

STRESS GROUP PATTERNS, FOCUS SIGNALLING AND
SENTENCE INTONATION IN TWO REGIONAL DANISH
STANDARD LANGUAGES: AALBORG AND NÆSTVED

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This paper investigates stress group patterns, prosodic focus signalling and sentence intonation contours in Standard Danish as spoken on a substratum of Northern Jutland (Aalborg) and South Zealand (Næstved) dialect. The major difference between these two regions (and the difference to Standard Copenhagen Danish) is to be found in the way segments and Fo patterns are aligned in the prosodic stress group. Both regions share with Copenhagen the global signalling of sentence intonation contours, as well as a pronounced reluctance to indicate, with prosodic means, in this style of delivery, the pragmatic, contextually invited focus of the utterance.

I. INTRODUCTION

The research presented here, like Thorsen (this volume, p. 25-138), is part of a larger project which entails investigations of intonation in four Danish provincial towns, which in its turn is part of a five-year project, commenced in 1986, engaging numerous researchers, funded by the Research Council of the Humanities, called 'Spoken Danish in its varieties'.

Scope, purpose, methods and material resemble exactly those outlined on p. 27-32 to which the reader is referred for the complete treatment, but a few points are important enough to warrant a repetition here: Firstly, I have not intended to investigate the dialects proper in any of the areas I have vis-

ited, but rather the present-day regional standard language of the respective provincial towns. This language may be characterized as Standard Danish on, e.g., an Aalborg substratum. (The phonology and phonetics of present-day regional Danish is a sadly neglected area, and I cannot refer the reader to any existing literature on either Aalborg og Næstved regional Danish.) Accordingly, the material has been presented to the speakers in standard orthography and it adheres to the morphology and syntax of the standard language. (The only adjustments to the two towns have been semantic, in the names of cities to be travelled to, objects to be bought or sold, etc., so that the speakers might feel that they were talking about items familiar to them.) The aspect which suffers least, however, from the transition from dialect to regional standard language is the prosody. And prosody is also the main reason why speakers from different parts of the country can be identified (geographically), even though they conform to the standard norm in all, or most, other respects. Secondly, I am fully aware of the limitations imposed on an investigation which deals with highly monitored speech read into a microphone, in terms of loss of spontaneity and naturalness. However, the procedure enables you to isolate certain aspects of speech, while keeping everything else constant, and thus be sure that the description of, say, the relation between stress and fundamental frequency (F_0) is not fouled up by interference from, say, sentence accent or junctures. You may also reasonably expect that the intonational structures thus disclosed will appear in spontaneous speech, that they are the neutral minimum upon which a speaker operates in less rigid semantic and pragmatic circumstances.

II. PROCEDURES

1. Material

(1) To look at the realization of default and focal sentence accents, if they are manifest at all, three sentences were made up, where the same word occurs as the first, middle and last stressed word, respectively (the stressed vowels are indicated here with acute accents and intended sentence accents with plus symbols):

Kámma stámm⁺er fra Sálling/Náestved.

(Kamma comes from ...)

Ánders og Kámma skal til Strárandby/Fákse.

(Anders and Kamma are going to ...)

Tórbens søster hedder Kámma.

(Torben's sister is called Kamma.)

These utterances are presented in isolation, i.e. without any context at all, as well as in two different contexts, designed to evoke a focal sentence accent on Kamma and on some other word in the utterance, respectively. These contexts took the

form of questions to which the utterances above were the answer:

Ved du hvor Kamma er født? (Do you know where Kamma was born?)

Kamma stammer fra Salling/Næstved.

Hvem af dem er født i Salling/Næstved?

(Who among them was born in ...?)

Kamma stammer fra Salling/Næstved.

Hvor skal de unge holde ferie?

(Where are the children going for holidays?)

Anders og Kamma skal til Stråndby/Fåkse.

Hvem skal til Strandby/Fakse foruden Anders?

(Who, besides Anders, is going to ...?)

Anders og Kamma skal til Stråndby/Fåkse.

Hvad hedder Torbens søster?

(What is Torben's sister's name?)

Torbens søster hedder Kamma.

Hvem har en søster der hedder Kamma?

(Who has a sister called Kamma?)

Torbens søster hedder Kamma.

For a discussion of sentence accent versus emphasis for contrast and their (different) manifestations, see Thorsen (this volume, p. 28). Note that the research presented here is not intended as a contribution in the more syntactically or semantically oriented debate about what determines focus placement; when and whether a focus is 'broad' or 'narrow'; what is focus and what is contrastive stress or emphasis; what determines the 'default' location of focus; etc. For an excellent treatment of these questions, see Ladd (1978) and the references therein, and for a more recent overview, see Fretheim (1988). *ltd*

The nine utterances above will also allow me to look at the relation between stress and Fo as well as the realization of terminal declarative intonation.

- (2) To further illustrate sentence intonation phenomena, a fairly long declarative utterance was made up:

Køfoed og Thorsen skal med rútebilen fra
[Brønderslev til Skågen]/[Fuglebjerg til Sørø]
klokken fire på tirsdag.

(K. and T. are taking the bus from
... to ... at four o'clock on
Tuesday.)

as well as a dialogue with a question word and a one-stress echo-question:

Hvor længt ér der fra [Løkken til Stråndby]/
[Næstved til Fåkse]?
Til Stråndby/Fåkse? - Der er cirka 80/30
kilometer.

(How far is it from ... to ...?
- To ...? - It is about 80/30
kilometres.)

(3) Two utterances occur which have (a) one stress group with a fairly large number of post-tonic syllables, and (b) a polysyllabic word with stress on its last syllable (underlined below - this last to certify that word boundaries leave no trace in Fo, as it does not in Copenhagen Danish, cf. Thorsen 1980a, 1982, 1984):

De sidste dýbhavsfiskere må snart lægge óp./
Den bedste af cåmpingpladserne vil snart blive
lúkket.

(The last of the deep sea fisher-
men will soon have to lay up their
ships./The best among the camping
sites will soon be closed down.)

Fabrikken solgte elektroník for tō
milliōner krōner.

(The factory sold electronics
worth of two million crowns.)

To look in more detail at the coordination of Fo and segments, five utterances were constructed which contain a stress group (underlined below) whose voiced part grows progressively shorter, from top to bottom:

De fik kånerne frēm til nýtår.

(They got out the sleighs for New
Year's.)

Hun fik kånderne fýldt til kánten.

(She had the jugs filled to the
brim.)

Hun fik kånden fýldt med mælk.

(She had the jug filled with milk.)

Kóldt vånd slúkker tōrsten.

(Cold water quenches your thirst.)

Den grå kåt krådser.

(The grey cat scratches.)

The last two utterances are ill considered on my part. I neglected the fact that here the stress group under scrutiny is not the first one in the sentence. And to the extent that an initial juncture is manifest - which will make the first stress group differ from succeeding ones - the five underlined sequences are not immediately comparable.

(4) Turísterne forøger befólkningstallet om sōmmeren.

(The tourists increase the popula-
tion during the summer.)

Månge vstjyder/forrtninger lver af turisterne.
 (Many West Jutlanders/shops live
 off the tourists.)

These two utterances should disclose any final lengthening, granted that the second one did not receive a sentence accent on the last word (which it did not, see further below). Further, the 'Kamma' utterances can of course also be used to measure duration of initial and final 'Kamma's.

The total of twenty utterances/dialogues were typed out on library index cards in three different randomizations, twice, numbered consecutively from 1 to 120.

2. Speakers and recordings

The speakers from Aalborg were recorded in April 1987 in an ordinary office with a dynamic Sennheiser MD21 microphone, a Revox Studer tape recorder, on to Agfa PE36 tape, at a speed of 7½ ips. They were two males (PP and JW) and two females (IK and BL), all in their thirties, all born and raised in Aalborg. One of the females (BL) sounded, upon listening to the tapes, only very slightly regional, and was accordingly discarded from further processing.

Five speakers from Nstved participated. Four of them (two males, TJ and MC, and two females, CS and HH) are teen-agers, recruited from a local high-school. They were recorded at a local radio station in October 1986 with a dynamic AKG D130E microphone, a Revox PR99 tape recorder, on to Agfa PEM369 tape, at a speed of 7½ ips. The fifth speaker, ONT, is a 28 years old colleague, male, who was recorded in our quasi-damped room, with a Sennheiser MD21 condenser microphone, a Revox A700 tape recorder, Agfa PEM369 tape, at 7½ ips. The two teen-ager males were used only for a limited part of the material. One (MC) spoke at a devilish rate, and the other (TJ) produced predominantly non-terminal sentence intonation contours. Thus, the bulk of the results presented rests on three speakers from each region.

For an account of registration and measurements, see this volume, p. 30-31.

III. RESULTS

A. FOCUS INDICATION

1. Auditory evaluation

I should stress first that sentence accents, as they are generally understood in the literature, namely extra prominent F₀ movements associated with one or several stressed syllables in

the utterance, are found nowhere in this material, just like they are absent in Copenhagen Danish. See further Thorsen (this volume, p. 25-138) and the references therein. However, a restricted number of utterances were found, while listening to the tapes and providing the mingograms with identification and text, with what may be termed a focus indication. I.e. when replaying in isolation these (few) utterances from context, it was obvious what question they were the answer to. The results of this auditory evaluation are given in Tables I and II, and the acoustic foundation for my auditory impressions is presented in the succeeding section. (I am the sole auditory judge in this case, but although certain shady cases might receive another verdict from other listeners, I have no doubt that the main trends will remain unchanged.)

Table I

Number of focus assignments produced by three speakers from Aalborg in percentage of the possible maximum (given beneath the legend to each column), determined a priori by the context (i.e. columns should add up to one hundred.)

	Contextually invited focus assignments (FA)			
	None (51)	Initially (33)	Medially (17)	Finally (51)
Sentences realized				
Without FA	92%	0%	65%	80%
Initial FA	0%	85%	0%	0%
Medial FA	0%	15%	35%	0%
Final FA	8%	0%	0%	20%

The 8% (4 items) in the lower left of Table I are due to one speaker, PP, and should probably go down as 'mistakes' due to the nature of the reading task, and caused by the awareness of contexts where this rendering would be appropriate. The 15% (5 items) medial foci which were invited by the context to be initial are due to one speaker (IK). They are 'mistakes' which I cannot explain except as, again, due to the nature of the reading task. (One of my Stockholm speakers also misplaced some initial accents to medial position in this utterance, cf. p. 34.)

Table II

Number of focus assignments produced by three speakers from Næstved in percentage of the possible maximum (given beneath the legend to each column), determined a priori by the context (i.e. columns should add up to one hundred.)

	Contextually invited focus assignments (FA)			
	None (54)	Initially (36)	Medially (18)	Finally (54)
Sentences realized				
Without FA	100%	67%	89%	100%
Initial FA	0%	33%	0%	0%
Medial FA	0%	0%	11%	0%
Final FA	0%	0%	0%	0%

The 11% (2 items) realized medial focus assignments are due to one speaker (ONT); the 33% (12 items) initial foci are due to ONT (10 items) and HH (2 items).

The results from Næstved are very reminiscent of the two Copenhagen speakers, cf. this volume (p. 34-35), one of whom never produced any perceptible foci, the other producing initial and medial foci, when invited by the context, but never any final ones.

Whether or not the difference in focus assignment between Aalborg and Næstved speakers is significant and consistent cannot be determined, the number of speakers from each region being too limited. We can say of both regions that isolated utterances are always realized without any of the stressed words being more prominent than the others. Final focus signalling is extremely rare, medial focus indication is uncommon, especially in Næstved, whereas initial foci get signalled most of the time by Aalborg speakers, but not very often by Næstved speakers. The scarcity of final prosodic focus indication is interesting in the light of the results from Bornholm and Malmö (cf. p. 69), where final position attracts more prosodic focusing than medial position, prosodic focus signals being facultative in these two regions, and also because final position is where default sentence accents land in languages which possess this phenomenon. Such a difference in the location of prosodic centres of gravity (early versus late in the utterance) may reflect differences in spoken language syntax. This is obviously an immense field for future research.

2. Fundamental frequency

The F_0 tracings should establish the acoustic foundation for my auditory impressions and justify my rejection of focus signaling as 'sentence accent' in its customary sense.

(a) Aalborg

Figures 1-3 display average tracings of the three different utterances in their various editions. The only noteworthy difference between speakers is the somewhat slower rise from the low minimum in the stressed syllable to the peak of the F_0 pattern with IK. This difference corresponds with a difference in stressed vowel duration in initial, neutral 'Kamma', averaging 9.3 cs and 9.5 cs with PP and JW, respectively, versus 14.0 cs with IK. Thus, the peak of the pattern coincides with post-tonic vowel onset with all three speaker. Range spanned rarely exceeds 8 semitones.

(i) Initial 'Kamma' Stress group patterns in the neutral editions (i.e. the context free utterances, full lines in the figures) are characterized by a very slight (one semitone, approximately) and brief fall to the low onset of a fairly considerable rise (spanning approximately 5 semitones). This rise ends with the onset of the post-tonic vowel, which is falling, and as we shall see below, this fall is both sharp and extensive when the number of post-tonics allows for its full development. An indication is given already here by JW, who pronounced 'Kamma stammer fra Salling' with secondary stress only on 'stammer', i.e. 'stammer fra' becomes part of the preceding prosodic stress group, as far as its F_0 course is concerned. PP's 'stammer' also sounded reduced in prominence, but it has retained, at least partly, a rising-falling movement. IK and JW also demonstrate the tendency, known from Copenhagen Danish (cf., e.g., Thorsen 1980b) for

Figures 1-3

Average fundamental frequency tracings (logarithmic display) by three Aalborg speakers of three utterances with different focus locations. Speakers are identified at the top left of each figure, as is the frequency value which is the basis for the conversion to semitones. The number of items behind each average is given at the top right of each subpart of the figures. Utterances with no perceived focus are traced in full lines, utterances with perceived initial focus in dotted/broken lines, utterances with perceived medial focus in dotted lines, and utterances with perceived final focus in broken lines. Note that JW pronounced 'Kamma stammer fra Salling.' with secondary stress only on 'stammer'.

PP 0 semi-tones = 92 Hz

semi-tones

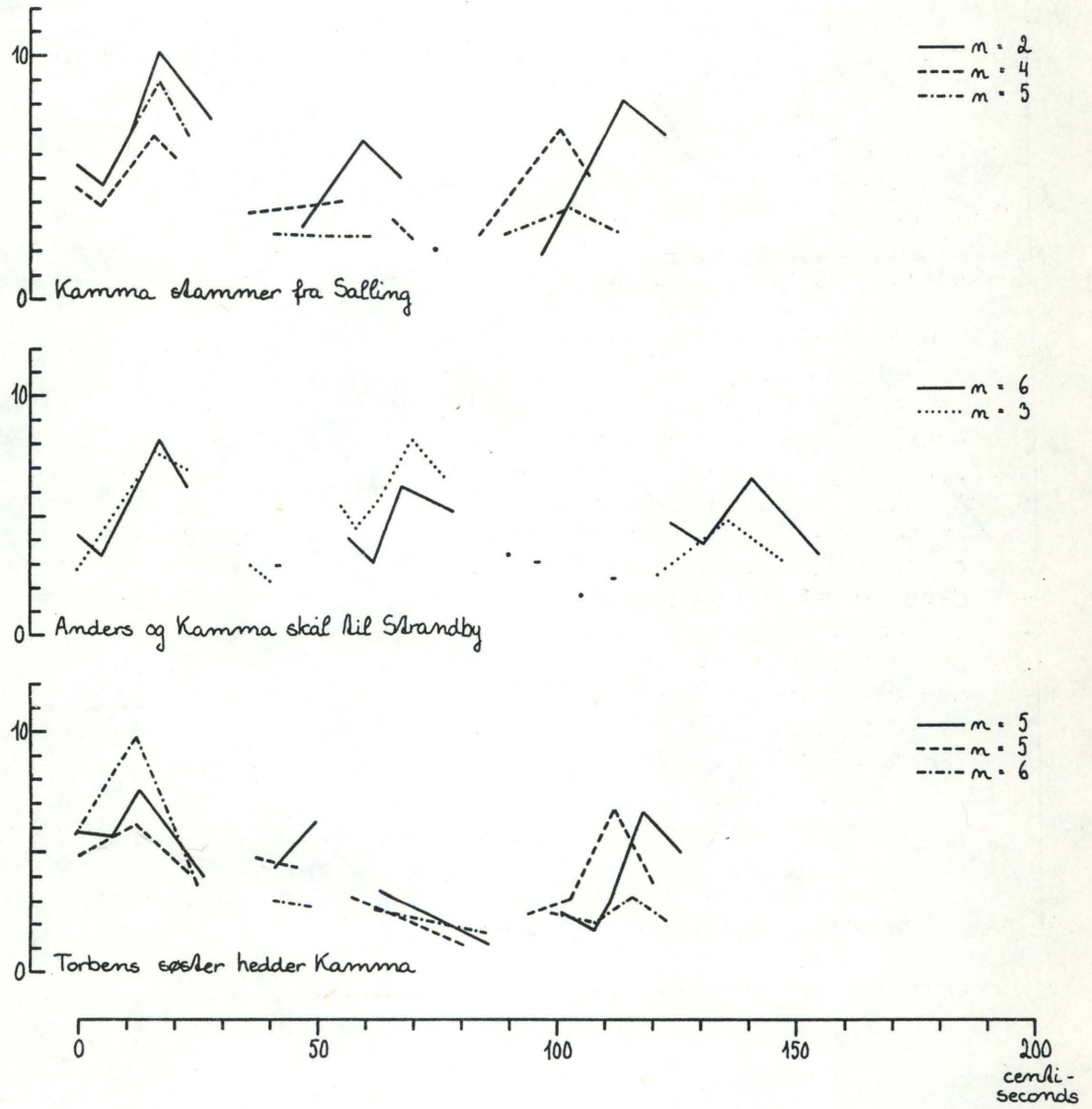


Figure 1

IK 0 semi-tones = 164 Hz

semi-tones

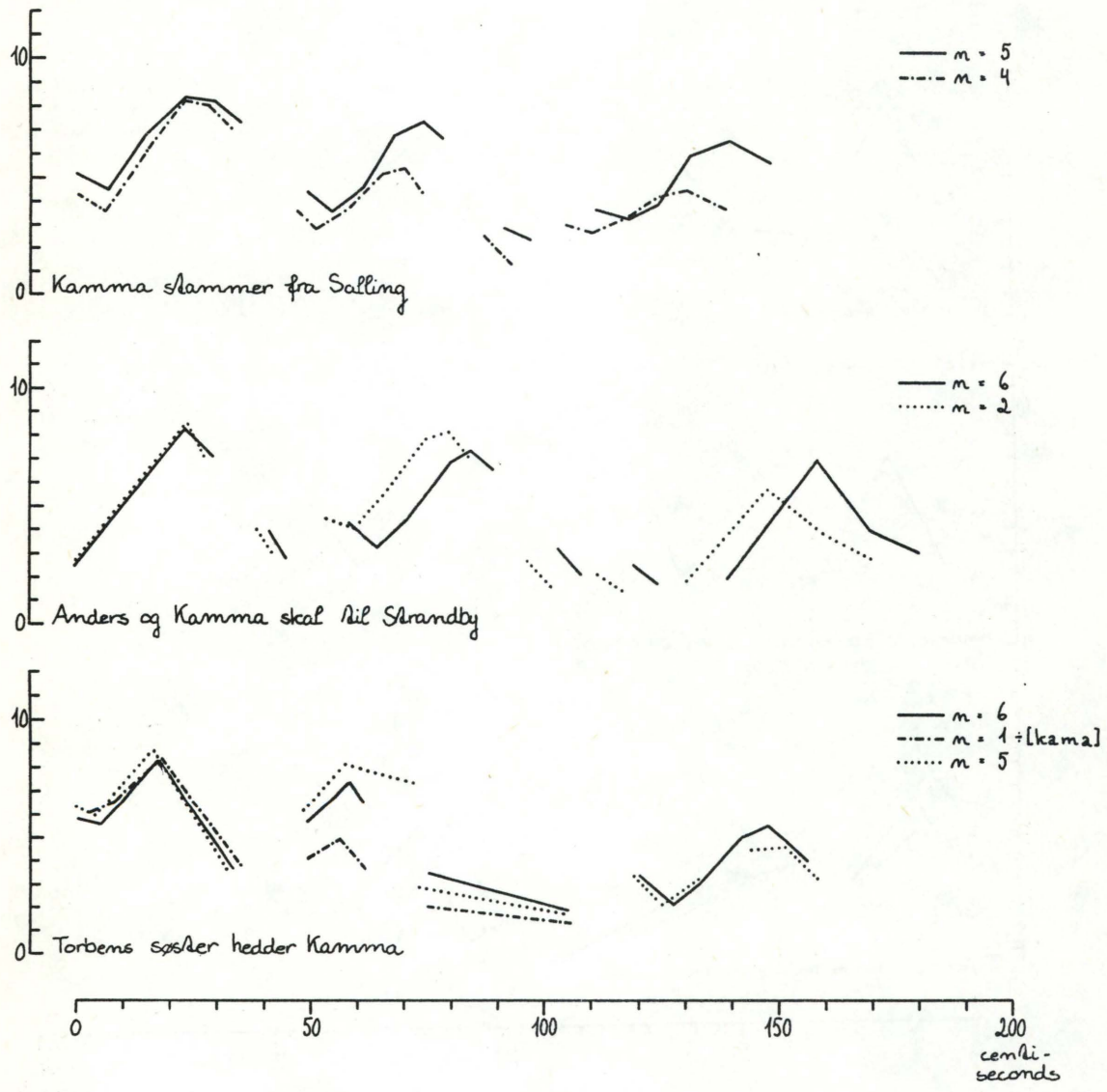


Figure 2

JW 0 semitones = 90 Hz

semitones

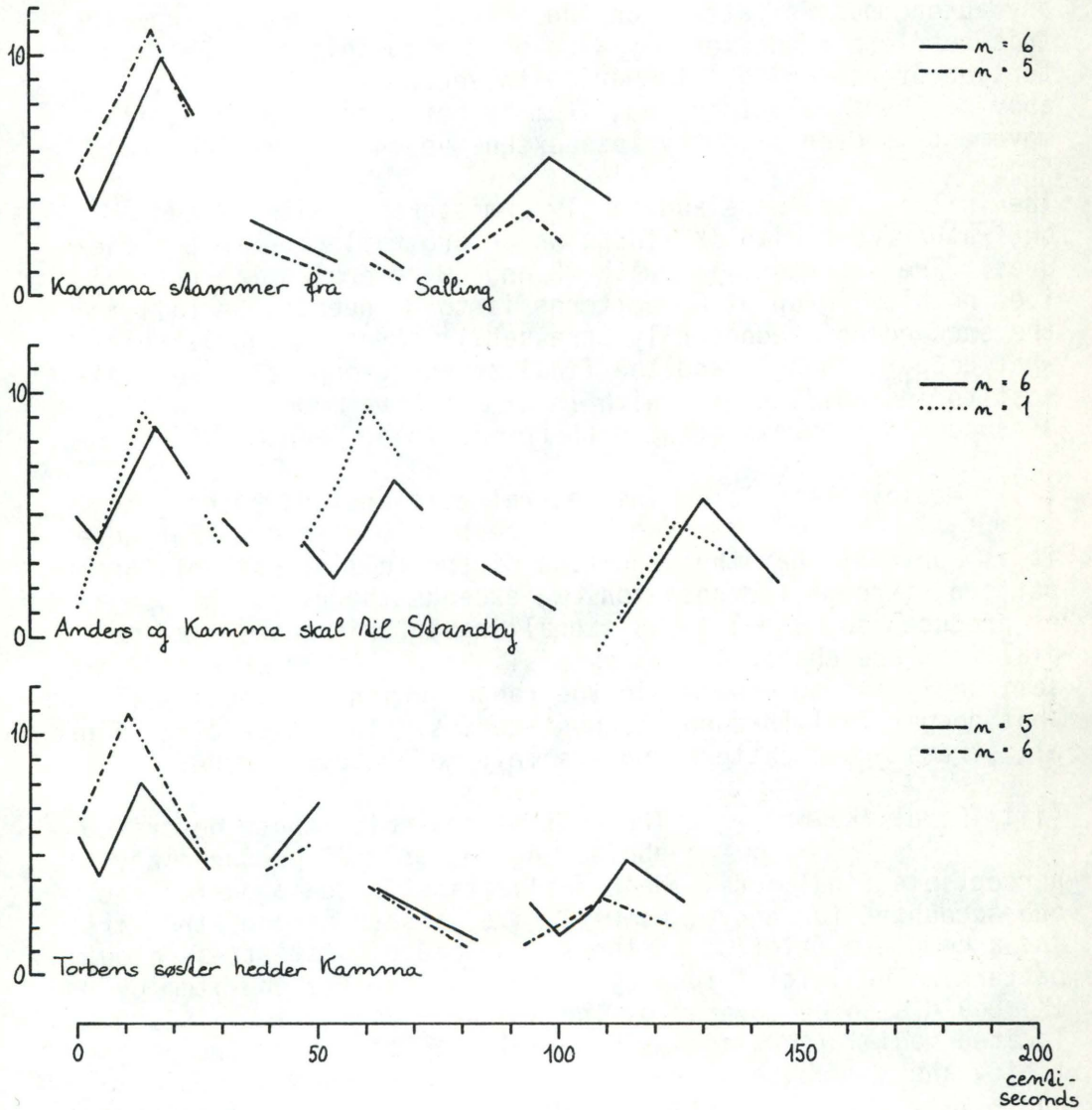


Figure 3

stress group patterns to shrink from the onset to the offset of the utterance, i.e. the rise becomes progressively less extensive in frequency from left to right. The global course, the intonation contour proper (as defined by the mutual relation between the stressed vowels) is mildly and approximately linearly falling, in these short terminal declaratives.

Final focus, signalled only by PP, is characterized by a diminishing of the first stress group pattern, whose rise is halved compared to the neutral edition, and a complete annihilation of any autonomous Fo pattern on the second stress group. However, this complete reduction may also be due to this speaker's intention of rendering 'stammer' with secondary stress, cf. above. The final, focussed, item is not boosted at all, its movement is even slightly less extensive than in the neutral.

The initial foci were auditorily unmistakable with PP and JW but rather weak with IK, facts which are reflected in the figures. The focussed item with PP and JW resembles the neutral, i.e. no blowing-up of Fo patterns is to be seen. The fall to the succeeding (secondarily stressed?)¹ stress group is somewhat deeper, though, and the final stress group has shrunk almost to insignificance. With IK a much more modest reduction of succeeding stress group patterns is to be seen.

(ii) Medial 'Kamma' The neutral editions add nothing to what has been said already. But here it is apparent that the magnitude of the falling part of the pattern, through the post-tonics, exceeds the rise. No speaker produced any final focus signalling in this case. The medial foci are characterized by a slight (a little more than one semitone) lifting upwards in the range, which entails a somewhat deeper fall through the post-tonics. The succeeding, final, stress group pattern appears only moderately shrunk.

(iii) Final 'Kamma' The neutral resembles those described above. Again, only PP produced any perceptible final foci, whose realization is analogous to the one accounted for above, as well, i.e. a shrinking of the first and a complete deletion of the second and closest stress group pattern. The initial foci by PP and JW (and the one item by IK) could also be covered by the account just given. IK's dislocated medial foci, again, have a lifted stressed plus post-tonic, and thereby a steeper fall to succeeding post-tonics, and a very slight reduction of the final stress group pattern.

Utterances with perceived foci are visibly shorter than the neutral ones (with the exception of IK's 'Torbens søster hedder Kamma' with medial focus). I assume that this shortening, which is approximately evenly distributed over the whole utterance, is due mainly to the presence of the focus. See further p. 64-68 in this volume, about duration and sentence accents in Bornholm Danish.

To summarize: Sentence intonation contours are globally falling, and very mildly so, with no trace of any particular, steep final fall, entirely in line with the model posed for Copenhagen Danish (Thorsen 1978 - see also p. 61 and 62 in this volume). Stress group patterns are rising-falling, with a fall which is more extensive than the rise, if enough segmental material is present to carry it. The slope of the rise seems to be adjusted to (inversely proportional to) the stressed vowel duration, in order that the high turning point may coincide with the onset of the first post-tonic vowel. The fall appears to be executed mainly between the first and second post-tonic and to level off after that. This rapid and rather deep fall is probably what accounts for the auditory impression of a "high-low" type stress group pattern, even though the stressed vowel does not constitute the maximum in the F_0 course. Final and medial focus realization is rare. Final focus diminishes the first, i.e. farthest, stress group pattern and deletes the penultimate, nearest one, but does not change the pattern of the focussed item itself. Medial focus has an even more modest effect, which lifts the stressed and first post-tonic slightly upwards, and reduces, but only very slightly, the final stress group pattern. Initial focus inverts the final one, i.e. the immediately succeeding stress group pattern is deleted, the final and farthest one retains a shrunken rise-fall.

- It would have been very interesting to see how emphasis gets expressed in Aalborg. Whether the emphasized item would come out with expanded F_0 patterns and more (and more far-reaching) suppression of the surroundings (especially with medial emphasis). (That is how emphasis for contrast is expressed in Copenhagen, cf. Thorsen 1980b.) This question will have to remain unsolved for the time being. I did not dare include in the material also contexts and utterances with emphasis (e.g. of the type 'Was Kamma born in Salling or in Strandby? - Kamma was born in Salling.) for fear that speakers would get confused about and not distinguish focus and emphasis systematically.

(b) Næstved

Figures 4-6 display average tracings of the three utterances. Again, speakers differ (as in Aalborg) in the slope of the rise in the stress group pattern. ONT's rises are steeper, apparently because they are more extensive. It is true generally of all three speakers that the short stressed vowel is centered around the low turning point and the first post-tonic vowel is

Figures 4-6

Average fundamental frequency tracings by three Næstved speakers of three utterances with different focus locations. See further the legend to figures 1-3

ONT 0 semitones = 92 Hz

semitones

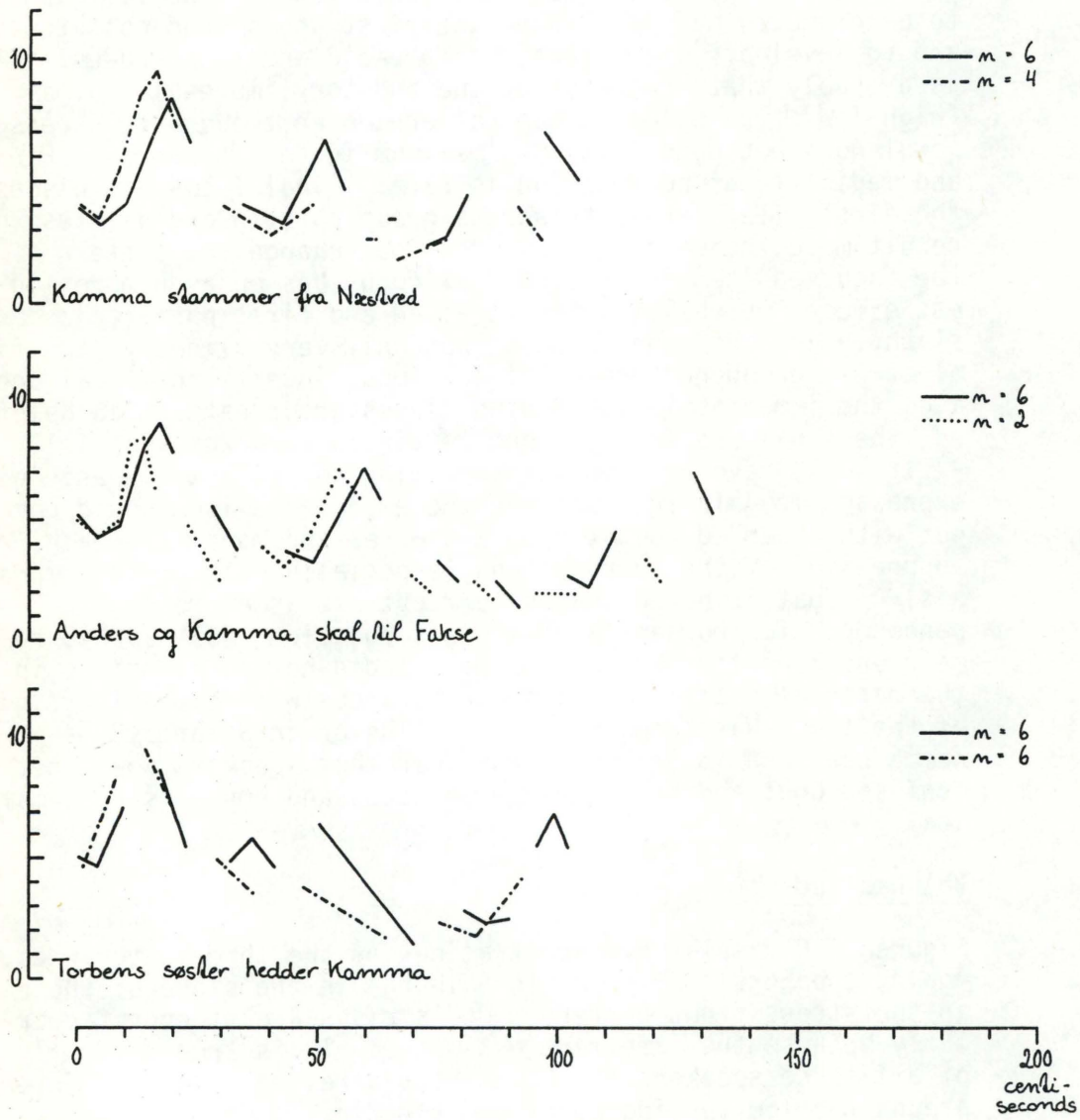


Figure 4

CS 0 semitones = 174 Hz

semitones

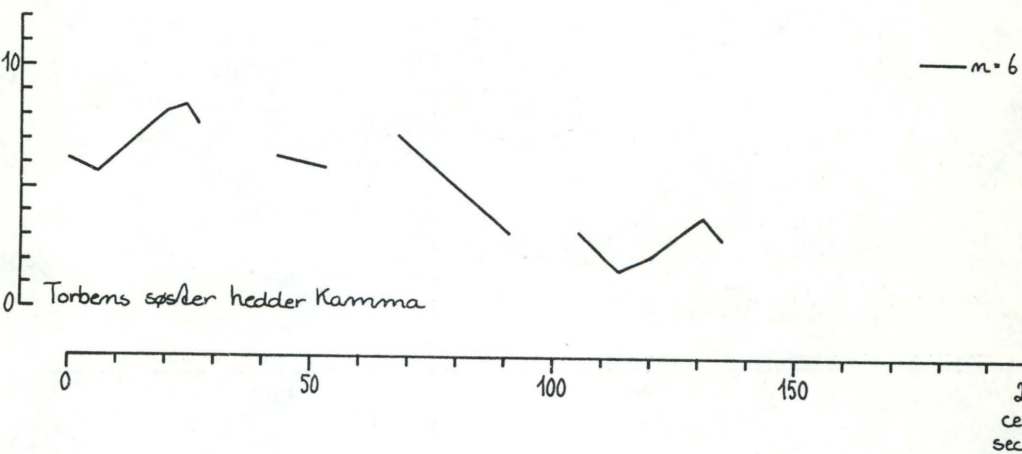
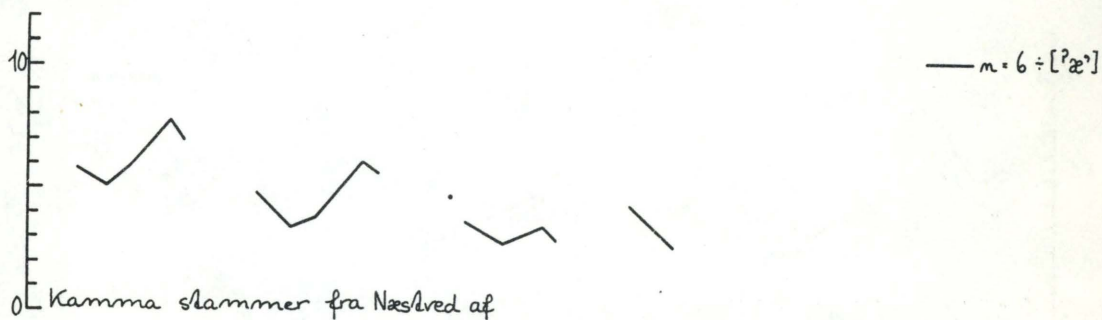


Figure 5

HH 0 semitones = 148 Hz

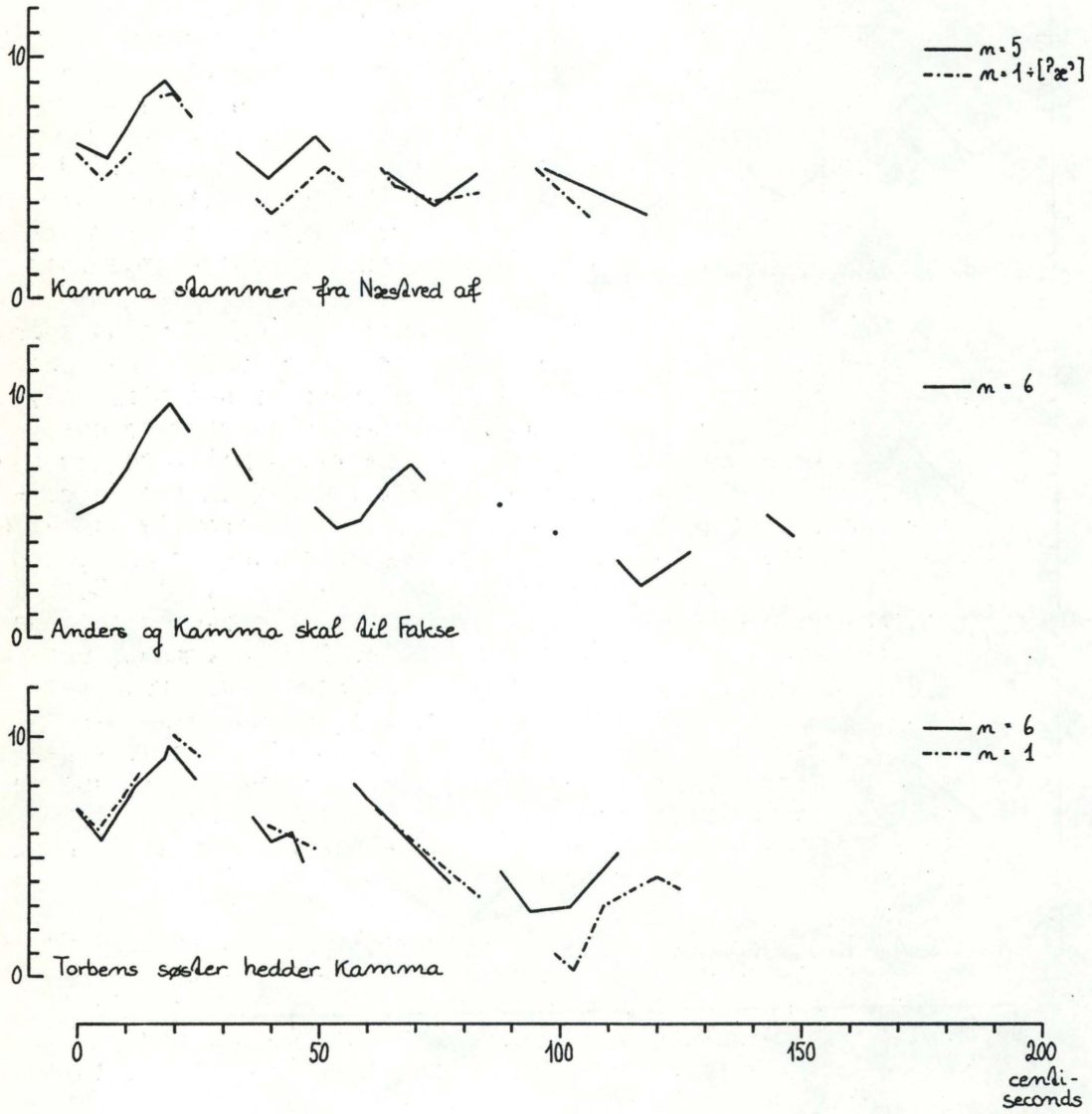


Figure 6

centered around the high turning point in the pattern. When the stressed vowel is phonetically long, as in 'Torbens', it covers more of the rise and the post-tonic is transposed in time, i.e. the high turning point coincides with its onset. At least this is true of ONT and HH. Speakers' ranges are modest, not exceeding eight semitones. Their intonation contours are slightly and globally declining, with no trace of any final, local falls. Stress group pattern rises are slightly less extensive than in Aalborg, covering 3-4 semitones, and have a weakly pronounced trend towards left-to-right reduction of the magnitude of the rise. The fall through the post-tonics is gradual (as opposed to Aalborg), and not as extensive, compared to the rise (again compared to Aalborg). The scarce initial focus indications (10 items with ONT, two with HH) are contained in a diminishing of succeeding stress group patterns, more so with the closest (middle) one, but not a complete deletion. HH is much less explicit than ONT. The two medial foci with ONT seem to be mainly signalled through a near-deletion of the succeeding (final) pattern. (Compare this with Aalborg, where it was the focussed item itself which manifested its focal status.) The prosodic manifestation of focus shortens the whole utterance (the apparent exception in the lower part of figure 6 may be accidental - there is one item only). Thus, focus signalling in Næstved seems to be carried out, when it occurs at all, in a manner exactly similar to Copenhagen (where it is also optional and excluded from final position), cf. this volume p. 60. It is less generously signalled than in Aalborg, where immediately neighbouring stress group patterns are deleted when focus is initial or final. Both regional languages, when they express focus prosodically, do so not through a larger and more explicit F_0 movement, but rather through a reduction of surrounding stress group patterns, a stress reduction on surrounding words. This is in sharp distinction to the (focal and default) sentence accents found in Bornholm and Stockholm, cf. p. 35-56 in this volume, and this is the reason why I prefer not to employ the term 'focal sentence accent' at all in the description of Aalborg and Næstved (and Copenhagen).

The most intriguing question, when Aalborg, Næstved and Copenhagen are compared, lies in the fine details of the stress group pattern: the slope and extent of the rises and falls, and the coordination of segments with the F_0 pattern. This will be treated further below, but let us look at the long declaratives and the questions first.

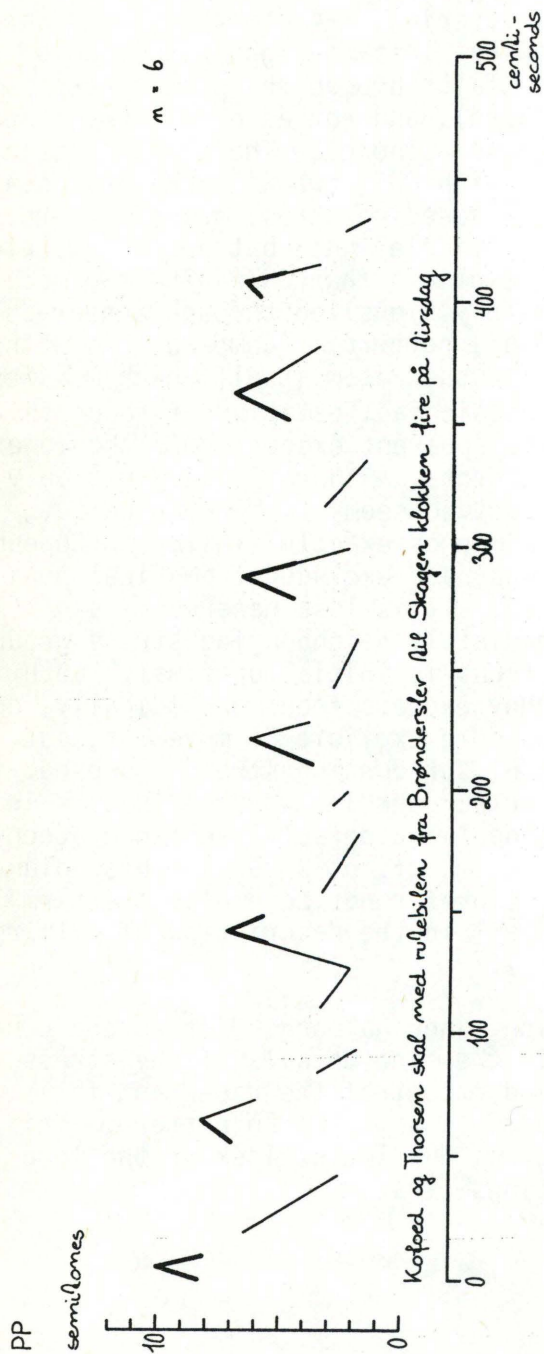


Figure 7

Average fundamental frequency tracing of a long terminal declarative utterance by three (including figures 8 and 9) Aalborg speakers. The vocalic part of the stressed syllables is drawn in thicker line. The time scale is compressed compared with other figures. See further the legend to figures 1-3.

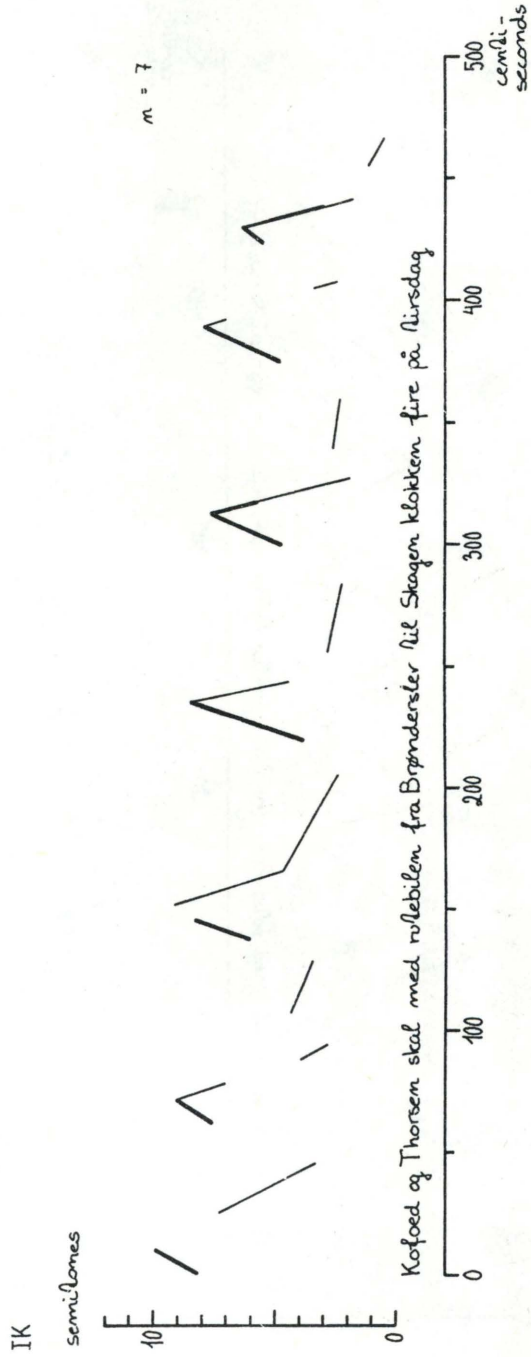


Figure 8 - see legend to figure 7

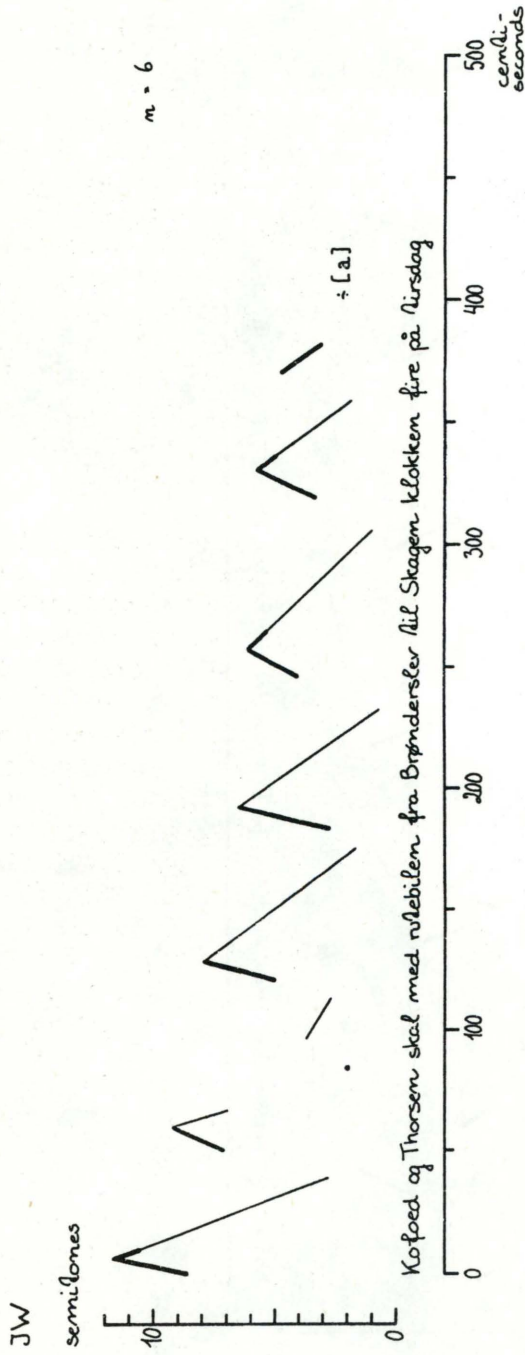


Figure 9 - see legend to figure 7

B. SENTENCE INTONATION

1. The long declarative

(a) Aalborg

Figures 7-9 display the average tracings of 'Køfoed og Thørsen skal med rutebilen fra Brønderslev til Skågen klokken fire på tirsdag.' The three speakers behave remarkably alike, except that the stress group pattern fall is evenly distributed over the post-tonics with JW, as opposed to the asymptotic fall with PP and IK, cf. above. The global course falls over the first two to three stress groups and then levels out with PP (and JW), whereas it is evenly distributed over the whole utterance with IK, where it amounts to a mere two semitones. With PP the fall seems to be carried by the stressed vowels, i.e. the peaks in the F_0 course, since the post-tonics reach approximately the same low level throughout the seven stress groups. The same might be said for JW, though a slight falling-rising trend through maxima as well as minima is observed. The effect with those two speakers is the often observed diminishing of stress group pattern range from left to right, which is not really apparent with IK.

Although the final stress group is not associated with any particularly extensive fall, it does differ from preceding ones in this utterance: the stressed vowel is predominantly falling, as opposed to the preceding rising stressed vowels. This feature is not apparent in any of the other terminal declaratives in the material, cf. the 'Kamma' utterances above, and see further below as well. (It is particularly not the case in the utterance 'De sidste dýbhavsfolkere må snart lægge óp.' which ends in a short stressed vowel.) This is an indication, however, that Aalborg speakers have a special means to express terminality, when required to do so. (It parallels the systematic and exceptionless inversion of low-high patterns into high-low ones in Bornholm, cf. p. 45 and 128-30 in this volume.) The requirement may arise from the total length of the utterance. I.e. with the rather restricted speaking range employed, a global fall is not steep enough to meet the demands of a terminal declarative intonation, so a final, local signal is superposed on the last stressed (and perceptually salient) vowel, whose movement becomes falling rather than rising. What this implies for the much debated question of pre-planning or not of gross intonational events (cf. Thorsen 1983a, 1983b, 1985, 1986, 1987, and this volume) is uncertain. A material which manipulated utterance length, keeping other factors constant would be required to determine whether global trends could be ascribed to iterative application of local rules, where each stress group is downstepped by a certain fraction relative to the preceding event, or whether the realization of a stress group, in terms of location in the frequency range, is demonstrably sensitive not only to preceding but also to upcoming events. What the Aalborg speakers do demonstrate here, however, is that more than one strategy is open for them to signal terminal declaratives, but whether one involves pre-

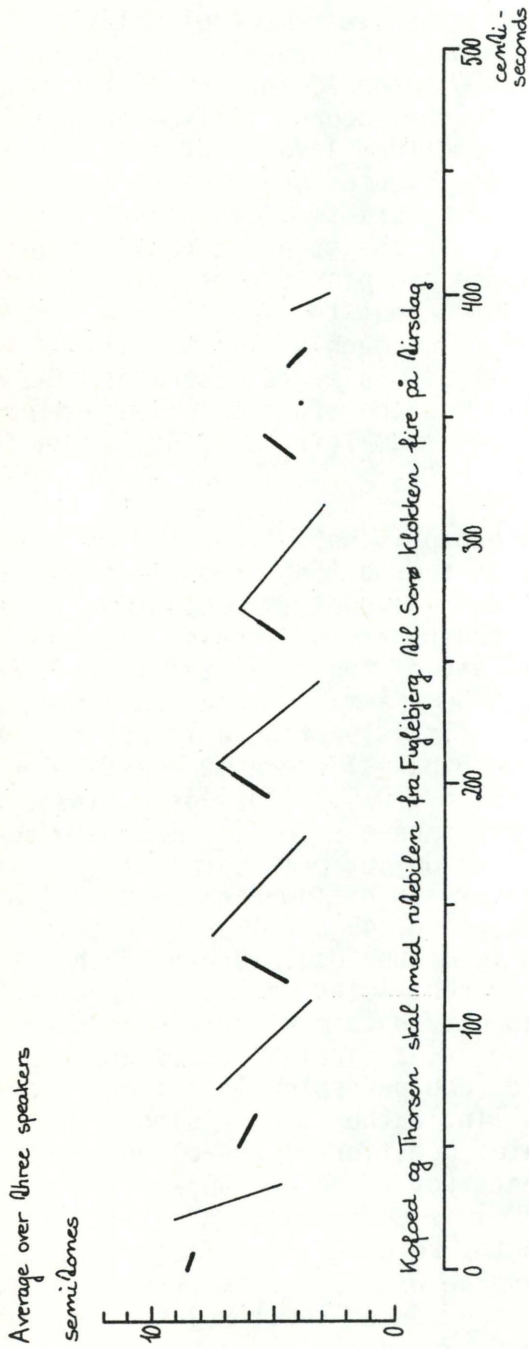


Figure 10

Average fundamental frequency tracing of a long terminal declarative utterance by three (averaged) Næstved speakers. The vocalic part of the stressed syllables are drawn in thick lines. The time scale is compressed compared with other figures. See further the legend to figures 1-3.

planned global contours, the other not is an open question, so far.

(b) Næstved

Speakers behaved sufficiently alike, qualitatively and quantitatively, to justify a grand mean. Thus, figure 10 displays 'Køfoed og Thorsen skal med rútebilen fra Fúglebjerg til Sørø klokken fire på tirsdag.' as the mean of means from ONT, CS, and HH.

Note that there are three stressed vowels which have falling movements. This must be ascribed to the strong stød, characteristic of this region, cf. Thomsen (1987). These speakers all produced a prosodic boundary before the complement of place, sometimes accompanied by a pause (suppressed in the figure), sometimes not, i.e. the intonation contour is reset between the stressed syllable of 'rútebilen fra' and 'Fúglebjerg til', creating two prosodic phrase contours. Each of these is globally falling, i.e. the fall is evenly distributed over the three and four, respectively, stress groups in each prosodic phrase, though maintaining a global fall, since the second phrase contour is not reset all the way up to where the utterance onsets, and since the first phrase contour ends higher than the second one. This is entirely in line with how long utterances behave in Copenhagen, cf. Thorsen (1983a). The fact that stress group pattern falls seem to have shrunk in the last two stress groups is not, presumably, a finality cue, but due rather to the comparative brevity of the segmental material, cf. further below.

I would argue, just as I did for Copenhagen (Thorsen 1983a), that these contours could not have been produced without look-ahead and preplanning in their actual, on-line production.

2. The questions

(a) Aalborg

The question with question word contains four stressed syllables, i.e. it is comparable in length to the 'Kamma' utterances and to the utterance 'De sidste dýbhavsfiskere må snart lægge óp.' - If we let the peaks of the Fo patterns determine the overall downdrift and define this in terms of the interval between first and last peak, it turns out that the questions depicted in figures 11-13 have somewhat less downdrift than the three neutral 'Kamma' utterances and '.. dýbhavsfiskere ..' The average downdrift in the four declaratives versus the downdrift in the question is as follows: JW 3.9/3.0 semitones, PP 2.0/1.0 semitone, IK 2.8/1.0 semitone. Note, though, that a certain slope is maintained, and is evenly distributed over the whole utterance, with no trace of any final rise (not even less of a final fall) in these question word questions. The one-word echo question is characterized by a higher peak (as high as or higher than the onset of the preceding question), and thus a higher rise, since the onset is as low as the onset of the final stress group in the preceding question. Again, the stress group terminates in a fall, and the interrogative status of this word is accordingly not signalled by any (absolutely) final rise, either.

(b) Næstved

The question word questions in figures 14-16 do not look systematically different from the declarative utterances examined above, i.e. there is no consistent difference in the overall slope, nor is the final stress group significantly different from preceding ones. These questions have the intonation of terminal declaratives. The one-word echo-question looks like any other stress group, except that it is positioned higher in the frequency range (on a level with utterance initial stress groups in general) with HH and CS, whereas with ONT the rise

Figures 11-16

Average fundamental frequency tracings of a question with question word, followed by an echo-question. Three Aalborg speakers (PP, IK, JW) and three Næstved speakers (ONT, CS, HH). The vocalic part of the stressed syllables is drawn in thicker line. See further the legend to figure 1-3.

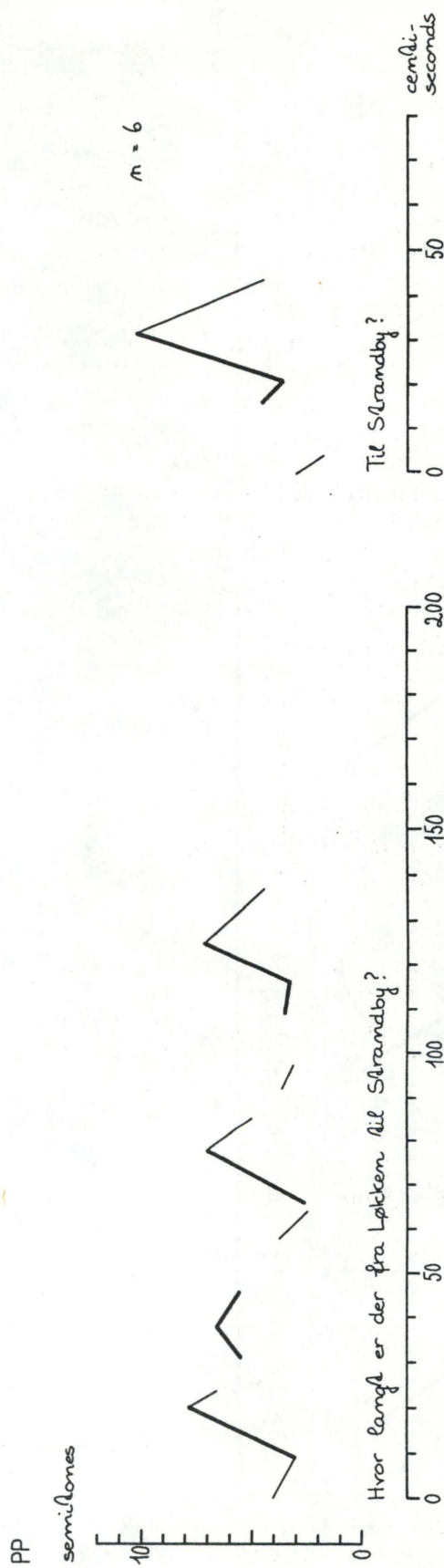


Figure 11

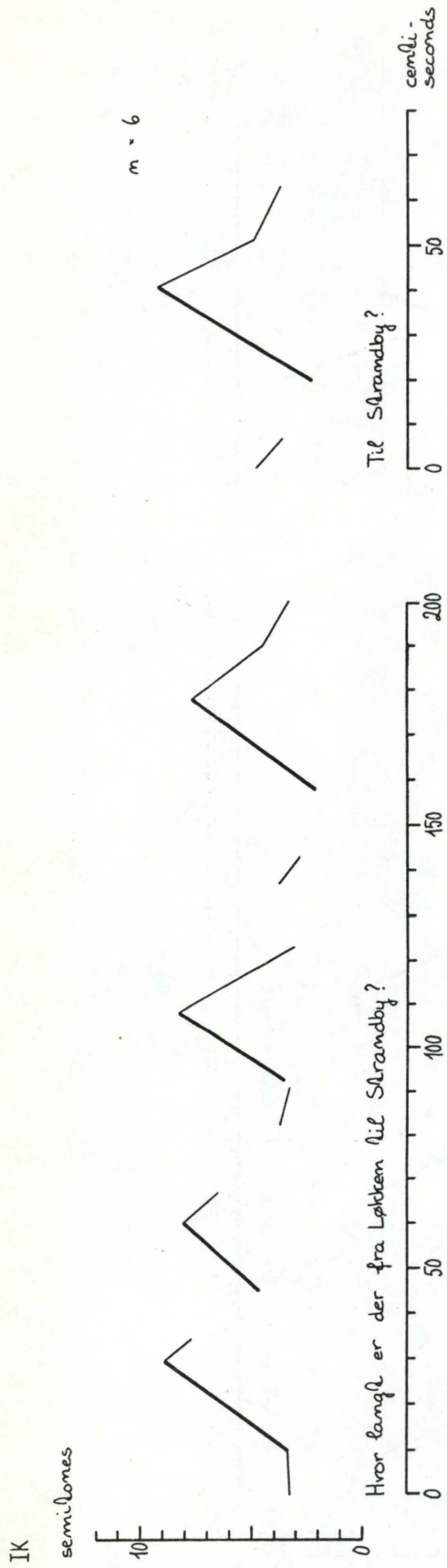


Figure 12

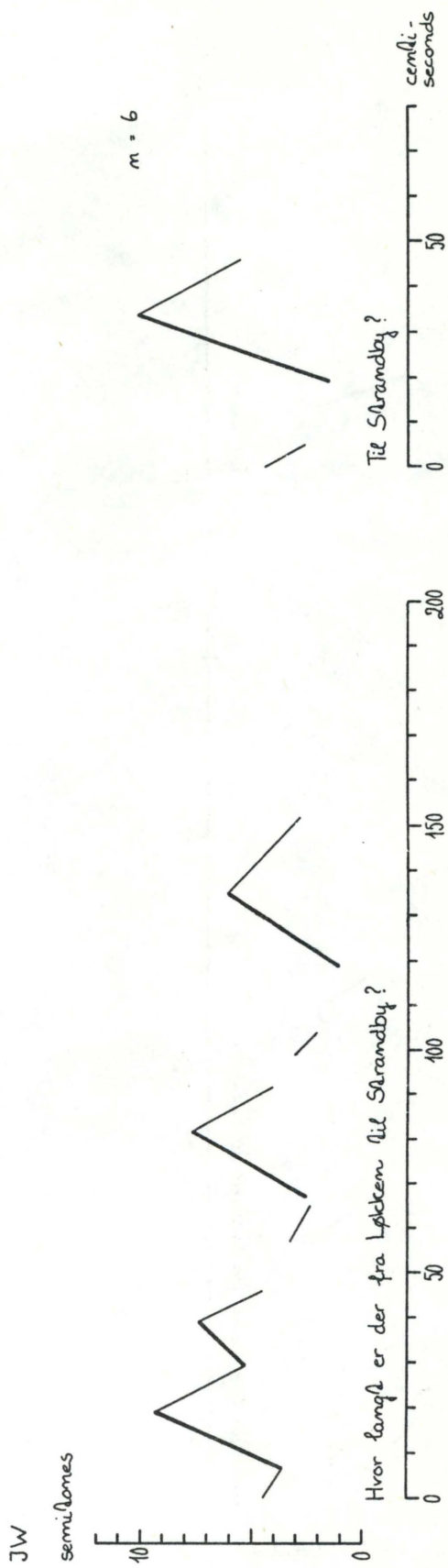


Figure 13

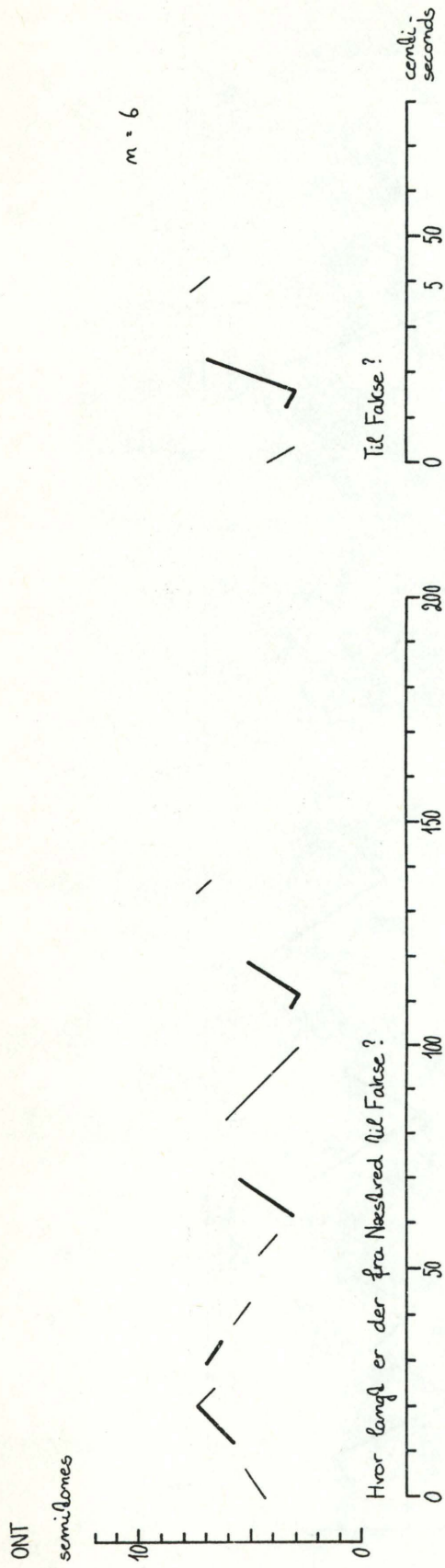


Figure 14

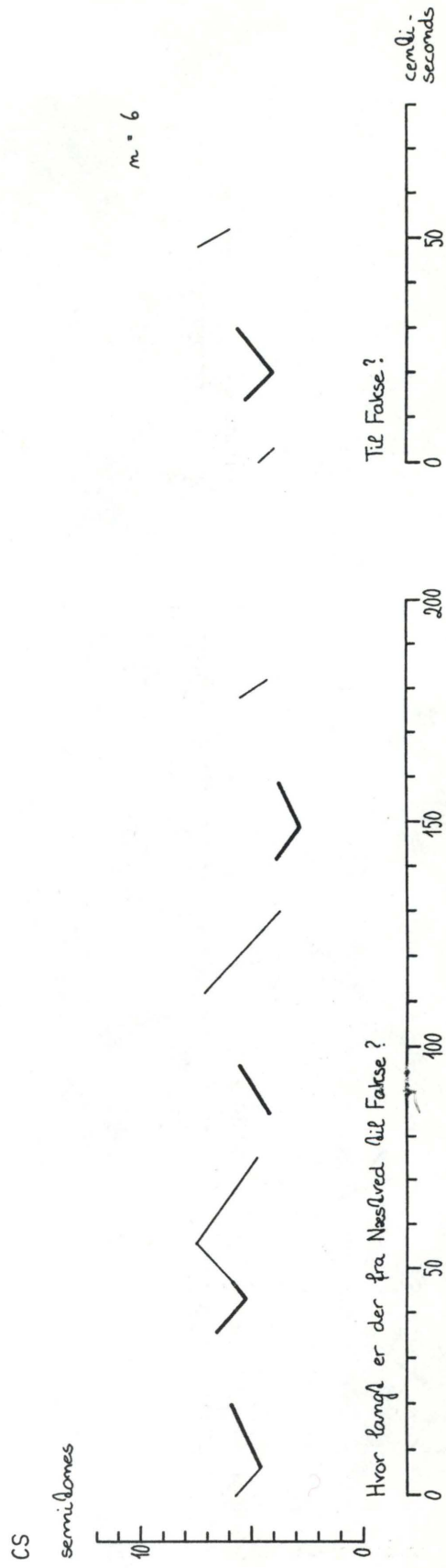


Figure 15

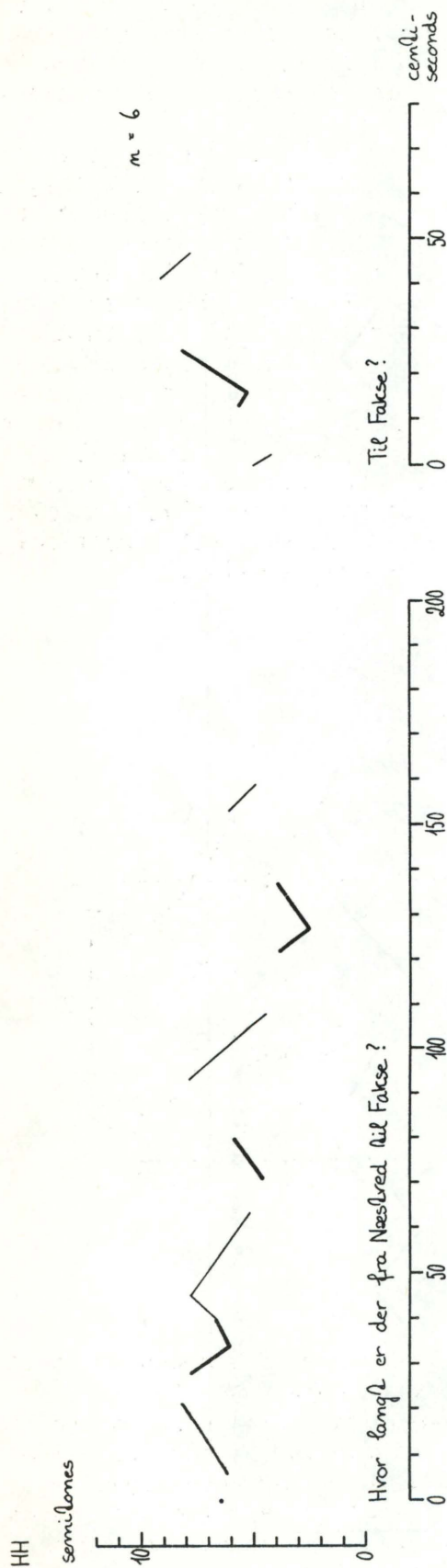


Figure 16

in the stressed vowel is higher, onsetting at the same low level as utterance final stress groups in general. The rise from stressed to post-tonic is not higher than in other stress groups and the post-tonic has a falling movement, i.e. again there is no 'final rise' to characterise these echo-questions.

Aalborg and Næstved, both, accordingly correspond exactly to Copenhagen Danish with respect to these types of questions, cf. Thorsen (1978). In fact, the same model for sentence intonation in short utterances could apply to all three regions, presumably. Figure 17 reproduces the model for Standard Copenhagen Danish. Long terminal declaratives also behave similarly, with a reservation about a final, local fall in Aalborg, cf. above. The difference between these regional variants of Standard Danish lies mainly in the way stress and F_0 are related, which means that the sentence intonation contour (as defined by the stressed syllables) will be identical to a true topline in Aalborg, i.e. a connection of local maxima in the F_0 course; it is often, but not invariably, a baseline in Copenhagen, whereas in Næstved it is, at least acoustically, rather an intermediary between top- and baseline.

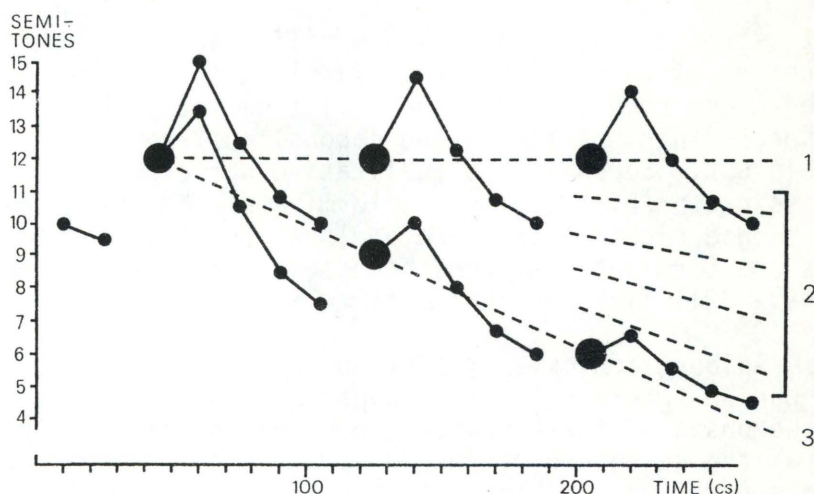


Figure 17

A model for the course of fundamental frequency in short utterances/sentences in Standard Copenhagen Danish.

1: syntactically unmarked questions, 2: interrogative utterances with word order inversion and/or interrogative particle; non-terminal declarative and interrogative sentences (variable), 3: terminal declarative utterances. The large dots represent stressed syllables, the small dots unstressed ones. The full lines represent the F_0 pattern associated with prosodic stress groups, and the broken lines denote the sentence intonation contours.

C. ALIGNMENT OF SEGMENTS AND FUNDAMENTAL FREQUENCY

1. Compression or truncation

The principal issue here is whether fundamental frequency patterns associated with prosodic stress groups are truncated or compressed in time, when the stress group is shortened.

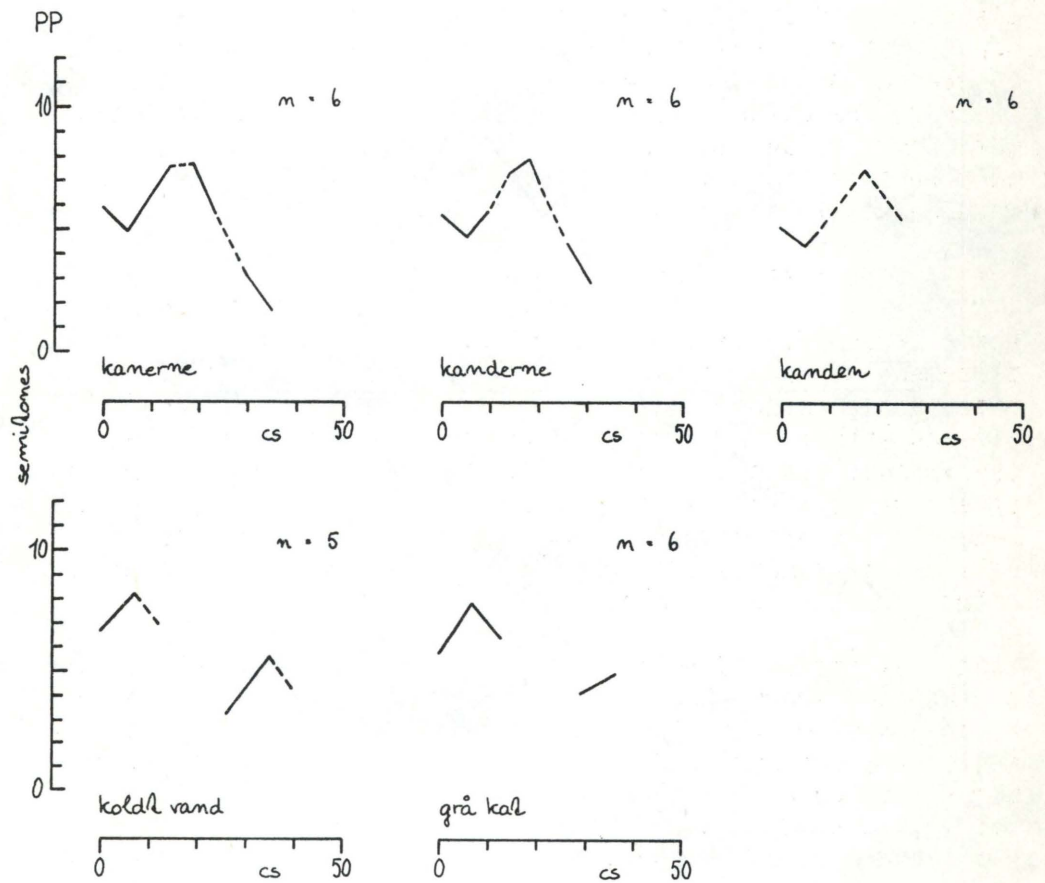
(a) Aalborg

- (i) Systematically shortened stress groups For an account of the onset of F_0 movement in the words displayed in figures 18-20,

see this volume, p. 103 ff: I shall assume that the slight falls preceding the rise in the stressed vowel is a segmental effect, and disregard them in the following. It is beyond any doubt that the stress group pattern is truncated as it is shortened in time, as is the case also in Copenhagen, but contrary to the compression that takes place in Bornholm Danish (cf. Thorsen 1984 and this volume, p. 103 ff.) The falling part becomes progressively shorter from frame to frame, and with JW all that remains in the monosyllables is the rise.

- (ii) Long stress groups Figures 21-23 display two rather long stress groups (including the next, stressed, syllable), which differ in the number and placement of word boundaries. Firstly, the pattern already noted above recurs: that the fall from the peak is accomplished within the first (and second) post-tonic and then levels out. Secondly, no qualitative difference between the stress group which begins and terminates mid-word ((fa)bríken solgte elektron/ík - broken line) and the one which onsets and terminates at word boundaries (dýbhavsfiskere må/snárt - full line) is apparent.

Thus, Aalborg conforms exactly to the model posed for Copenhagen Danish, where stress group patterns are bound to the left by the onset of the stressed vowel and to the right by the onset of the succeeding stressed vowel, cutting indifferently across any word (or higher syntactic) boundaries (at least within the same sentence intonation contour). (This is not to say that a speaker cannot, if he chooses to do so, signal word boundaries with tonal means, cf. Thorsen 1980a, but in a style of speech which is fluently conversational, as in these recordings, such would be the exception rather than the rule.) The difference lies in the shape of the pattern, and in the alignment of segments and F_0 . In Aalborg, the stressed vowel onset defines the beginning of the rise (disregarding segmental effects from preceding consonants), the rise is terminated with the stressed vowel offset, i.e. the high peak, or turning point, generally coincides with the boundary between stressed vowel and postvocalic consonant, if any, although a long vowel may occupy a brief portion of the fall. The fall is steep and low, i.e. it is accomplished through the first, or the first



Figures 18-20

Average fundamental frequency tracings of three words and two pairs of words, where the voiced stretch becomes progressively shorter through the frames, by three Aalborg speakers. When the sonorant consonants could be delimited, they were drawn in broken lines. See further the legend to figures 1-3.

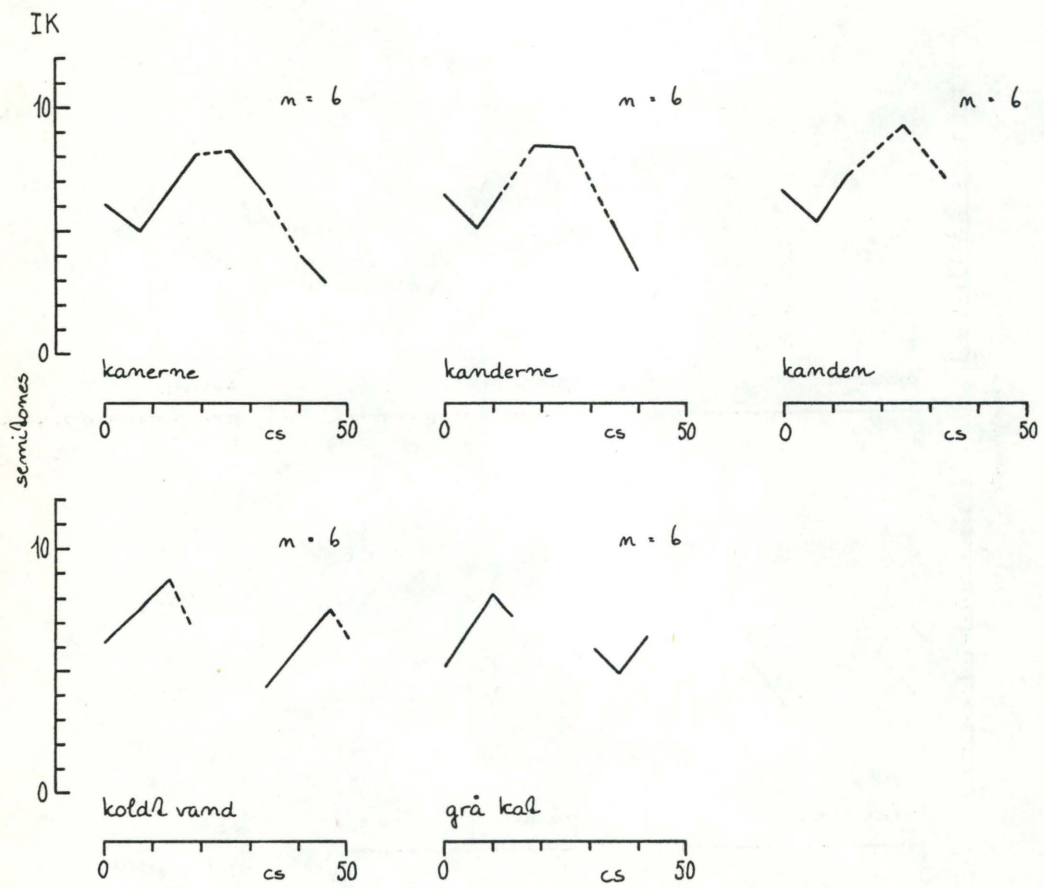


Figure 19

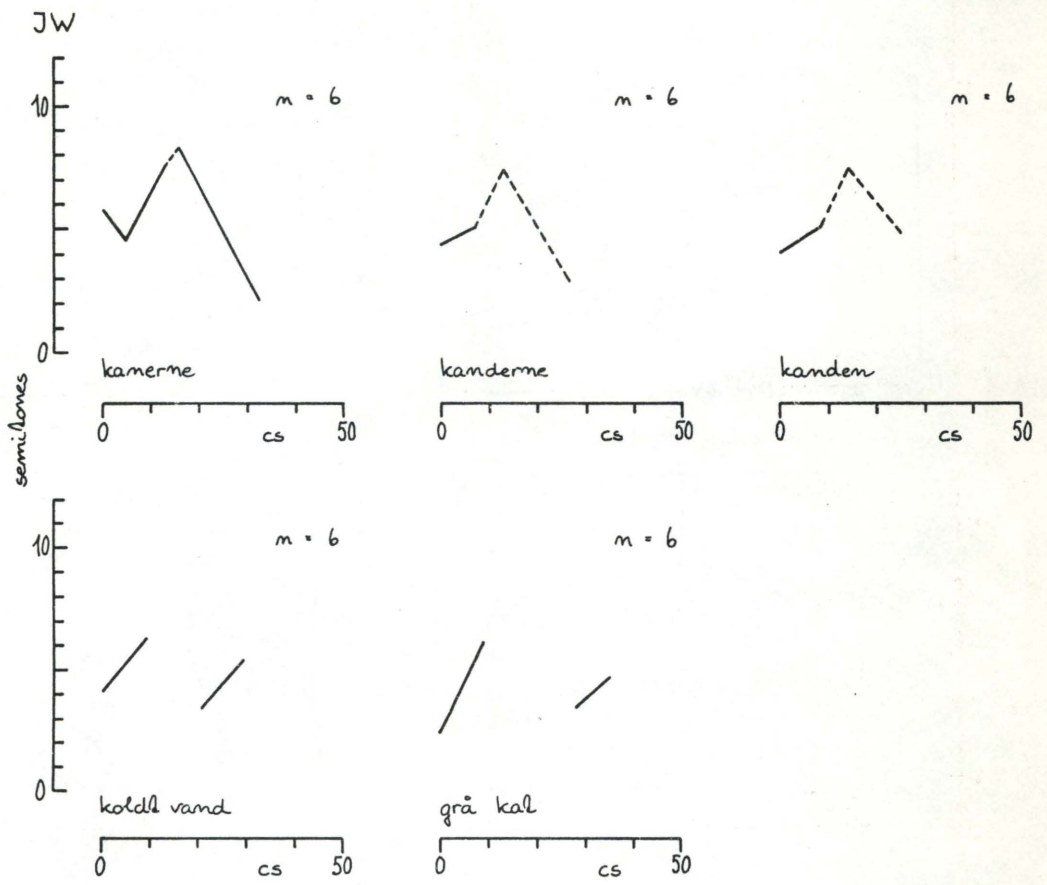


Figure 20

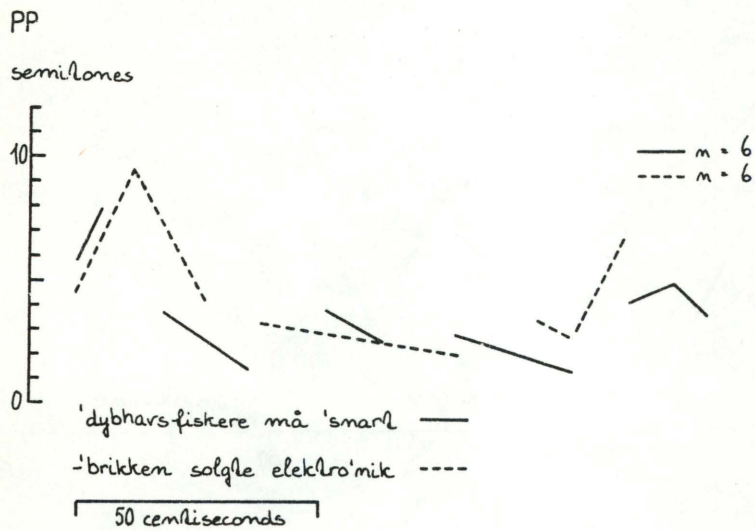


Figure 21-23

Average fundamental frequency tracings of two long stress groups plus the next stressed syllable by three Aalborg speakers. See further the legend to figures 1-3.

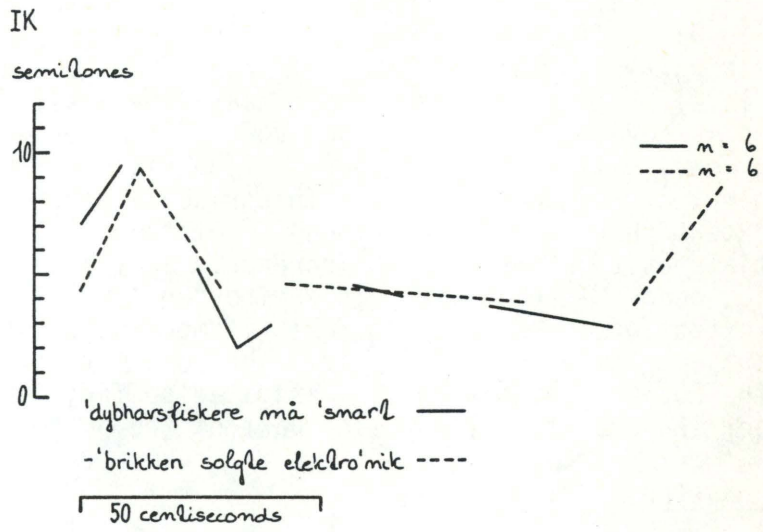


Figure 22

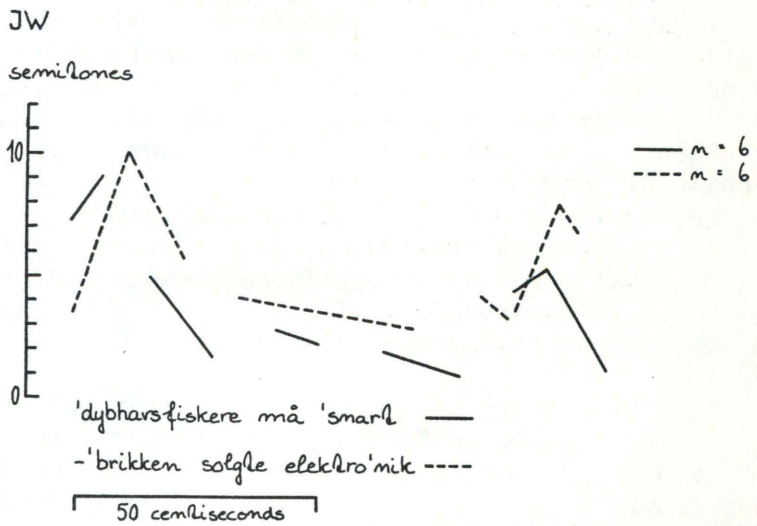


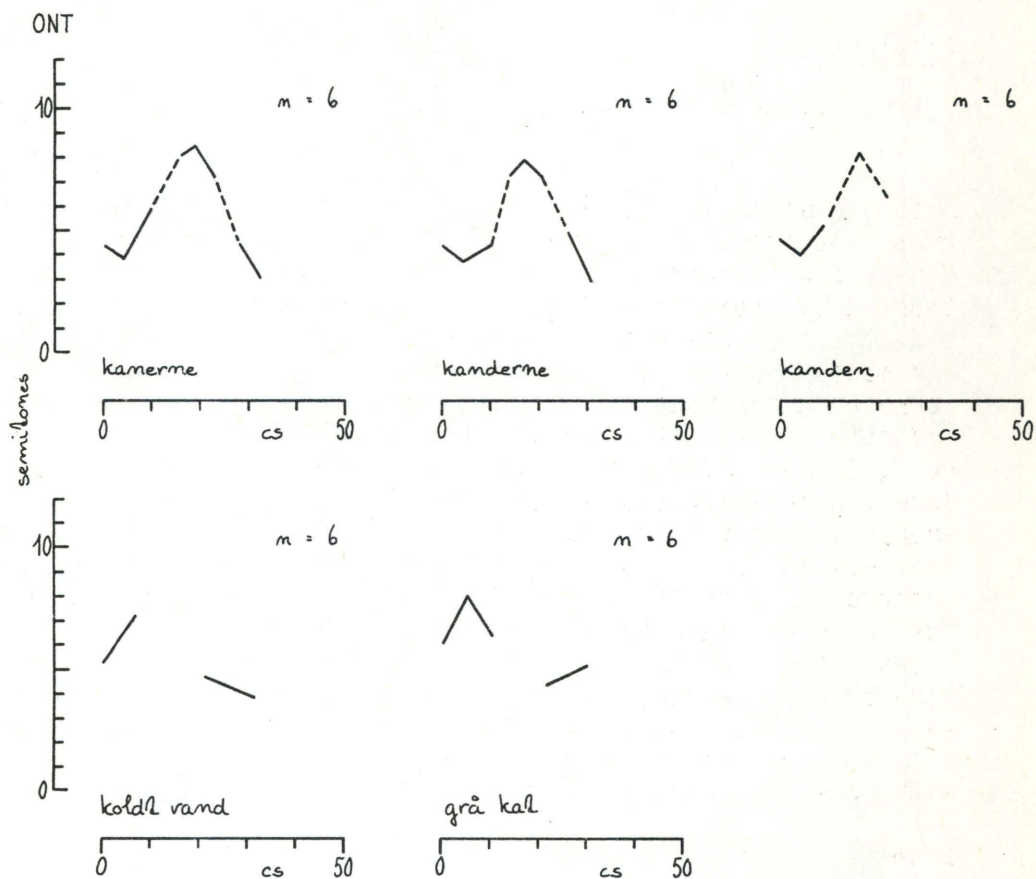
Figure 23

and second post-tonic, after which it levels out. The extent of the falling part of the pattern is somewhat greater than the rise, i.e. a stress group composed of two or more post-tonics will offset at a lower frequency than the onset of the preceding rise. This is very different from Copenhagen (Thorsen 1984) where the pattern is initiated by a slight fall, which is covered by the stressed vowel, if it is short. A long vowel will continue up part of the rising flank of the pattern, cf. figure 30 below. This rise is generally smaller in extent than in Aalborg (around 3 semitones in utterance initial position). Its peak is reached in the first post-tonic, generally (but see further Thorsen 1983c). The slope and extent of the succeeding fall (if more post-tonics follow) is subject to inter speaker variation, but with the majority of the Copenhagen speakers investigated so far, it does not exceed the extent of the rising part of the pattern.

(b) Næstved

(i) Systematically shortened stress groups Figures 24-28 display the words 'kanerne, kanderne, kanden, kat' from five speakers, including MC and TJ. The strong stød in this region disrupts the smooth F_0 pattern of stød-less strings, either by superposing a sharp drop in F_0 (in the "weakest" manifestations), by creating highly irregular (both with regard to periodicity and intensity) vibrations which make the registration and measurement uncertain, or (in its strongest form) by interrupting the vocal fold vibrations altogether. Since the acoustic manifestation of the stød is not the central issue here, I have omitted the stød words from this section. The acoustic manifestation of stød in the rural dialect in the area has been the object of a study by Thomsen (1987). Four speakers follow the pattern outlined already for Aalborg (and Copenhagen): the tail end of the stress group is cut short as the chain of segments is abbreviated. But one speaker, TJ, seems rather to compress his pattern, mainly by performing a steeper rise between the low and high turning points. However, his 'kat' is just as mutilated as with the other speakers, the only remaining movement being a slight fall (and, with some, a subsequent even slighter rise).

I think it safe to conclude, once more, that prosodic stress group patterns, also in Næstved, are truncated rather than compressed, when time is cut short. Thus, the production of stress group patterns need not involve any particular on-line look-ahead which would scan the segmental composition of the stress group in order to align F_0 with the segments. Once the pattern is initiated, its course is simply interrupted when no more segments are present to carry it.



Figures 24-28

Average fundamental frequency tracings of three words and two pairs of words, where the voiced stretch becomes progressively shorter through the frames, by five Næstved speakers. When the sonorant consonants could be delimited, they were drawn in broken lines. See further the legend to figures 1-3.

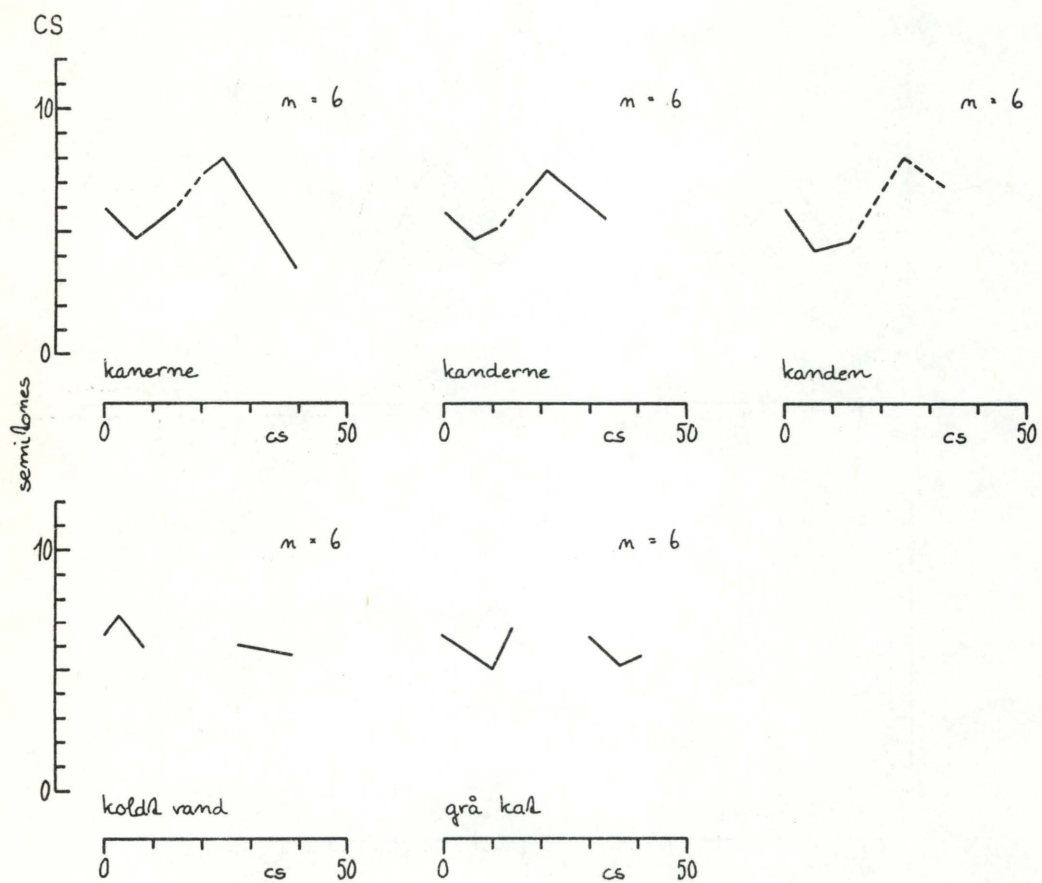


Figure 25

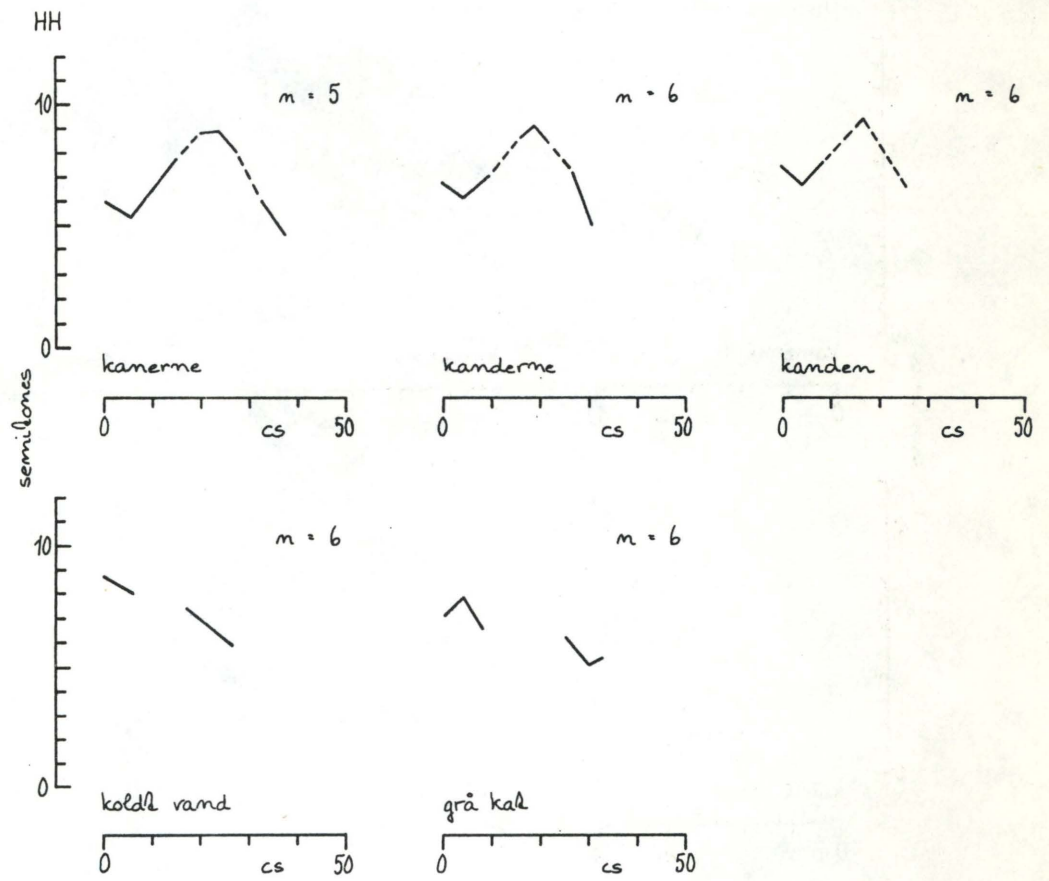


Figure 26

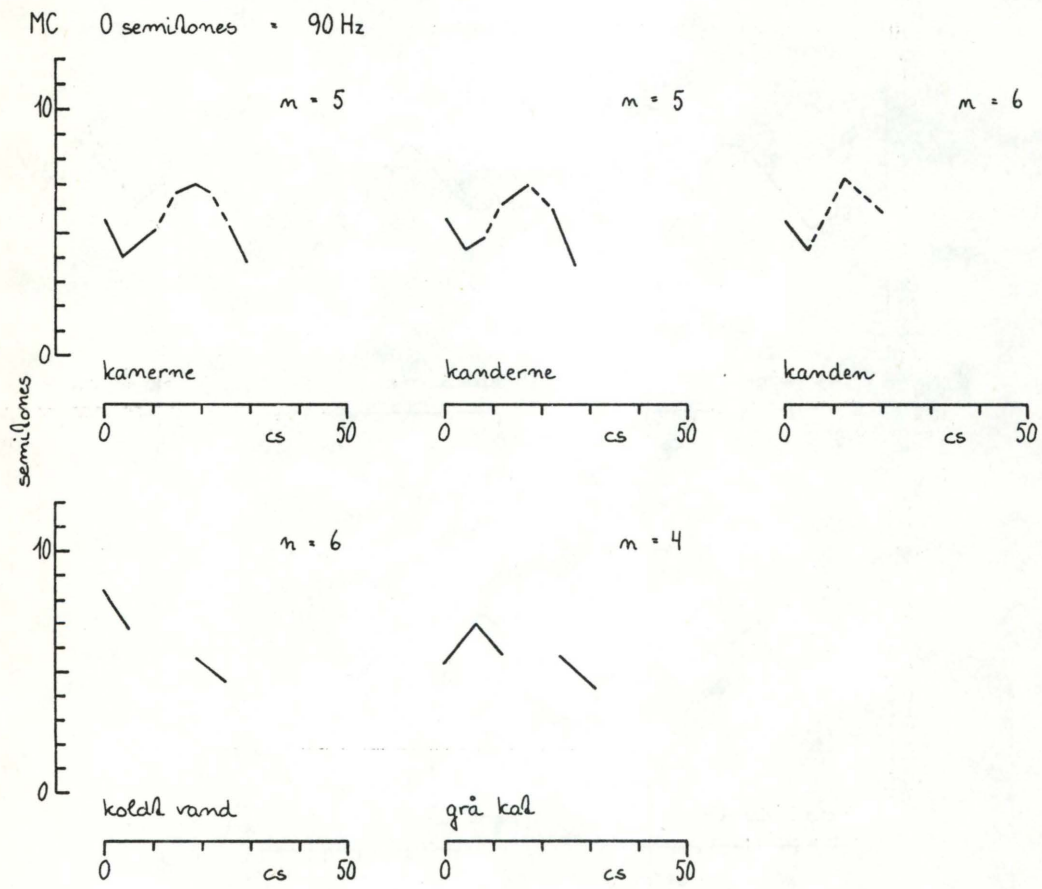


Figure 27

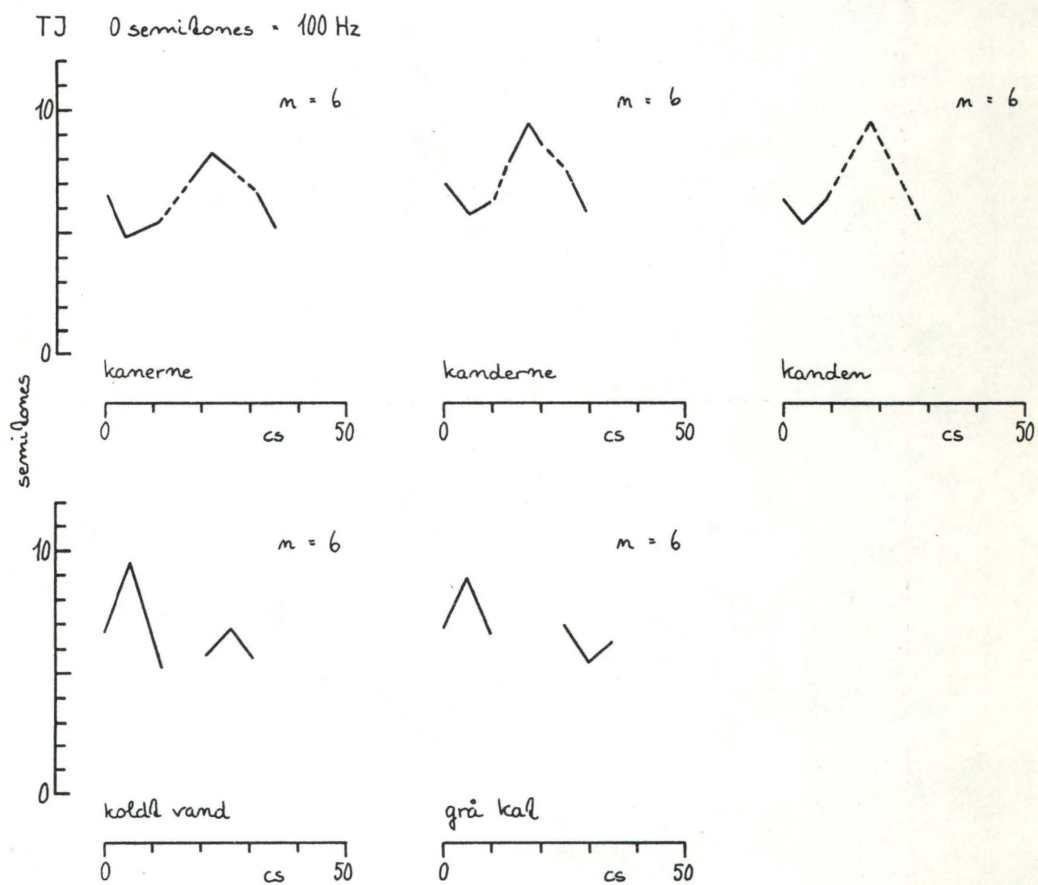


Figure 28

(ii) Long stress groups Figure 29 displays the same patterns as figures 21-23, by one speaker, CS, who epitomizes the behaviour of the group of Næstved speakers. She adds nothing new in principle to what has been observed for Aalborg (and Copenhagen), that word boundaries leave no perceptible trace in the course of F_0 . It is very apparent here, that after the initial rise and (an only slightly more extensive) fall, the pattern levels out, as it does also in Aalborg. This is in contradistinction to the treatment of stress group patterns by Copenhagen speakers, where the slope of the fall through the post-tonics is generally rather more modest, wherefore it may extend over the whole stress group without hitting the floor of the speaker's F_0 range. With excessively long stress groups, however, the pattern may either level out at the end or a slight resetting, skip up, may be observed, see further Thorsen (1984).

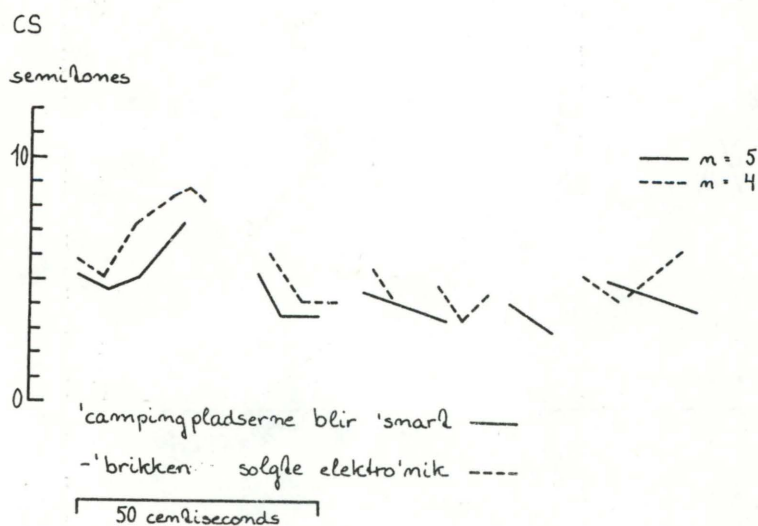


Figure 29

Average fundamental frequency tracing of two long stress groups plus the next stressed syllable by one Næstved speaker.

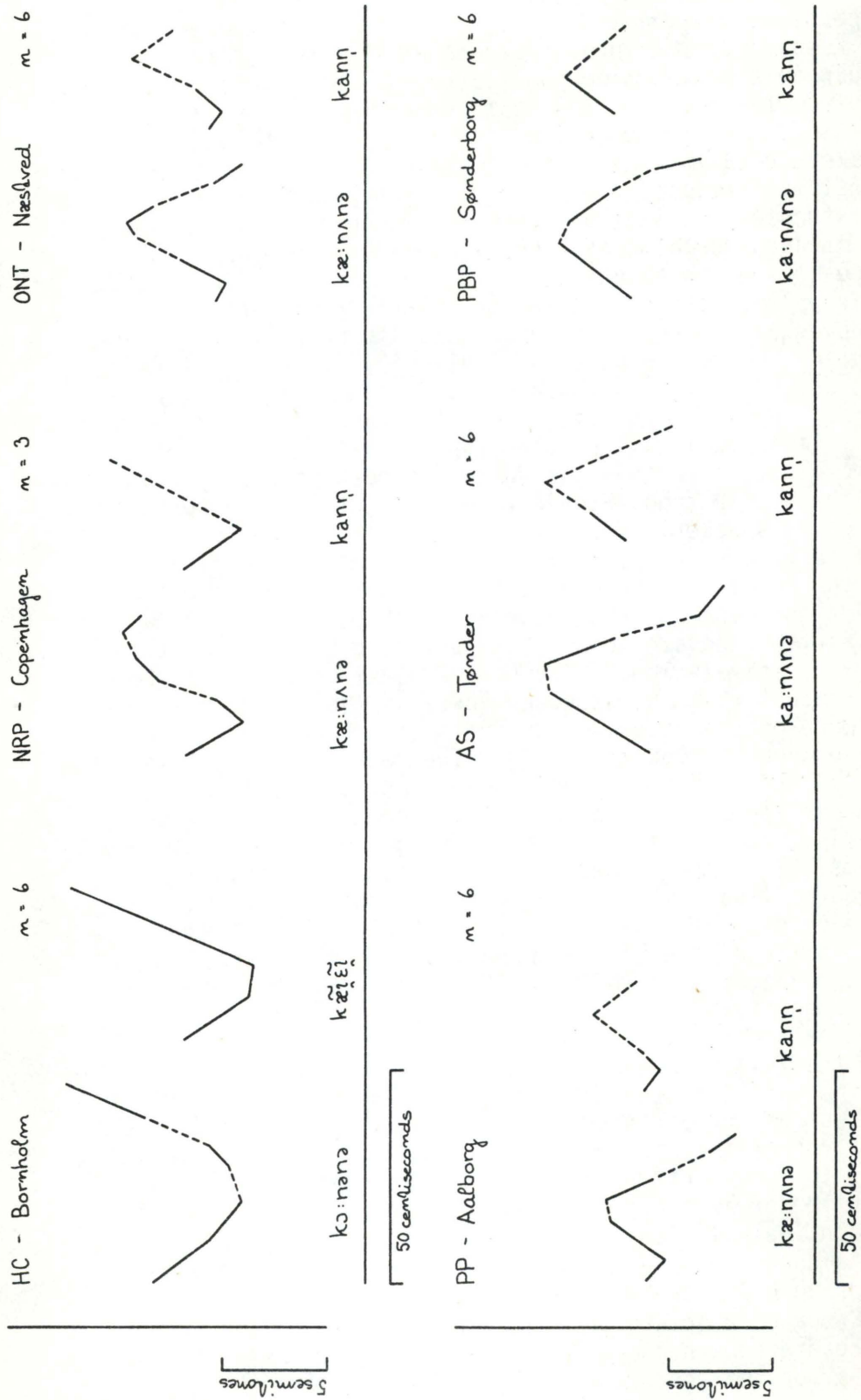


Figure 30

Average fundamental frequency tracings by one speaker from each of six towns of two words which differ in the duration of the voiced stretch. When the sonorant consonants could be delimited they were drawn in broken lines.

(c) Summary

To highlight the differences in the alignment of segments and F_0 in the prosodic stress group, figure 30 displays the words 'kanerne' and 'kanden' as produced by one speaker from Bornholm, Copenhagen, Næstved, Aalborg, Sønderborg and Tønder (the complete results of the investigations of the two latter towns will appear in a forthcoming publication). The tracings are arranged from the first to the last speaker according to a scale of "low-high" to "high-low" stress group patterns. Bornholm speakers initiate the pattern with an extensive fall, in time as well as frequency, whose offset generally coincides with the stressed vowel offset (whether it be short or long). The rise is considerable, as high as or higher than the fall, and its peak is timed to coincide with the offset of the last post-tonic syllable. This is the only variety of Danish that I have looked at so far which compresses its F_0 patterns. Next is Copenhagen, where the pattern is also initiated with a fall, which is less extensive and much shorter than in Bornholm, and whose offset generally coincides with the short stressed vowel offset. A long vowel will continue up the rising flank. The rise is more extensive than the fall, its peak generally coinciding with the first post-tonic vowel, and it is time constant (for any given speaker, of course - but inter-speaker variation is slight in this respect). If enough segmental material is present, the pattern falls again, a fall whose slope is rather modest (not apparent in this figure), which means that it may continue for the whole extent of the stress group, unless this is really excessively long. The Næstved pattern resembles Copenhagen, except that the stressed vowel is timed somewhat later, i.e. more of the rise is occupied by the stressed vowel, and more so when the vowel is long. The peak is reached with the onset of the first post-tonic vowel, and the fall thereafter is rather steep, but generally only somewhat more extensive than the rise, i.e. it is performed during the first and second post-tonics. Thereafter the pattern levels out (not apparent here). Above, I have termed the Næstved stress group pattern one of the perceptually high-low type. I would like to revise that, and make a distinction between low-high patterns (Bornholm and Copenhagen), low-high-low (Næstved), and the remaining types are then all high-low. Aalborg, Sønderborg and Tønder share the feature that, given enough segmental material, the extent of the fall is considerably larger than the rise. In Aalborg, the extent of the rise is rather small, offsetting with the offset of a long stressed vowel. The succeeding fall is larger than the rise and terminates with the second post-tonic, whereafter the movement levels out (not apparent here). The pattern in Tønder is a clear rise-fall, and even though the rise is not inconsiderable, the fall exceeds it by approximately twice the amount. It is performed within the first and second post-tonics, and then the pattern levels out. I have seen data from two Sønderborg speakers only, so far, and to judge from them, the difference between Tønder and Sønderborg stress group patterns may be that both the rise and the fall are somewhat less extensive and the fall less steep with Sønderborg speakers.

Table III

Differences in duration, in centiseconds, of (parts of) words in utterance final minus utterance initial position, based on averages of six items by each of three speakers from Aalborg and three speakers from Næstved. Differences that are statistically significant (student's one-tailed t-test) are indicated with two or three stars, corresponding to levels of probability of 0.005 and 0.0005, respectively.

	'Kamma'	(tu)risterne	
PP	-0.9	-0.3	
IK		5.2*** ⁴	1) the final vowel is lengthened most (4.6 cs)
JW	6.1*** ¹	6.3** ⁵	2) the stressed vowel is lengthened most (4.4 cs)
			3) - - - (3.7 cs)
ONT	-1.6	-0.8	4) the post-tonic segments are lengthened (6.5 cs)
CS	4.8** ²	0.9	5) - - - (5.7 cs)
HH	4.2** ³	-1.0	

D. FINAL LENGTHENING

Due to the rather parenthetical nature of this part of the investigation, this section will be restricted to a mere presentation of the facts. For a thorough treatment of segment duration as a function of context, including references to the existing literature, the reader is referred to Lindblom (1978), and Fischer-Jørgensen (1982). See also this volume, p. 130 ff., for an account of final lengthening in Copenhagen, Bornholm, Malmö and Stockholm.

I have measured each segment in 'Kamma', excluding the closure of the aspirated stop, which cannot be delimited in utterance initial position. I have measured groups of segments in '-rí/st/erne', as indicated by the slants. There are two major segmentation problems: intervocalic /r/ in 'turisterne', which is a uvular approximant or obstruent, and then, of course, the utterance final vowels. The /r/-onset was determined where the intensity curves begin to drop from the preceding vowel. - The final vowels are more cumbersome: they may terminate in weak breathy voice (most often) or in weak unvoiced aspiration. The segmentation which offers the best uniformity across speakers and utterances is a vowel offset coinciding with the point in time where the high-pass filtered intensity curve reaches zero. This corresponds physiologically to the point in time where the vibratory pattern of the vocal cords produces a source function with little energy in the upper part of the spectrum and where any energy below 500 Hz, which might be produced by 'edge vibrations', is disregarded. Correspondingly, the final vowel in initial words was offset at the point in time where the intensity of the noise of the succeeding fricative (/s, f/) rises sharply ('Kamma stammer fra ..'/'Turisterne fordobler ..').

The results are presented in Table III, where the difference, in centiseconds, of the total duration of the (part of the) word in final minus initial position is given, with footnotes about the distribution of the lengthening in those cases where it is both statistically significant and considerable. Note that there are a number of negative values, i.e. instances where the initial item was longer (though only very slightly) than the final item, *ceteris paribus*. - No uniform pattern is to be seen. One Aalborg speaker (PP) seems not to have any final lengthening at all, whereas the other two do (there were not enough data from IK on 'Kamma'). Likewise, one Næstved speaker (ONT) does not lengthen his segments in final position, whereas the other two do so, but not consistently, i.e. only in one of the two word pairs. Those lengthenings that are found compare well with what I found for two Copenhagen speakers (this volume, p. 132), and tally reasonably well with Fischer-Jørgensen's (1982) results for Danish, as well. - It seems, in conclusion, that final lengthening is not a stable feature of any of the two regional languages investigated, but further research would be needed into this matter to corroborate this finding.

IV. SUMMARY

The parameters investigated are listed in tabular form below, including the results for Copenhagen, for comparison

	COPENHAGEN	NÆSTVED	AALBORG
SENTENCE INTONATION IS SIGNALLED	globally	globally	globally ¹
DEFAULT SENTENCE ACCENT	no	no	no
FOCAL SENTENCE ACCENT	no	no	no
FOCUS SIGNALLING BY STRESS REDUCTION	optional, never in final position	rare, never in final position	optional, rare in final position
FINAL LENGTHENING	yes	optional	optional

1) though with a possibility of reversing the movement of the final stressed vowel (into a fall) at the end of a long terminal declarative

Apparently, the prosodic systems of Copenhagen, Næstved and Aalborg are very similar. The major difference lies in the tonal pattern associated with the prosodic stress group, cf. above.

V. NOTE

(1) The uncertainty about the degree of stress on 'stammer' is vexing. However, the necessary auditory and acoustic experiments have not been performed which could disclose any difference between a word whose main stress gets reduced in the neighbourhood of a word with focal prominence or emphasis for contrast, and a word with syntactically determined secondary stress in the same condition.

ACKNOWLEDGEMENTS

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