) Let $'s coincide with grammatical boundaries before words, before stems, before stressed native suffixes, and before zero. If, by the application of this principle, any two consecutive +syllabic segments have a $ between them, the string is syllabified; otherwise, proceed to (ii).

(ii) In all cases of two consecutive +syllabic segments having no $ between them, mark off all the places where a $ can

occur without giving rise to a syllable-initial or a syllable-final cluster which is impermissible word-initially or word-finally, respectively; if there is only one such place, a $ is inserted at that place. If, by the application of this principle, any two consecutive +syllabic segments have a $ between them, the string is syllabified; otherwise, proceed to (iii).

(iii) In all cases of two consecutive +syllabic segments having no $ between them, insert a $ at the rightmost place marked off by principle (ii) if the second of the two +syllabic segments is shwa and in the leftmost place marked off by principle (ii) if the second of the two +syllabic segments is a "full" vowel, i.e. any vowel other than shwa, cf. below.

According to Basbøll, the application of these principles at the level of representation which is input to (the first of) the rules that have the syllable as their domain (or refer to a $ in their structural description) will supply the $'s needed by these rules with one important exception, "viz. when a consonant cluster which contains a stop other than /g/ preceded by either a (underlyingly) voiced continuant or a nasal, occurs before shwa. In that case the syllable boundary goes <u>before</u> the stop" (p. 90).

It should be noted that stressed native suffixes comprise both suffixes with main stress and suffixes with reduced main stress (secondary stress) as e.g. -<u>inde</u> and -<u>dom</u>, cp. <u>skuespillerinde</u> ('actress') [sgu·əsbeɪɒ'enə] and <u>barndom</u> ('childhood') ['bɑːnˌdʌmˀ]. It should also be noted that the unstressed native suffixes -<u>ig</u> ([i]), -<u>(n)ing</u> ([(n)eŋ]), and certain occurrences of -<u>isk</u> ([isg]) have shwa at the level at which syllabification takes place.

The following examples may illustrate the function of these principles: <u>mados</u> ('smell of cooking') and <u>godhed</u> ('goodness') are syllabified /mad$oːˀs/ and /goːd$heˀd/ (principle (i)); <u>angre</u> ('regret') is syllabified /ang$ʁə/ (principle (ii), cf., however, below); <u>bade</u> ('bathe') and <u>Ida</u> (a personal name) are syllabified /baːd$ə/ and /iː$da/ (principle (iii)); <u>verden</u> ('world') and <u>værten</u> ('the landlord') are syllabified /vɛʁ$dən/ and /vɛʁ$tən/ (the exception to principle (iii)).

Now, let us try to determine the meaning of the expression "principles of syllabification". Since they have the effect of changing phonological strings at a certain point in a generative

phonological derivation, Basbøll's "principles" of syllabification
must apparently be interpreted as informal descriptions of (the
function of) a set of phonological rules which apply at a certain
point in the generative phonological derivation, namely just be-
fore the (first of the) rules which have the syllable as their
domain or which mention a $ in their structural description, (cf.
Basbøll, 1974, p. 84). In other words, if the derivational ma-
chinery is to work, the principles must be spelled out as phono-
logical rules with the combined effect of inserting $'s (hopefully)
at the places where they are needed in order to take care of the
above-mentioned processes (consonant gradation and vowel adjust-
ment). Such rules can undoubtedly be formulated (on the rule(s)
corresponding to principle (ii), however, see below), and I will
not discuss here the (mainly formal) problems which probably arise
in connection with the formulation of such rules.

Taking for granted that principles (i)-(iii) can be trans-
lated (some way or other) to phonological rules, I find them ex-
plicit to the extent that the entities they refer to are well-
defined. From that point of view principles (i) and (iii) are
impeccable: the grammatical boundaries mentioned in (i) and the
full vowels and shwa referred to in (iii) are reasonably identi-
fiable at the level at which syllabification takes place, cf.
Basbøll's careful descriptions (1974, p. 84-86 and p. 88-89).

The reference in principle (ii) to structurally possible
word-initial and -final clusters seems also unambiguous in view
of Basbøll's reference (1974, p. 87) to his own work on Danish
consonant combinations (Basbøll, 1973a) for a phonotactic descrip-
tion allowing one to distinguish between structurally motivated
and accidental gaps in the corpus of consonant combinations.
But the phonotactic description given in Basbøll (1973a) concerns
a level which presupposes that the $-dependent rules have already
applied, cf. e.g. the existence on that level of segments like
/ð ɣ ɒ̂/, and cf. Basbøll's explicit statement that "The terms
"pre-" and "post-vocalically" refer to the position in the syl-
lable (the syllable division being in accordance with Basbøll
(1972))." (Basbøll, 1973a, p. 110, footnote 2). The reference
to Basbøll (1972) in this quotation is not of much help either,
since the principles for syllable division given in that paper
(p. 194) are "intra-level" principles, i.e. they state where the

$'s <u>are</u> (at the level of Basbøll (1973a)), not how they came to
be there. Since the rules to which principle (ii) must be trans-
lated cannot refer to segments which only arise through the appli-
cation of later rules, cf. below, we need to know what are the
structurally motivated restrictions valid for the level which is
input to principle (ii) (= the phonemic level in Basbøll's struc-
turalistic description in 1973c). As far as I can see, this level
must come close to the level used in Vestergaard (1967), since the
idea underlying Basbøll's whole strategy of syllabification is to
account for the allophones of certain phonemic segments (= the
segments found at the level which are input to principle (ii) in
a generative derivation). But the level in question is not <u>iden-</u>
<u>tical</u> to that of Vestergaard (as regards its inventory of conso-
nants and consonant combinations). How, then, can we know what
is structurally permissible or excluded on that level if we are
not referred to a description of phonotactic constraints valid
for such a level? The only answer seems to be that the structural-
ly permissible word-initial and word-final consonant clusters on
the level in question are those which - through the application
of syllabification rules and syllable final weakening - would
<u>yield</u> structurally permissible word-initial and word-final con-
sonant clusters at the level described in Basbøll (1973a). The
inventory of permissible clusters on Basbøll's phonemic level
(= the level which is input to syllabification) probably only de-
viates from Vestergaard's inventory in cases where the <u>derivation-</u>
<u>ally</u> corresponding clusters on lower levels are permitted by
Basbøll but excluded by Vestergaard (in the sense that Basbøll's
rules, if applied to Vestergaard's phonemes, would not generate
the desired output). To take an example: In Vestergaard's ma-
terial (which is reproduced in Basbøll (1973a, p. 138-139)) final
clusters containing sonorant + /d/ or /b/ are excluded; but it can
be inferred from Basbøll's exceptions to principle (iii) (1974,
p. 90) that such final clusters are permissible (and distinct
from sonorant + /t/ or /p/) on the level which is input to sylla-
bification, since otherwise it would be superfluous to mention
words like <u>ændre</u> ('change' (vb.)) and <u>jambe</u> ('iambus') as examples
of such exceptions (they would be unequivocally syllabified by
principle (ii)).

I conclude that the clusters permitted word-initially and word-finally on the phonemic level (= the level which is input to syllabification) are such as would <u>produce</u> - through the application of syllabification and syllable final weakening - word-initial and word-final clusters permitted on the level described in Basbøll (1973a).

This means that Basbøll's principle (ii) in a way "looks ahead", i.e. its correct application is conditioned by the possible outcome of tentative applications of principle (ii) and (iii) and other later rules. This is neither circular nor meaningless as long as principle (ii) is only given as an informal description of the function of a phonological rule (or of a set of phonological rules), but as suggested above, such rules must probably be formulated in terms of the segments found at the level at which they apply, since the application of a generative phonological rule can only depend on its own structural description which, as far as I know, is an "intra-level" concept. This means either that the phonological rules corresponding to principle (ii) must refer (in their structural description) to possible word-initial and -final segments on <u>that</u> level or that the rules must refer <u>directly</u> to the sequences of segments found at that level, as Basbøll actually suggests (1974, p. 79); cf. also the formulations of $-insertion rules in other generative phonological works, e.g. Hooper (1972) and Vennemann (1972).

If the rules corresponding to principle (ii) are formulated in terms of the segments found at the level at which syllabification takes place (and this seems to be technically necessary, cf. above) they will, for instance, have to prohibit the potential syllabification /havg$ə/ of the name <u>Hauge</u> [ˈhɑuɡə], since otherwise the output would be *[ˈhɑuɣə], whereas they will have to allow the potential syllabification /alg$ə/ of <u>alge</u> ('seaweed') [ˈalɣə], since otherwise the output would be *[ˈalɡə]. These examples illustrate an important property of the whole strategy: Basbøll has decided that (most of) the phonotactic restrictions valid for consonants should be stated by reference to the phonological syllable and that they should refer to the segments occurring at a level at which "syllable final" weakening has already applied (this is one of his main claims in Basbøll (1973a)).

It is his task, therefore, to supply a syllabification which makes this possible, and this means that the insertion of $'s at a (slightly) higher level is <u>functionally determined</u> rather than <u>structurally motivated</u> from the point of view of the higher level.

In the following, I shall assume that the above-mentioned interpretation of principle (ii) is in accordance with Basbøll's intentions (otherwise one would need a reference to a phonotactic description valid for the phonemic (= pre-syllabificational) level). If this is correct it may be concluded that Basbøll's principles of syllabification are sufficiently explicit in the sense that their application to phonological strings do not give rise to ambiguities. In the next section we shall evaluate these principles from a more general point of view.

2.2   Basbøll's use of syllable boundaries

Basbøll's use of syllables and of syllable boundaries is of interest not only from the point of view of the generative phonological framework in which it was launched. Since it can also be seen as an interesting attempt to account for the distribution of surface phonological segments (see Basbøll, 1973c), it may be compared with other ways of dealing with the syllable in structuralistic and pre-structuralistic as well as in generative phonology and descendants of the latter trend, e.g. natural generative phonology. Since, however, this is not the place for a general discussion of the syllable, I shall confine myself to a few theoretical remarks concerning Basbøll's concept of the role of syllable <u>boundaries</u>.

It may be expedient to consider first Basbøll's motivation for referring to his syllables as "phonological" rather than "phonetic". The following quotation gives us the cue: "In some cases (e.g. Grüsse /gry̅s·ə/ the postulated syllable boundary may not coincide with the intuitively felt syllable boundary or with some experimentally established syllable boundary (or better: experimental data may seem to contradict the proposed syllable boundary). This may indicate that the syllable we are dealing with is a more abstract entity than the phonetic syllable, viz. a "phonological syllable". Nevertheless I dare use the term "syllable" since it is an entity which has, in Danish at least,

exactly one phonological vowel and whose boundaries can be posited in accordance with some generally recognized principles for syllabification [roughly: principles (i) and (ii) above; PMH]" (1972, p. 193). This quotation and other passages of his clearly show that the "phonological" aspect of Basbøll's syllable lies in its being a descriptive device which need not be motivated by phonetic or typological "naturalness". In other words, Basbøll's phonological syllables (and, in particular, their boundaries) are primarily motivated by what they accomplish (together with the $-dependent rules), viz. by the fact that certain surface-near structural constraints may be economically stated by reference to them. Superficially, Basbøll's principles of syllabification and the later $-dependent rules may thus look like a rule conspiracy in Kisseberth's (1970) sense. The similarity is only apparent, however: postulating a set of rules which have the combined effect of rescuing some (real) surface constraint which is statable in terms of segments in their relation to each other and to independently motivated grammatical boundaries is very different from postulating a set of rules (like Basbøll's) whose application merely permits the description of some surface-near constraints by (direct or indirect) reference to "phonological" syllable boundaries which have, of course, no physico-phonetic (segmental) existence at all, but may, at best, in some cases (e.g. probably not in a word like bade ('bathe') [ˈbæːðə]) correspond to psycho-phonetic syllable boundaries.

Incidentally, I find Basbøll's three-way distinction between "phonological", "phonetic", and "psychological" syllables and syllable boundaries (1974, p. 72-73) somewhat dubious. If "the fact that in German, word-initial vowels have a glottal attack, e.g. ein Esel [ʔɑin ʔeːzl̩]" is an example of "phonetic syllabification" (p. 74), then the terminology is at best confusing. In my view (and in my terminology), the interpretation of glottal stops in German as manifesting syllable boundaries is no less phonological than the interpretation of a Danish word like gade ('street') [ˈgæːðə] as /gaːd$ə/, but the former interpretation is obviously more concrete in the sense that the relation between perceptual data (which are conditioned by both physical and psychological factors) and interpretation is more direct.

In order to illustrate the theoretical status of Basbøll's "phonological" syllable it may be fruitful to compare it with two main trends in the use of syllables and syllabification by various phonologists: one of these is characteristic of glossematic theory and may be characterized as follows: once the number of syllable peaks is established at a certain level of representation, then boundaries may be inserted between them at places where the phonologist can use them to provide an economical description of the distribution of segments. In many cases, this gives the phonologist a high degree of freedom to distribute syllable boundaries (with the obvious restriction, though, that only one syllable boundary may be posited between two consecutive syllabic peaks). As is well known, this freedom is typically used (when possible) to insert syllable boundaries at places where they will split up intervocalic consonants or consonant clusters in a possible word-final + a possible word-initial consonant or consonant cluster, the need for making special statements about possible medial clusters thus being eliminated (cf. Basbøll's principle (ii)). In cases where - at a certain level of abstraction - this can be done in several ways, the syllable boundaries are (whenever possible) inserted at such places as to make the manifestations of consonants on lower levels statable in terms of the position in the syllable (cf. Basbøll's principle (iii)). Within structuralistic schools this relatively free use of syllable boundaries often amounts to the postulation of phonemic syllable boundaries which may permit a reduction of the inventory of phonemes, cf. e.g. Hjelmslev's (1938) treatment of [z] and [s] in German as allophones of the same phoneme.

The other main trend is characteristic of natural generative phonology (Hooper, 1976; Kahn, 1976) and differs crucially from the first in that $'s are inserted in phonological strings according to phonetically and typologically based hypotheses of natural syllabification of sequences of segments, leaving relatively little room for language specific deviations.

Basbøll's use of syllable boundaries is in important respects a compromise between these two conceptions: it resembles the former in that its motivation is primarily descriptive economy and in that relatively large freedom is allowed in connection with the placement of syllable boundaries, but it resembles the

latter in that these syllable boundaries are nevertheless inserted by explicit principles which are translatable to phonological rules proper.

From the point of view of the latter trend, Basbøll's principles may be criticized on the grounds that some of his $'s are definitely located at unnatural (or at least unexpected) places. This is true, in particular, of the $'s occurring before shwa, especially when the preceding vowel is long as in bade ('bathe') ['bæ:ðə] which is syllabified /ba:d$ə/. Basbøll is, of course, aware of that, and in fact he makes a point of claiming that these "unnatural" locations of $'s constitute the "phonological" or "marked" aspect of his syllabification (cf. the quotations above). I shall not go much deeper into such theoretical issues here, but I would like to point to some implications of Basbøll's principles which seem to be of general methodological interest.

In the following we shall discuss each of Basbøll's principles separately.

Ad (i). The general content of this principle, viz. the claim that certain (transparent) grammatical boundaries are also syllable boundaries is uncontroversial, as far as I can see. It is a traditional insight that languages may differ as to the types and ranks of grammatical boundaries which have phonological effects of the sort usually related to syllable structure and syllabification. Pulgram's (1970) distinction between word-languages, nexus-languages, and cursus-languages is probably of typological significance. From this point of view, Danish is definitely not a cursus-language (like e.g. French), but probably a nexus-language, i.e. the morphophonemic string to be syllabified on purely phonological criteria (in Pulgram's terminology: the section) is a non-compound wordform, perhaps including certain clitic extensions. In short, I find Basbøll's principle (i) and also the fact that it is ordered before the other principles both meaningful and typologically plausible.

Ad (ii). This principle is, of course, well known and indeed accepted by many phonologists. I nevertheless think that the application of this principle to Danish (and certain other languages, e.g. German) may be criticized on the following grounds: the splitting up of intervocalic consonant clusters in a possible word-final cluster + a possible word-initial cluster is well

motivated in languages in which any vowel may occur in any syl-
lable. In Danish, however, there are certain restrictions in the
inventory of vowels found in certain syllable positions, the most
important restriction being that shwa does not occur in a word-
initial syllable, and this means that principle (ii) becomes some-
what arbitrary: the idea underlying this principle would appear
to be that the word should be regarded as composed of an integral
number of syllables which are all potential words or minimal ut-
terances. As is well known, such an analysis is not possible in
all languages, either because any location of the syllable bound-
ary would lead to a syllable-final or -initial cluster which is
structurally excluded word-finally or -initially, as in Finnish,
or because certain vowels (notably shwa) do not occur word-
initially or word-finally. In Danish and German, shwa does not
occur as the first segment of a word (in Danish shwa is even im-
possible as the vowel of the first syllable of a word). This
does not mean that principle (ii) is completely arbitrary, of
course; but the application of this principle to a language like
Danish seems to be based upon the somewhat questionable assump-
tion that the consonantism of a word is more relevant to potential
divisions than its vocalism. Since e.g. the sequences [mnə], [ə],
and [ðə] are all structurally excluded as word-initial segment
combinations in Danish, neither of the syllabifications /ba:$də/
and /ba:d$ə/ of the word bade ('bathe') [ˈbæ:ðə] (which are both
permissible as far as principle (ii) is concerned) are a priori
more motivated from the point of view of Danish word structure
than the syllabification /ɛ$mnə/ of the word emne ('subject')
[ˈɛmnə] (which is excluded by principle (ii)). I do not deny
the descriptive advantages of principle (ii) in its combination
with certain parts of principle (iii); but the appeal to the con-
ception of syllables as possible words implicit in principle (ii)
is not straight-forward in a language like Danish, and if the
structure of words must be used as a criterion for excluding
certain locations of syllable boundaries, then the reason for
considering consonants more important than vowels should be stated
explicitly. As mentioned above, these remarks are not meant as a
criticism of the descriptive value of principle (ii), and I only
mention this problem because the tacit acceptance of principle
(ii) is likely to conceal what I consider an important structural

property of Danish words, viz. that they cannot always be regarded as composed of syllables which are potential words. Basbøll's statement (1972, p. 194): "Syllables always begin with a "full vowel" or with a possible word-initial consonant or consonant cluster..." must be a lapse, since it is incompatible with his statement later on the same page that "One intervocalic consonant belongs to the syllable of the preceding vowel if the following vowel is /ə/...", but it may nevertheless reflect the above-mentioned neglect of the importance of vocalism in principle (ii).

Ad (iii). This principle is, of course, crucial for Basbøll's whole strategy. However, in addition to being responsible for the major part of the observational inadequacies which will be exemplified in the next section, it gives rise to some minor problems which ought to be taken into account in the evaluation of Basbøll's syllabification. The postulation of principle (iii) was inspired, I think, by four important facts of Danish surface phonology: 1) the inventory of word-final consonants is identical to the inventory of single intervocalic consonants occurring before shwa; 2) the inventory of word-initial consonants is identical to the inventory fo single intervocalic consonants occurring before a full vowel. 3) /a/- and /o/-adjustment invariably take place when the vowel of the following syllable is shwa and when the /a/ or the /o/ is the last vowel of a word. 4) consonants with phonetic stød-basis, i.e. [m n ŋ l ɒ ð ɣ i̯ u̯], may receive the stød irrespective of whether they are followed by shwa, consonants or word boundary. Thus, by postulating that the syllable boundary goes to the right of a single intervocalic consonant if it is followed by shwa and to the left if it is followed by a full vowel, the need for making special statements about single intervocalic consonants is eliminated. The descriptive advantage of this is obvious, and the principle of locating the syllable boundary to the right of (at least some) consonants before shwa can be traced back at least to Hjelmslev (1951) and has also been adhered to in many Danish dialect monographies (e.g. Jul Nielsen (1968)). In most Jutlandic dialects, this sort of description is even more motivated than in SD because in these dialects the gradation series k-g-ɣ and t-d-ð are parallelled by the labial series p-b-β.

Thus, the description of single intervocalic consonants before shwa as syllable final and also the description of single

intervocalic consonants before full vowels as syllable initial must be given credit for a certain elegance.

The situation is somewhat different when it comes to inter-vocalic consonant clusters. In the case of clusters before shwa, it is clear that it is the behaviour of only certain of these which has lead Basbøll to locate the $ as far to the right as permitted by principle (ii) instead of locating it, say, to the right of the first intervocalic consonant (which would cover the cases with single intervocalic consonants as well): by locating the $ as far to the right as possible it becomes possible to ascribe the behaviour of stops preceded by obstruents and /g/ pre-ceded by sonorants to their position in the syllable in the same way as with single intervocalic stops and /r/. In all other cases, however, there is no descriptive motivation for preferring the rightmost location of the $ compatible with principle (ii) rather than the location one segment to the left of that position; as a matter of fact, the latter location would in most cases be pre-ferable from the point of view of naturalness. Thus, the only motivation I can see for syllabifying a word like salme ('hymn') /salm$ə/ rather than /sal$mə/ is economy of formulation: from a purely descriptive point of view, such a syllable boundary will do no harm within Basbøll's framework, and it permits principle (iii) to be formulated in a simple way; but it has no function whatsoever, and it is such syllable boundaries and also the fact that clusters containing a sonorant + a stop other than /g/ must be excepted from principle (iii) which makes Basbøll's whole strategy less convincing. Consider, e.g., the derivation of the words Hauge, Frauke (personal names), alge ('seaweed'), and malke ('milk' (vb.)) (starting with the level which is input to syllabification (the "phonemic" level); [u̯] is here derived from /v/; it is immaterial in the present context whether it should be derived from /u/ instead, cf. the discussion in section 3 below. The semicolons denote the potential locations of syllable bound-aries marked off by principle (ii)):

	Hauge	Frauke	alge	malke
input	havgə	fravkə	algə	malkə
(i)	-----	------	----	-----
(ii)	hav$gə	frav;k;ə	al;g;ə	mal;k;ə
(iii)	-----	frav$kə	alg$ə	mal$kə
weakening	hau$gə	frau$kə	alɣ$ə	mal$kə
output	ˈhɑugə	ˈfʀɑukə	ˈalɣə	ˈmalkə

(by later rules: [ˈhɑu(.)gə ˈfʀɑugə ˈal(.)ɣ/i̯ə ˈmalgə]).

It is a good illustration of Basbøll's strategy that the similar clusters /vg/ and /vk/ are divided in the same way but for different reasons, i.e. according to two different principles, whereas the equally similar clusters /lg/ and /lk/ are divided in different ways according to one principle, viz. principle (iii) and its exception. Having chosen beforehand to ascribe the pronunciation [ɣ] of /g/ to its position in the final part of the syllable, Basbøll must claim that /g/ is final in alge but initial in Hauge and select his syllabification rules accordingly.

The above-mentioned draw-backs may not be too serious, after all. At least their significance depends on one's conception of the function of syllables and of the factors determining syllabification. If their observational adequacy can be considered satisfactory, Basbøll's principles of syllabification must be considered an interesting attempt to account for consonant gradation and vowel-adjustment.

In the next section we shall see, however, that certain surface phonological facts of SD are incompatible with Basbøll's description.

3. Are Basbøll's principles successful?

Since we concluded above that Basbøll's principles of sylla-
bification are sufficiently explicit to be empirically inter-
pretable, we are now in a position to confront their effects with
surface-phonological data from SD to see whether they are obser-
vationally adequate in the Chomskyan sense.

First, however, the following remarks should be made: It was
natural for Basbøll to emphasize the impressive lot of data which
are accounted for by his hypothesis (and which, of course, in-
spired him to formulate that hypothesis) and to leave it to others
to search for data which are not. [Data of the first kind can be
found in Basbøll (1972 and 1974).] The data to be presented below
belong to the latter category. Such data have not, to my know-
ledge, been published before (at least not from the point of view
of their being counter-examples to Basbøll's findings), and I
therefore consider them relevant to an evaluation of the empirical
success of Basbøll's syllabification principles, e.g. they may
give rise to questions like the following ones: are such data
sufficiently marginal to be ignored? if not, can Basbøll's prin-
ciples of syllabification be amended to cover these facts without
becoming extremely ad hoc or without entailing more complications
than they were invoked to remove?

The validity of many of the examples in this section depends
on the following assumptions concerning Basbøll's descriptive
framework (as outlined in Basbøll (1973a, 1973b, 1973c, and 1974)⟩:

(1) Non-alternating as well as alternating occurrences of
[ɣ ð ɒ�̩] are derived from /g d r v/ (the alternation v-u raises
special problems, though, cf. below). The correctness of this
assumption - which is only crucial from a <u>generative</u> viewpoint
for the validity of some of the types of counter-examples men-
tioned below - can be inferred from several passages in Basbøll's
writings, cf. e.g. his examples of exceptions to principle (iii)
(1974, p. 90) from which it can be seen that e.g. a word like
<u>alge</u> [ˈalɣə] contains a <u>stop</u> /g/ at the level which is input to
syllabification ([ɣ] does not alternate in the morpheme in ques-
tion). Anyway, since Basbøll's principles of syllabification are
also meant to be part of a structuralistic description of Danish
phonology, cf. in particular, Basbøll (1973c, p. 32), it cannot

be decisive, at least in such a description, whether or not certain segments alternate. Since the phonemic level in such a description seems to be identical - as far as the inventory and arrangement of segments is concerned - to the level which in a generative phonology is input to the syllabification rules, I shall refer to such a level as the _phonemic level_ except in certain cases where the generative aspect calls for special comment.

(2) Possible word-initial and -final consonant clusters are those described in Basbøll (1973a) (note especially that /vl/ and /vj/ are taken to be structurally possible word-initial clusters).

(3) The "syllable final weakening processes" comprise the consonant gradation phenomena mentioned in Basbøll (1974, p. 42-43) and the manifestation of /v/ as [u̯] after short vowels, cf. Basbøll (1973c, p. 32) (on the relation between [v], [u̯], and [u], however, cf. below). Note especially that homo-morphemic [ŋ] and [ŋg] are both taken to manifest /ng/, [ŋ] being the syllable final manifestation.

(4) The manifestation of /g/ after homosyllabic vowels and non-nasal sonorants is [ɣ] in conservative standards, whereas it is [u̯], [i̯] or zero in younger standards (cf. also below).

(5) The types of morpheme boundaries obligatorily coinciding with syllable boundaries are those mentioned in principle (i) above.

The correctness of these assumptions can be inferred from Basbøll's writings on Danish phonology (cf. the references above), and I only mention them explicitly, because they are crucial for many of my counter-examples. In some cases, however, some (parts) of these assumptions will be further discussed.

It should be noted that Basbøll's principles "should ... be taken as exemplifying the preceding discussion [of various grammatical and phonological criteria for syllabification; PMH] rather than explaining the location of every syllable boundary in Danish" (1974, p. 83). Thus, if e.g. some of my examples depend crucially on the restricted list of boundary types given in principle (i), this is not in itself fatal to Basbøll's general strategy: Basbøll's principles are tentative (as he himself remarks) and to a certain extent independent of his general use of syllabification. In other words, some of the following types of examples do not per se seriously undermine Basbøll's syllabificational strategy,

but they are all problematic in some way or other if principles
(i)-(iii) are interpreted rigoristically.

Many of the examples in this section are foreign words and
proper names. However, I do not think that this can be used as
an argument against their validity as counter-examples to the
predictions of Basbøll's principles: most of the material used
by Basbøll himself to illustrate the dependence of his syllabi-
fication upon the distinction between "full" vowels and shwa con-
sists of foreign words and proper names (like Amanda, Hulda,
Gerda), and it is one of the main claims in Basbøll (1972) that
it is the presence of full vowels in posttonic syllables, not e.g.
a deviant syllabification, which signals a foreign word structure,
a view which I fully share.

The structural types which are problematic in connection with
Basbøll's principles of syllabification fall into several groups:

(I) Most words in which, according to assumptions (1) and
(3) above, one of the phonemic clusters /vj vr vl/ occurs between
a (preceding) short vowel and a (following) full vowel which be-
longs neither to a stressed native suffix nor to one of the suf-
fixes -ing, -ig, and -isk. Since a $ before any of the clusters
in question would yield a structurally possible word-initial
cluster, and since they are followed by a full vowel (not deriv-
able from shwa), the application of principles (ii) and (iii) will
place the $ before these clusters; they will accordingly be treated
as syllable-initial, and the syllable-final weakening rules will
not apply to them, but in the following words the intervocalic
clusters are pronounced with a "weak" first member, i.e. the pro-
nounced clusters are [u̯i u̯ʁ u̯l]: Sovjet ('Soviet'), aura ('aura'),
aurikel ('auricula'), aurora ('aurora'), Laura, Laurids, Europa,
manøvrere ('manoeuvre' (vb.)), Euripides, Povla, Paulus, Aulin
(name of a firm), aula ('aula', 'hall'), paulun ('tent', 'pavil-
ion'), støvlet ('bootee'), Pauline.[1]

To be sure, the validity of these words as clear counter-
examples to Basbøll's predictions is disputable: they would be
more detrimental to Basbøll's syllabification if their [u̯] were

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1) But note that Sovjet and manøvrere may also be pronounced
    with [vi] and [vʁ], respectively, i.e. in some words [v] and
[u̯] are in (a kind of) free variation.

in <u>alternation</u> with [v], but this is not the case in the words
above, and I am not sure that examples of alternations between
[v] and the [u̯] of <u>homo-morphemic</u> [u̯i]-, [u̯ʁ]-, and [u̯l]-clusters
can be found. The significance of the above examples of [u̯C]-
clusters thus hinges upon two assumptions: a) that they are de-
rived from /vC/-clusters, and b) that [u̯] is the manifestation of
/v/ in the final part of the syllable, cf. assumptions (1) and
(3) above. Although this seems to be Basbøll's position (1973b,
p. 42), his suggestion (1973c, p. 76ff) that [Vu̯]-diphthongs be-
fore homo-morphemic obstruents (e.g. in a word like <u>sovs</u> ('sauce')
[sʌu̯'s]) be derived from underlying /Vu/ could probably easily be
generalized to comprise all occurrences of non-alternating [Vu̯],
and in that case the words above would not be counter-examples.
I nevertheless think they are worth mentioning, since Basbøll's
principles of syllabification are clearly relevant to a struc-
turalistic interpretation of [v] and [u̯] as allophones (syllable
initial and -final, respectively) of one phoneme (/v/). Even under
this analysis, however, the intervocalic [u̯l]- and [u̯i]-clusters
before full vowels might be considered marginal. They are listed
here because /vl/ and /vj/ are considered possible word-initial
clusters in Basbøll (1973a), cf. also the (foreign) names <u>Vladimir</u>
and <u>Vietnam</u>. (The pronunciation [sʌ'vi̯ɛd] of <u>Sovjet</u> is, of course,
in agreement with Basbøll's predictions.)

　　In short, what the examples with intervocalic [u̯C] (at least
those with [u̯ʁ]) actually show is that if Basbøll's machinery is
to work, then <u>either</u> [u̯] cannot be derived from /v/ in such cases
(phonemically speaking: [u̯] and [v] cannot be interpreted as allo-
phones of the same phoneme) <u>or</u> the distribution of [v] and [u̯]
cannot be accounted for by reference to their position in the
<u>syllable</u>. Basbøll's own suggestion that [u̯] be derived from /u/
(phonemically speaking: that [u̯] be the postvocalic allophone of
/u/ (at least after short vowels; after long vowels the situation
is more complex)) would probably be a satisfactory solution of
this problem. /v/ would then simply be defectively distributed
(it would not occur after a homosyllabic short vowel), and there
would be no discrepancy between the behaviour of the intervocalic
consonant cluster in <u>livré</u> ('livery') [li'vʁe] and e.g. <u>manøvrere</u>
('manoeuvre' (vb.)) [manøu̯'ʁeːɒ] (these words would be underlying-
ly and/or phonemically /li'vre/ and /manøu'reːrə/, respectively).

But of course, a rule which de-syllabifies postvocalic /u/ would
have to be postulated.

(II) Some words in which the phonemic clusters /gr gl gn gv/
occur in environments like those mentioned under (I) above; al-
though principles (ii) and (iii) will insert a $ before these
clusters they are pronounced with a weak first member ([ɣ] or, in
younger standards, [u̯] or [i̯] according to the specific context):
(Sigrid), Børglum, Ragna, kognitiv ('cognitive'), inkognito ('in-
cognito'), magnet ('magnet'), magnat ('magnate'), stagnere ('stag-
nate'), stagnation ('stagnancy'), magnium ('magnesium'), magnesium
('magnesium'), magnum ('big-'), sphagnum ('peat moss'), Magnus,
Agnete, Dagny, (Sigvald, Sigvard).

    Most of these examples are clear counter-examples in those
conservative standards in which postvocalic written g is pronounced
[ɣ] in the words above. (In some very conservative standards the
pronunciation [ŋn] is possible for intervocalic written gn in
these words, cf. e.g. Hansen (1956, p. 82). In such standards,
the words magnet, etc. are counter-examples of the type illustrated
in (IV) below.) In most younger standards, however, the words
with intervocalic written gr, gl, gn, gv contain (non-alternating)
[u̯C]- and [i̯C]-clusters, and if, in these standards, such words
have underlying /jC/ and /vC/, then the words with [i̯C]- and [u̯n]-
clusters are definitely not valid as counter-examples, since /jC/
and /vn/ are impossible word-initial clusters; furthermore, the
remarks above (concerning non-alternating [u̯C]-clusters) will,
in these standards, apply to the words in which written gr and gl
are pronounced [u̯ʁ] and [u̯l].

    If, however, these words contain underlying (phonemic) /gC/-
clusters (and within Basbøll's framework this seems inescapable
in standards with surfacing [ɣ]) they are incorrectly processed
by Basbøll's rules, since the $ will be located before the /g/,
whereas words like agrar ('farmer') [aˈgʁɑ:] and agglutinerende
('agglutinating') [agluti'neːɒnə] are in agreement with Basbøll's
treatment. The pronunciation of the words prognose ('prognosis')
and diagnose ('diagnosis') is of particular interest in this con-
nection. These words may be pronounced [pʁoˈgnoːsə] and
[diaˈgnoːsə], respectively. Within Basbøll's framework, these
pronunciations could be due to two different interpretations:
1) a "pre-stem" boundary may be felt by some speakers to occur

before /g/ (this would be etymologically "correct"), or 2) the words may be interpreted as mono-morphemic. In either case, Basbøll's principles will locate the syllable boundary before /g/, albeit for different reasons. In standards with [ɣ], however, the pronunciations [pʁoɣˈnoːsə] and [diɑɣˈnoːsə] are by no means rare. It is tempting to assume that the pronunciations with [g] in the latter ([ɣ]-)standards reflect the bi-morphemic analysis, whereas the pronunciations with [ɣ] represent the mono-morphemic analysis which leaves the syllabification to be determined by purely segmental criteria. Anyway, the pronunciation with [ɣ] can hardly be compatible with a morpheme boundary before this [ɣ]. (It should be mentioned that the pronunciations [pʁoˈnoːsə] and [diaˈnoːsə] are also common.)

The proper names Sigrid, Sigvald, and Sigvard are parenthesized because a morpheme boundary (of the "strong" kind mentioned in principle (i)) might be postulated to occur after Sig-, cf. names like Ingrid, Thorvald, and Edvard, but they are of interest because they are probably the only existing words with intervocalic [ɣʁ] and [ɣv] before full vowels, and it is not unlikely that such clusters could be freely introduced in Danish mono-morphemic words (this question concerns the descriptive (pre-dictional) adequacy of Basbøll's principles); it seems inescapable that the other words are incompatible with Basbøll's analysis, at least if they are pronounced with [ɣC]-clusters.

(III) Some words with postvocalic /dj dr dv/ before a full vowel: Gudrun, Edvin, Edvard, klodrian ('clumsy person') and some words of Latin origin with the Latin prefix ad-, e.g. adjudant ('adjutant'), adjektiv ('adjective'), advent ('advent'), advokat ('lawyer'). If these words are to be processed correctly by Basbøll's rules, a $ must be inserted after /d/ in order to generate the pronunciation [ð] of this phoneme, and this must be taken care of by principle (i), since principles (ii) and (iii), if allowed to apply, would locate the $ before the /d/ (for the reasons mentioned above). This means that a transparent morpheme boundary (rigoristically: a morpheme boundary belonging to one of the categories mentioned in principle (i)) must be postulated to occur after /d/. As for the latter type (with ad-) one can, of course, claim that such a boundary exists, but the transparency of such a morpheme boundary to other than linguists or latinists

is highly questionable in cases where the "stem" does not occur in isolation (or in combination with other "prefixes") and/or the ad- is not interpretable (to the naive speaker) as a prefix, cf. that there are no such "stems" as *jektiv, *judant, *vent, *vokat. If such a morpheme boundary is nonetheless postulated in order to rescue Basbøll's principles, then it will be difficult to explain why there is apparently no such boundary if the latin stem begins with a vowel as in adaptere ('adapt') [adɑbˈteːɒ], adept ('adept') [aˈdɛbd], adoptere ('adopt') [adʌbˈteːɒ]. It is tempting to assume that the pronunciation of written d as [d] or [ð] in such words is conditioned by purely phonological, i.e. non-grammatical, criteria.

The word adækvat ('adequate') is particularly instructive in this connection. This word is pronounced [adɛˈkvæːd] by some people (primarily, I think, by people who are not aware of the fact that from a latin point of view it is morphemically complex). However, those who use this word actively and frequently almost always pronounce it with [ð]. This may in some cases be due to a morphemic analysis, but it is highly significant that the pronunciation of the written d as [ð] in this word is often correlated with the pronunciation [ə] of the following written æ, i.e. [aðəˈkvæːd] (at least there seems to be no opposition between [ə] and [ɛ] in such a context). This pronunciation is quite regular if no morpheme boundary is felt to occur after /d/.

As for the words Gudrun, Edvin, Edvard, and klodrian, I would not claim that the postulation of a (transparent?) morpheme boundary after /d/ is entirely ad hoc, cf. words like Gudmund, Ervin, Sigvard, dumrian ('stupid person'), grimrian ('ugly person'); but the addition of such types of morpheme boundaries to the categories listed in principle (i) obviously makes Basbøll's whole strategy considerably more complicated and less attractive, and like the words with intervocalic [ɣʁ] and [ɣv], such words are of interest to the descriptive adequacy of Basbøll's principles.

(IV) Words like jonglere ('juggle'), jonglør ('juggler'), Ingrid, pingvin ('penguin'). At the level which is input to syllabification, these words must apparently contain the intervocalic clusters /ngl ngr ngv/ since the only source of [ŋ] within Basbøll's framework seems to be an underlying nasal followed by /g/ or /k/, the post-nasal /g/ being deleted (via

lenition to [ɣ]) in the final part of the syllable. (It is pos-
sible that the nasal is at that level already specified as velar;
anyway, the rule that velarizes a nasal before /k/ and /g/ seems
to have a domain larger than the syllable, but it must at least
apply before the syllable-final deletion of post-nasal /g/, and
this means that /g/ must be present at the level at which syllabi-
fication takes place.) Since these words are normally pronounced
[ʃʌŋˈleːɒ, ʃʌŋˈløɒˀ, ˈeŋʁið, peŋˈviːn], the $ must be inserted
after /g/, but principles (ii) and (iii) will (for the reasons
mentioned under (I) above) insert it before /g/, thus yielding
*[ʃʌŋˈgleːɒ, ʃʌŋˈgløɒˀ, ˈeŋʁið, peŋˈgviːn] as the final output.
(Of these pronunciations at least [ˈeŋʁið] and [peŋˈgviːn] are
hardly ever heard; the others are possible (according to ODS)
but extremely rare, as far as I know.) To state the problem in
nuce: it is difficult, within Basbøll's framework, to account
for the fact that a word like lingvist ('linguist') [leŋˈgvisd]
has a pronounced [g] while a word like pingvin has not.

    (V) In words like gamma (name of the Greek letter), Hammurabi
Kamma, mammon ('mammon'), mammut ('mammoth'), Abba (name of a
popular Swedish song group), Pablo, kappa (name of the Greek
letter), Afrika, (akkumulator) ('accumulator'), akkurat ('accu-
rate'), Malacca, Bacchus, khaki ('khaki'), (akvavit) ('aquavit'),
Jakob, Ajax, Maja, the first and/or stressed vowel is [ɑ] in my
speech and also in the speech of most other speakers of SD (I have
interviewed a few speakers of Copenhagen Standard Danish with this
in mind and asked my phonetician colleagues), and words like gummi
('rubber') and Gunna are invariably pronounced [ˈgɔmi] and [ˈgɔna],
as far as I know. Within Basbøll's framework these pronunciations
would presuppose a $ after the (first) intervocalic consonant,
but the principles of syllabification will place it before the
(first) intervocalic consonant (for the reasons mentioned under
(I) above). Although some words of this type vacillate between
[a] and [ɑ] (in my material, this seems to be true of the paren-
thesized words), I think there is sufficient evidence that the
correlation in $C_0aC_0VC_0$-structures between frontness (acuteness)
of /a/ before an intervocalic non-coronal (grave) consonant (or
before an intervocalic consonant cluster whose first member is
non-coronal) and the presence in the following syllable of a
full vowel is not so high as Basbøll seems to presuppose. This

is particularly significant in cases where the intervocalic con-
sonant is an exclusively "syllable-initial allophone", i.e. [p]
or [k]:   if akkurat is pronounced [ɑkuˈʁɑːd] as seems to be the
normal case, then the domain of /a/-adjustment must be larger
than the syllable (but smaller than the word, cf. below). In-
cidentally, Basbøll mentions this particular problem (1974, p.
67); he interprets such cases as a symptom of a phonological
change in progress, the /a/-adjustment rule being in the process
of enlargening its domain. This may be true (although I am some-
what sceptical about his claim that the pronunciation [pɑˈpin̩ʼ]
is a new phenomenon (to the extent that it occurs)), but the im-
portant thing is that if /a/- and /o/-adjustment (cf. the exam-
ples gummi and Gunna above) do not have the syllable as their
domain, then two important arguments for Basbøll's syllabification
are seriously weakened.

(VI) Words like Harry, Lorry, karry ('curry'), sherry
('sherry'), terrier ('terrier'), terrakotta ('terra-cotta'),
paritet ('parity'), Karoline are hardly ever pronounced with the
consonantal, "syllable initial" allophone [ʁ] of /r/ as predicted
by Basbøll's rules (which will treat the /r/ as syllable initial).
For distributional conditions on the pronunciation of etymological
/r/, see Brink and Lund (1975, p. 261ff). One could, of course,
claim that the unstressed, posttonic [i] in sherry, paritet, etc.
is /əj/ at the level of syllabification, cf. that such a strategy
is used by Basbøll to account for the unstressed suffixes -ig,
-(n)ing, and certain occurrences of -isk (1974, p. 88), but still
the words with posttonic [y], [o], and [a] make trouble.

(VII) The words Canada, Malaga, Paludan, annuum ('annual
grant'), kognak ('brandy') are to my knowledge invariably pro-
nounced [ˈkanʼada, ˈmalʼaga, ˈpalʼudan, ˈanʼuɔm, ˈkʌnʼiɑg]. If,
for a moment, we ignore the stød, their segmental structure after
syllabification must be /kanada, malaga, paludan, anuom,
kɔ$njag/, according to Basbøll's principles, and this syllabifi-
cation raises serious problems for the stød, as far as I can see.

Basbøll considers the stød to be a syllable prosody which
is assigned to certain syllables by rule (1974, p. 46ff), but it
is far from clear where, in the generative phonological deriva-
tion, the stød assignment rule is meant to apply; nor is it clear

how it applies. In Basbøll (1974, p. 53) a stød assignment rule
(applicable to words of the type represented by the words above)
is formulated thus:

$$\begin{bmatrix} S \\ +stress \end{bmatrix} \rightarrow [+stød]/ \ \_\_(SS)\#\#$$

Does the symbol S in this rule refer to a syllable complete with
peak and boundaries? Apparently not, for in his general discus-
sion of syllabification Basbøll states that "...where the syllable
functions as a unit in phonological rules (i.e. typically in rules
concerning prosodic features like stress, tone, and stød....), syl-
labification is <u>not</u> required for the correct application of the
rules: what is necessary is only that the <u>number</u> of syllables be
known, and this information can possibly be given with an identi-
fication of the syllabic <u>peaks</u>" (1974, p. 68). I take this and
other passages of Basbøll's to mean that an abstract stød-prosody
is assigned (at a relatively early step in the derivation, at least
before syllabification) to certain syllabic peaks. The <u>manifesta-
tion</u> of the stød, as a glottalization of the first segment after
the syllabic peak if that segment is sonorant (including the final
part of a (phonetically) long vowel), must, however, be taken care
of by a later rule which must be ordered <u>after</u> syllabification and
syllable final weakening, since, otherwise, words like <u>Agner</u> (a
personal name) ['αɣˀnɒ] and <u>edder</u> ('venom') ['eðˀɒ] could not be
realized with stød (before syllabification, the postvocalic segment
would be an obstruent ([g] or [d]) which cannot receive the (pho-
netic) stød). A word like <u>Malaga</u> thus has the segmental structure
/malaga/ when it is input to the stød manifestation rule, and
this means that such a rule will have to disregard $'s in its
structural description (or, within Basbøll's framework, its domain
must be larger than the phonological syllable), since the syllable
initial /l/ is the stød segment. Although such an arrangement of
rules would generate the correct output, I sincerely doubt that
such consequences are in accordance with Basbøll's intentions:
it is hardly meaningful to claim that the stød is a property of
the <u>syllable</u> if it is first assigned to an entity (the syllabic

peak) which may be <u>smaller</u> than a syllable and then specified, by a later rule whose domain is <u>larger</u> than the syllable, as glottalization of a segment which in words like those above belongs to the <u>following</u> syllable. If the conception of the stød as a syllable prosody is not discarded, then it seems inescapable that words like those above must be listed as exceptions to principle (iii).

We shall now take an overall view of these counter-examples and try to evaluate their importance both from the point of view of Basbøll's syllabificational strategy and from the point of view of Danish phonology in general.

Let us consider first the types (I) - (IV). These types have three things in common: a) they contain an intervocalic consonant cluster which on the phonemic level is a possible word-initial cluster (or better: the location of a $ before such clusters would give rise to a syllable initial cluster which is possible word-initially); b) there is no (transparent) morpheme boundary between their first member and the following full vowel (at least this holds true in the majority of cases); c) they are followed by a full vowel. What is at stake here is thus that part of principle (iii) which locates the $ in the leftmost position compatible with principle (ii), before a full vowel. From the point of view of Danish phonology, the significant thing about this part of principle (iii) is that it amounts to postulating that a) in homo-morphemic V1C1C2V2-structures where V1 is a short vowel, where V2 is a full vowel, and where C1C2 is one of the phonemic clusters /(vj vr vl) gj gr gl gn gv dj dr dv/, these clusters must be manifested as [(vj̬ vʁ vl) gj̬ gʁ gl gn gv dj̬ dʁ dv], respectively, and b) in homo-morphemic V1ngC2V2-structures /ngj ngr ngl ngn ngv/ must be manifested as [ŋgj̬ ŋgʁ ŋgl ŋgn ŋgv], respectively. The above examples show that this does not hold true in all cases. It is obvious, however, that these structures are not of equal importance. As mentioned above, the examples with intervocalic [uj̬ uʁ ul̬] before a full vowel need not <u>per se</u> be detrimental to Basbøll's analysis, and I shall not discuss this type further here, since the analysis of labials poses special problems which are, at least in part, irrelevant to Basbøll's principles of syllabification. They are therefore parenthesized above. Of the remaining clusters, some could perhaps be discarded as marginal or not even valid as counter-examples: the only examples I have

found with "unexpected" manifestations of phonemic /gr/- and /dr/-
clusters are <u>Sigrid</u> and <u>Gudrun</u> which might be analyzed as mor-
phemically complex (quasi-compounds or the like) and the same may
be said of /ngr/ in <u>Ingrid</u>. The /Cr/-clusters are nevertheless
of some interest, because they - like the remaining clusters -
have some bearing on the question of possible contrasts between
consonants in medial clusters before full vowels, and in the fol-
lowing discussion the relevant /Cr/-clusters will be discussed
along with the remaining ones (including the /(n)gj/-clusters for
which I have found no counter-examples. The only example with
this cluster I can think of is the name <u>Ingjald</u> which is, to my
knowledge, invariably pronounced ['eŋ‚giaɪ'] in accordance with
Basbøll's predictions). The behaviour of these (phonemic) clusters
gives rise to the following questions: (1) in the homo-morphemic
structures V1C1C2V2 where V1 is a short full vowel, where C2 is
one of the non-syllabic segments [ʁ i̯ l n v], and where V2 is a
full vowel, is there in position C1 a contrast k-g or a contrast
g-ɣ or perhaps a three-way distinction k-g-ɣ? (2) in the struc-
ture V1C1C2V2 where V1 and V2 are specified as above and where C2
is one of the non-syllabic segments [i̯ ʁ v], is there a contrast
t-d or a contrast d-ð or perhaps a three-way distinction t-d-ð?

My answers to these questions must be split up in the follow-
ing way (and these answers must be considered tentative hypotheses
rather than established truths):

A. The velars.

a)   There is a contrast k-g before liquids followed by a full
vowel, cp. <u>mikroskop</u> ('microscope'), <u>lukrativ</u> ('lucrative'), <u>acryl</u>
('acrylic'), <u>cyklamen</u> ('cyklamen'), <u>cyklon</u> ('cyclone')
[mikʁo'sgoːb, 'lukʁa‚ti̯u', a'kʁyːl, sy'klæːmən, sy'kloːn] vs. <u>agrar</u>
('farmer'), <u>hygrometer</u> ('hygrometer'), <u>agglutinerende</u> ('agglutinat-
ing'), <u>Tekla</u>, <u>Hekla</u> [a'gʁaː, hygʁo'meːdɒ, a/agluti'neːɒnə, 'tegla,
'hɛgla]. The status of [ɣ] in this context is uncertain, cf. the
names <u>Sigrid</u> and <u>Børglum</u>.

In di-syllabic trochaic mono-morphemic words, postvocalic [kl]
seems to be excluded, cp. the words <u>Hekla</u>, <u>Tekla</u>, <u>cyklus</u> ('cycle')
(with [gl]); it would be interesting to test whether naive speakers
of the conservative variant of SD with surfacing [ɣ] would pro-
nounce a fancy name like *<u>Ragla</u> as ['ʁaɣla] or ['ʁagla]. (My own
variant of SD (which has a distinct Jutlandic flavour) belongs

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here, and I would not hesitate to pronounce this word as [ˈʁɑɣla]).
It will be discussed below whether such trochaic di-syllabic words
(or parts of words) can in any sense be considered phonological
units of structural significance.

b) There is a contrast g-ɣ before [n] + full vowel, cp. teknik
('technique'), stryknin ('strychnine'), teknikum ('technical
school'), ignorant ('ignorant') [tɛgˈnig, sdʁygˈniʔn, ˈtɛgnikɔm,
ignoˈʁanˀd] vs. magnet ('magnet'), magnat ('magnate'), magnium
('magnesium'), Ragna, Dagny [mɑɣˈneʔd, mɑɣˈnæʔd, ˈmɑɣˀniɔm,
ˈrɑɣna, ˈdɑɣny]; [k] is excluded in this context. These struc-
tures are thus clearly at variance with Basbøll's principles.

c) There is not much material on which to base a hypothesis con-
cerning the behaviour of velars between a short vowel and [v] or
[i̯] + a full vowel. It would seem plausible, though, to disre-
gard the names Sigvard, Sigvald and to postulate that there is
only a contrast k-g in this context, but it is questionable whether
[k] is possible in this context in trochaic words (personally, I
would pronounce a fancy word like *nokva as [ˈnʌgva]).

B. The alveolars.

a) Before [ʁ] there is a contrast t-d, cp. nitroglycerin ('nitro-
glycerine'), nitrat ('nitrate') [ˈnitʁoglysə ʁiʔn, niˈtʁɑʔd] vs.
hydrogen ('hydrogen'), hydrat ('hydrate') [hydʁoˈgeʔn, hyˈdʁɑʔd].

b) Before [i̯] the material is sparse. The names Katja and Nadja
need not be distinguished (except of course through their initial
consonants), but if they are, it is definitely as [ˈkati̯a] vs.
[ˈnadi̯a]. Very few, if anybody, would pronounce the latter name
[ˈnaði̯a]. A few speakers of Copenhagen standard Danish whom I
have interviewed with this in mind would tend to pronounce both
names with [-adi̯a] but could distinguish them (in the above men-
tioned manner) in careful speech. The words adjektiv and, in
particular, adjudant and a few more pose the problems discussed
under (III) above.

c) Before [v] the situation is probably somewhat different.
It is not unlikely that the contrast is d-ð (cf. (III) above),
and that [t] is excluded at least in trochaic words.

    I conclude that the behaviour of at least the clusters /kn
gn/ and perhaps also /kl gl/ is at variance with Basbøll's prin-
ciples (note, e.g., that cyklist ('bicycle rider') is normally
pronounced [sygˈlisd] (the pronunciation [sy/iˈklisd] given in

ODS is extremely rare, as far as I know); this would presuppose phonemic or underlying /sy'glisd/, but the basic forms cykel, cykle ('bicycle', 'to ride a bicycle') are pronounced ['sygəl, 'syglə], presupposing underlying /sykəl, syklə/). If Basbøll's principles are to be amended to cover such facts as the manifestation of /gn gl/ they would probably have to be made sensitive to stress and to the sequences of intervocalic consonants per se.

If the absence of aspirates in many of the above mentioned structures is not accidental, this ought somehow to be stated in a phonology of SD. Within Basbøll's generative framework, such restrictions would probably have to be stated as morpheme structure conditions: a word like bekneb ('trouble') [be'knetb] shows that the absence of [k] in words like teknik and stryknin is not due to word structure conditions; but in trochaic structures, the absence of aspirates might be due to such word structure conditions. I have not discussed the labial stops in this connection because they do not participate in the gradation process, except in a few words, under specific phonological and stylistic conditions, cf. Basbøll (1975), but it is highly significant that in di-syllabic trochaic words there is probably no contrast of aspiration in the context V1(-long)__CV2 in labial stops either, irrespective of whether V2 is a full vowel or shwa, cf. that the name Pablo must be phonemically /'pablo/ within Basbøll's framework (just as teknik, teknologi, cyklus must be /tɛ'gnik, tɛgnolo'giː, 'syglus/).

The examples in (V) above show that the distinction between full vowels and shwa is not decisive for the behaviour of /a/ and /o/ in the preceding syllable, or rather: even though /a/- and /o/-adjustment before the relevant consonants invariably takes place when the vowel of the following syllable is shwa, it also takes place in many instances when the following vowel is a full vowel. It is probably significant that in most of these cases (e.g. in almost all the examples listed in (V) above), the full vowel is unstressed (see also Brink and Lund (1975, p. 73)). This is also characteristic of the full vowels before which /r/ is treated as "syllable-final", cf. (VI) above.

The words with stød in segments preceding a full vowel (cf. (VII) above) also seriously weaken Basbøll's claim that the distinction between full vowels and shwa is a (directly) conditioning factor with regard to syllabification, at least if the stød is said to belong to the syllable.

The words pingvin and jonglør (vs. lingvist), cf. IV above, give rise to a particular problem: within Basbøll's framework the only way to account for this distinction seems to be to accept /ŋ/ as an underlying (phonemic) segment distinct from /n+ velar obstruent/.

In this section I have only mentioned problems which are not mentioned by Basbøll. I have thus omitted the problems posed by words like ordne ('manage') ['ɒ:dnə] and tordne ('thunder' (vb.)) ['tɒɒdnə]; but Basbøll's suggestion that they are underlyingly /ɔrdənə/ and /tordənə/ (1972, p. 200) seems to me somewhat ad hoc: the late shwa-deletion required by such an analysis is not motivated by Danish word structure, cp. vordende ('prospective') ['vɒ:dənə]. In fact, I would find it much more meaningful to claim that the words orden ('order') and torden ('thunder(storm)') ['ɒ:dən, 'tɒɒdən] from which the verbs ordne and tordne are derived have underlying /ɔr'dn, tordn/ with phonologically motivated shwa insertion (no Danish word can end in [Vɒdn]), whereas the verbs do not need such a rule.

4. Concluding remarks

We may conclude that although Basbøll's attempt to account for consonant gradation and vowel adjustment by reference to "phonological syllables" is in many respects empirically successful, there are quite a few phenomena which cannot be adequately described within this framework unless his (admittedly tentative) principles of syllabification are considerably modified. Although many of the counter-examples mentioned above may be considered marginal in the sense that they are lexically sporadic, I think that most of them are phonologically significant, and at least they give rise to some interesting questions concerning Danish word structure.

As mentioned in section 1, the aim of this paper has been the modest one of pointing to some problematic consequences of Basbøll's principles of syllabification. This may seem somewhat unconstructive, but I have nevertheless refrained from discussing whether or not Basbøll's principles could or should be amended to cover the above mentioned phenomena, because such a discussion

would require theoretical considerations (concerning, among other things, the functional and structural status of the syllable) which could be only superficially dealt with within the scope set for this paper.

For the sake of clarity, I shall recapitulate what I consider to be the main results and perspectives of my investigation.

1) It is doubtful whether both vowel adjustment and consonant gradation can be satisfactorily accounted for by reference to phonological syllabification in Basbøll's sense, even if syllable boundaries be inserted quite arbitrarily, cf. the examples in (V) above.

2) In homo-morphemic strings with intervocalic clusters there is a contrast gn-ɣn irrespective of whether the following vowel is a full vowel or shwa (in younger standards, this need not be a problem for the observational adequacy of Basbøll's principles of syllabification, but it ought to be stated somehow in any phonology of SD that [kn] is systematically excluded in such positions).

3) In di-syllabic trochaic words, the occurrence of intervocalic clusters of the type aspirated stop + sonorant (probably apart from [ʁ]) is probably heavily restricted in normal styles, irrespective of whether the following vowel is a full vowel or shwa. The status of [ɣʁ, ɣl, ɣv, ðʁ, ði̯, ðv] in this context is uncertain; most of these clusters may not be systematically excluded before full vowels; Basbøll's analysis presupposes that they are excluded in homo-morphemic strings.

These hypotheses ought to be tested; e.g. it would be interesting to present naive speakers with written fancy words like *Ragla,[1] *kidvas, *kaglo, etc.

4) If the stød is considered a syllable prosody manifested as a glottalization of the first post-peak segment (including the last portion of a long vowel) of a syllable, the syllabification of Malaga, annuum, etc. must probably be /mal$a$ga, an$u$om/ etc. (unless the manifestation of the stød is considered to be independent of phonological syllable boundaries?).

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1) In fact, the word raglanfrakke ('raglan') is pronounced [ˈʁaɣlan-] (in younger standards: [ˈʁau̯lan-]).

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5) It might be of some interest to investigate the possi-
bilities of recognizing other phonologically significant units
than segments and syllables. We have seen that di-syllabic tro-
chaic words seem to have rules of their own, and it may be fruit-
ful to consider the Danish word to be more hierarchically struc-
tured than usually assumed. What I have in mind is a unit larger
than the syllable but smaller than the word. Any word consists
of one or more such units, and any such unit consists of one
salient syllable or of one such syllable followed by one or more
subordinate syllables whose vowels may be shwa or one of the full
vowels /a o i y u/ but not /e ɛ ø æ ɔ/. Such a unit would be
internally consolidated by certain obligatory structural proper-
ties: /a/- and /o/-adjustment, the restricted occurrence of medial
aspirated stops before sonorants, the occurrence of at most one
stød, and probably some more. According to this conception, vari-
able pronunciations of a word would in some instances be due to
different hierarchizations: a-kva-vit [akvaˈvid] or akva-vit
[ɑgvaˈvid], cy-klo-tron [sykloˈtʁoːn] or cyklo-tron [sygloˈtʁoːn],
etc.

I am fully aware that such a description would also have its
costs; e.g. it would presuppose the hierarchization of each word,
to be a phonemic property or at least a property not exclusively
predictable from the sequence of segments. Nevertheless, this
hierarchical treatment may be worth while exploring.

I think the data and hypotheses presented in this paper de-
serve consideration in future work on Danish phonology, irrespec-
tive of whether or not syllables or larger units are recognized
as phonological units in their own right.

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