

Consonant length, stød and morae in Danish¹

Nina Grønnum¹ and Hans Basbøll²

¹Department of General and Applied Linguistics, Copenhagen University
 ng@cphling.dk

²Inst. of Language and Communication, University of Southern Denmark, Odense
 hba@language.sdu.dk

Abstract

In natural running speech postvocalic stød bearing (moraic) sonorant consonants are not—as might be expected from previous investigations—systematically longer across positions than the corresponding stød-less (non-moraic) consonants; therefore, in modern standard Copenhagen Danish, the moraic/non-moraic distinction in consonants is qualitative, not straightforwardly quantitative, as it is in vowels.

1 Introduction

Stød is a laryngealization which characterizes certain syllable rhymes under certain conditions. Its phonetic properties have been treated in depth by Fischer-Jørgensen (1989), its phonology and inflectional morphology by Basbøll (1985, 1988, 1998). Hansen (1943) is the pioneer treatment of its grammatical aspects.

Traditionally, potential for stød is a question of phonetic 'stødbasis.' A stressed syllable with a long vowel, or with a short vowel succeeded by a sonorant consonant has stødbasis. In *mono-morphemic* words the occurrence of stød can be charted thus:

	no stødbasis	stødbasis
monosyllables	no stød: [bʎus] <i>blus</i> 'flame'	stød: [lu:ʔs] <i>lus</i> 'louse'; [pʰulʔs] <i>puls</i> 'pulse'
disyllables	no stød: ['luseŋ] <i>lussing</i> 'slap in the face'	no stød: ['bʎu:sə] <i>bluse</i> 'blouse'

The generalisation is that syllables with stødbasis have stød, though not in disyllables. This is over-simplified, but sufficient for the present purpose, and the simplification does not affect the observation that consonant length is not an issue in the traditional account. The affinity between stød and Swedish Accent I is obvious, with minor distributional differences. See also Gårding (1977).

When inflected and derived words are admitted into the analysis, stød is unquestionably and abundantly contrastive on the surface, cf. minimal pairs like ['henn̩ 'henʔŋ 'vi:sʌ 'vi:ʔsʌ] *hinden* 'the film,' *hinden* 'the hind,' *viser* '(instrument) hand,' *viser* 'shows (v).' However, under a sufficiently sophisticated morpho-phonological analysis, it is possible—to a very large extent, though not entirely—to predict the presence or absence of stød in Danish words.

Basbøll (1988, 1998) assumes moraic structure in Danish syllables (though of a less proto-typical kind than in, e.g., Japanese, cf. Nagano-Madsen 1992), and thus stød is a **property of certain bi-moraic syllables**. In phonetic support of his analysis, inter alia, he quotes Fischer-Jørgensen's (1989) observation that the laryngealization tends to begin about halfway through the vowel, if it is long, or near its offset if it is short, which makes stød-syllables bi-phasal. - With yet a reservation about over-simplification, "mono-moraic" can be substituted for "no stødbasis," and "bi-moraic" for "stødbasis" in the chart above. Below are the principles for mora-counting in standard Danish:

- (1) Syllables with a long vowel are bi-moraic, like [mu:ʔs] *mus* 'mouse.'
- (2) Open syllables with a short vowel are mono-moraic, like [nu] *nu* 'now.'
- (3) Syllables with a short vowel succeeded by an unvoiced consonant are mono-moraic, like [kʰəʔ] *kat* 'cat.' (Similar syllables are bi-moraic in standard Norwegian and standard Swedish, cf. Kristoffersen 2000 and Riad 1998.)
- (4) Syllables with a short vowel succeeded by a sonorant consonant and a second consonant are bi-moraic, like [halʔs] *hals* 'throat.'
- (5) If stød occurs only in bi-moraic syllables, it follows that certain mono-syllables with a short vowel succeeded by one sonorant consonant must be bi-moraic, others not, under otherwise identical conditions, cf. [d̥aj tʰal sœn við] *dig tal søn vid* 'you, number, son, wit' vs. [d̥ajʔ halʔ tʰœnʔ viðʔ] *dej hal tynd hvid* 'dough, hall, thin, white.'

The crux of the matter is in (5): If consonants with stød are longer than stødless consonants, the interpretation of the consonants in the second set of mono-syllables as moraic is uncontroversial. If stød-consonants are not longer, moraicity in consonants—to be viable—must be given a more abstract interpretation. Accordingly, consonant duration holds the key to a phonological enigma.

2 The pertinent questions

2.1 Long stødless consonants?

There is an abundance of stød vowels and corresponding long stødless vowels, as in [ʔbe:ʔnð] *benet* 'the bone,' [ʔbe:nð] *benet* 'bony' [ʔmo:ʔsʌ] *moser* 'mashes (v),' [ʔmo:sʌ] *moser* 'bogs.'

There are also plenty of examples to show that vowel length may remain when stød is absent, as in the first part of a compound or derivative

[so:ʔl] *sol* 'sun,' [ʔso:lʔpæʌ] *solbriller* 'sunglasses'
 [bi:ʔl] *bil* 'car,' [ʔbi:lvasç] *bilvask* 'car wash.'

We do not similarly have long stødless consonants. There are no long stødless consonants in stressed syllables in standard Danish. Thus we have correspondences like

[ʔhenʔʌ] *hænder* 'hands' ~ [ʔhenʌ] *hænder* 'happens' - not *[ʔhen:ʌ]
 [ʔkʰʌmʔʌ] *kommer* 'comes' ~ [ʔʌmʌ] *lommer* 'pockets' - not *[ʔʌm:ʌ].

Nor do we ever get long consonants in the absence of stød due to derivation, cf.

[ʔtsʌmʔ] *tom* 'empty,' [ʔtsʌmheðʔ] *tomhed* 'emptiness' - not *[ʔtsʌm:heðʔ]
 [ʔulʔ] *uld* 'wool,' [ʔultʔp̥çæ] *uldtrøje* 'woolen cardigan' - not *[ʔul:tʔp̥çæ].

In other words, where stød vowels may recur as long vowels in spite of the absence of stød, we never get long consonants when a syllable with a short vowel "loses" stød.

¹This is a highly condensed version of Grønnum and Basbøll (in print).

2.2 Long stød consonants?

Fischer-Jørgensen (1989) and Riber Petersen (1973) both find consonants with stød to be systematically longer than consonants without stød. However, there are grounds for reservation with respect to the general validity of their data; see further Grønnum and Basbøll (in print). Furthermore, consonants with stød are not perceptibly longer than consonants without stød, whereas stød vowels unmistakably sound longer than short stødless ones. And, crucially, on the basis of examples as above, when—for structural reasons—stød is absent it never leaves a long consonant behind. - Danish simply does not have tautosyllabic long consonant sounds in stressed syllables.

To sum up: the existence of phonologically long consonants in Danish depends on the existence of measurably longer consonants with stød than without stød in comparable positions. Consonant duration is therefore what we undertook to investigate.

A fairly comprehensive corpus was designed and recorded in the laboratory. Recordings from five speakers were analysed. For reasons of space we summarize only the core of the results here. See Grønnum and Basbøll (in print) for details.

3 Results of the acoustic investigation

Word final position

There is a tendency for stød consonants to be somewhat longer than stødless ones, by 1 to 3cs.

Utterance final position

Stød consonants are consistently and considerably shorter than stødless ones, by 2 to 5cs.

Word medial position before an unstressed vowel

This is the crucial position, because no extrinsic factors can be made responsible for differences in duration: Consonants with and without stød are equally long.

By and large, we believe long stød consonants to be phantoms in normal running speech, at least where word medial position before an unstressed vowel is concerned. This is not to say that consonants with stød cannot be longer than consonants without stød, *ceteris paribus*, but they are not systematically longer across positions, and they may be shorter as well.

Stød onset timing

Variability in the onset of laryngealization, measured from vowel onset, is considerable, with time lags ranging between 1 and 13cs. It averages around 6cs.

4 Conclusion

Our results are from modern standard Copenhagen Danish. Chronological, geographical and social variation could not be taken into account, and there is little doubt that the details of stød and length are highly variable in time and space. This must be borne in mind when we discuss general issues about Danish stød, and not least when our results are compared to previous findings.

We shall now turn briefly to our conclusions about consonant length and their relevance for a mora analysis of the Danish stød. We shall distinguish between three levels of abstractness of the mora analysis.

At the most concrete level, we have not found any justification for considering stød consonants to be systematically long in normal running speech. Above all, word medial position before an unstressed vowel is crucial for this conclusion.

At the intermediate level of abstractness, the authors diverge: NG would conclude that the nature of the stød and its timing relative to segment boundaries makes it more plausibly a property of syllables than of the second mora of syllables - as tradition would have it and also Basbøll until as late as 1985. She finds further support for her stance in the fact that morae play no role in poetic metre in Danish, and on the whole she strongly doubts that morae have any cognitive reality at all for Danish speakers and listeners.

HB believes that the tendency towards a bi-phasal structure of the prototypical stød-syllable may be an essential auditory characteristic of bi-moracity, although the empirical validation for his claim—in terms of results from perceptual experiments—is not yet at hand. Furthermore, such a mora analysis allows a common categorization of syllables with long vowel and/or stød as bi-moraic, a class which is uncontestedly highly relevant in Danish phonology. HB emphasizes that stød as merely a syllable prosody is a much weaker claim than considering it a mora prosody, and the syllable analysis is therefore something which should be resorted to only after a mora analysis has been abandoned.

Both authors agree, however, that at more abstract levels of description, where no close affinity with phonetic surface manifestations and no explicit claim about psychological reality are postulated, a mora account of stød and its distribution may be entirely justifiable. Such an analysis would embody the claim that modern Danish has grammaticalized (phonologized) syllable weight, resulting in a linguistically relevant distinction between exactly two classes of stressed syllables: light and heavy (containing one vs two morae). According to Basbøll (1988, 1998), syllables with vowel length and/or stød would always be bi-moraic, but no claim about two distinct phases would be made at this level of abstraction. The description in terms of morae would be relevant for historical analysis and typological comparisons.

References

- Basbøll, Hans. 1985. 'Stød in modern Danish.' *Folia Linguistica* 19, 1-50.
- Basbøll, Hans. 1988. 'The modern Danish stød and phonological weight.' In P.M. Bertinetto, & M. Loporcaro (eds), *Certamen Phonologicum*, 119-152. Torino: Rosenberg & Sellier.
- Basbøll, Hans. 1998. 'Nyt om stødet i moderne rigsdansk - om samspillet mellem lydstruktur og ordgrammatik.' *Danske Studier 1998, Universitets-Jubilæets danske Samfund*, 33-86.
- Fischer-Jørgensen, Eli. 1989. 'Phonetic analysis of the stød in standard Danish.' *Phonetica* 46, 1-59.
- Grønnum, Nina and Hans Basbøll. In print. 'Consonant length, stød and morae in standard Danish.' *Phonetica*.
- Gårding, Eva. 1977. *The Scandinavian word accents*. Travaux de l'Institut de linguistique de Lund 11.
- Hansen, Aage. 1943. *Stødet i dansk*. København: Det Kgl. Danske Videnskabernes Selskab Historisk-Filologiske Meddelelser 29.5.
- Kristoffersen, Gjerd. 2000. *The phonology of Norwegian*. Oxford University Press.
- Nagano-Madsen, Yasuko. 1992. *Mora and prosodic coordination. A phonetic study of Japanese, Eskimo and Yoruba*. Travaux de l'Institut de Phonétique de Lund 27.
- Riad, Tomas. 1998. 'Towards a Scandinavian accent typology.' In W. Kehrein, & R. Wiese (eds), *Phonology and Morphology of the Germanic Languages*, 77-109. Tübingen: Niemeyer.
- Riber Petersen, Pia. 1973. 'An instrumental investigation of the Danish stød.' *Annual Report of the Institute of Phonetics, University of Copenhagen* 7, 195-234.