

COMPARISON OF PROSODIC CHARACTERISTICS IN ENGLISH, FINNISH AND GERMAN RADIO AND TV NEWSCASTS

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ABSTRACT

Some prosodic features in English, Finnish, and German radio and TV newscasts are compared with each other. These features include pause lengths, speech rate, articulation rate, F0 contours, and F0-distribution.

NEWS STYLE CHARACTERISTICS

There are several features common to newscasts all over the world such as monology, reading aloud (speech execution with previous verbal planning), economical time consumption, standard pronunciation, very clear articulation, correct grammar, quite complex syntax, objective ("neutral") but convincing presentation, and the absence of immediate listeners. Besides, certain speech acts, eg. questions or exclamations, cannot occur in newscasts, which limits the prosodical patterning. This does not, however, mean that there would exist a homogeneous *genre* of news-reading. We have discovered differences between languages, media, channels, and speakers. The speech style in newscasts is influenced especially by two factors: 1) the tendency to create and maintain a homogeneous style consisting of recurrent prosodic patterns characteristic of just one programme type (representing a channel or speaker), and 2) the maintaining of a certain homogeneous attitude within the programme type.

When news in several languages are compared with each other, it is not easy to distinguish stylistic and language specific features from each other. Our aim is not to make a clear distinction between style and language.

MATERIALS

The following radio and TV channels were recorded between March 29 and April 4 1994 (number of sentences):

- English (British = BrE)(49): SKY, ITN, BBC

- English (American = AmE)(46): NBC, CBS, TODAY, WORLDNET, VOA
- Finnish (Fin)(96): STT, YLE (radio), TV1, TV2, MTV (commercial)
- German (North = Ger)(44): RTL, ZDF, Deutsche Welle

MEASUREMENTS AND METHODS

In order to describe the mannerisms in newsreading we have investigated several macro and micro prosodic parameters.

- the speech rate (duration of the sentences and internal pauses divided by the number of syllables) and articulation rate (without internal pauses);
- pause lengths (within and between sentences);
- global prosodic features such as the use of F0-contours; F0 was measured mainly syllable by syllable; if special tones occurred within a syllable, more F0 points were measured; attention was paid to the F0 grid in sentences;
- the local use of F0-contours to express stress-groups, constituent structures and the thematic and rhematic parts of the sentences;
- F0-distribution (mean, standard deviation, minimum and maximum values of all observed glottal periods).

All metasentences were excluded.

The ISA speech processing system (*Intelligent Speech Analyser*; software designed by Raimo Toivonen) was used for analysis and documentation. A sophisticated multi-checking procedure based on zooming the low part of the frequency domain was applied to F0 measurements.

The intensity of the syllables was also measured, but the results are not reported here, because it is technically controlled during the broadcasts. The sentence final unvoiced and laryngealized portions have some effect on the statistics. 100% of the observed periods were included.

The way the material is grouped for calculations affects the statistics, too.

RESULTS

Pausing

The shortest pauses within the sentences (272.8 ms) and between the sentences (442.3) were found in the AmE newscasts (Table 1). The other language variants had in average longer pauses: BrE (295.8, 487.5), Ger (388.4, 549.9), and Fin (481.5, 752.1), in this order.

Table 1. Contrastive information on pausing.

Language	pauses within	pauses between
Finnish	481,5	752,1
German	388,4	549,9
Br. Engl.	295,8	487,5
Am. Engl.	272,8	442,3
Averages: pauses within sentences and pauses between sentences		

Speech and articulation rate

Table 2 shows the statistics. The number of speakers (18) and sentences (96) is greatest in Finnish material. The number of speakers varied between 5 and 9 in the other materials. The longest average sentence duration was found in AmE (mean 6028.8 ms). The other language variants showed the following values: 5987.9 (Fin), 5381.1 (Ger), 4838.9 (BrE).

The shortest mean syllable duration was found in Finnish (160.6 ms). German had longer values (175.5). AmE and BrE had the longest syllables (194.1 and 192.4). The shorter syllable duration in Finnish might depend on longer words

Table 2. Contrastive information on speech and articulation rate.

Lang.	N speakers	N sent.	average dur	speech rate ms/syllable	artic. rate ms/syllable	syll/second	syll/second
Finnish	18	96	5987,9	160,6	6,3	155,8	6,5
German	5	44	5381,1	175,5	5,8	170,6	5,9
Br. Engl.	8	49	4838,9	192,4	5,3	188,2	5,4
Am. Engl.	9	46	6028,8	194,1	5,2	187,6	5,4
Sums (N): number of speakers, number of sentences							
Averages: duration/sentence (ms), ms/syllable, syllables/second							

in Finnish: bisyllabic word is the most frequent structure, but words with four and five syllables are not rare. Therefore the stress groups get longer and the mean syllable duration becomes shorter according to a rhythmic principle (isochrony).

Consequently, the average number of syllables per second varies in different languages. The order is English (BrE 5.4 and AmE 5.4), German (5.9), and Finnish (6.5). The individual speech rates can, however, vary considerably. This concerns especially the American readers, who had the following personal values: 5.6, 5.6, 5.1, 5.4, 4.9, 4.8, 5.9, 5.6, 4.7. The British readers showed less variation: 5.1, 5.2, 5.1, 5.5, 5.3, 5.3, 5.4, 5.1.

Articulation rate seems to follow practically the above patterns (mean syllable duration and number of syllables per second): Finnish (155.8 ms; 6.5 syllables), German (170.6; 5.9), AmE (187.6; 5.4), and BrE (188.2; 5.4).

Global and local prosodic features

We have paid attention to the global features of the F0 contour of a single newscast as a textual unit (cf. Fig. 1), sentences as textual units and in relation to their contexts, and clauses as units within sentences. Our analysis is not yet completed, but the following qualitative and functional features can be reported. All four language variants use extra high F0 peaks at the beginnings of newscasts (cf. [1], [2]). Sentence initial F0 level depends very much on the thematic connection to the previous sentence. Low beginnings imply close semantic connections; higher beginnings start more independent topics. The newscast final syllables are most typically the lowest ones. In Fig. 1 the sentence final

syllables are equally low. The F0 declination happens to be most obvious in the first sentence in Fig. 1, but this feature is not a regular one.

The peaks and valleys are connected with the word stresses and the syntactical relationships between words. The higher peaks within sentences indicate special emphasis, usually contrastive stress. The intervals between peaks and valleys (accented maxima and unaccented minima which define the grid) can be kept more or less constant.

This feature seems to have a strong stylistic effect. It is most typically used in Finnish radio newscasts (STT)(Fig. 2). The relative effect of the grid can be shown on a semitone scale. Fig. 2 contrasts an example of Finnish radio news (STT) with the commercial TV news (MTV). The intervals comprise a larger variation span in the latter case.

The empirical application of the grid notion often causes great problems (cf. Fig 1, sentences 2 and 3).

American newscast: CBS March 29, 1994 JR. (male)

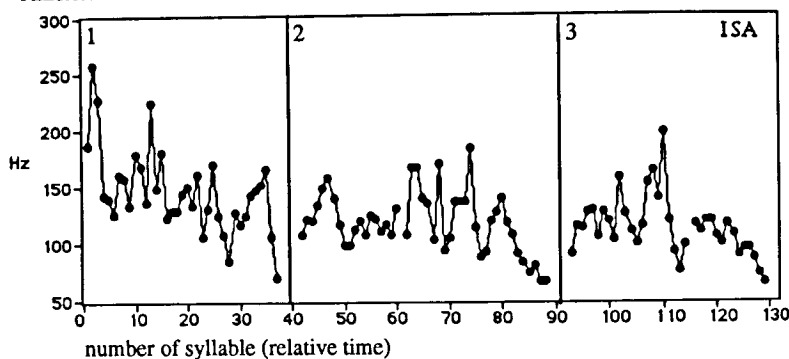


Figure 1. F0 contour (with relative time) of an American newscast consisting of three sentences. One F0 point per syllable was measured, in syllables with special tones of the F0, more points were measured.

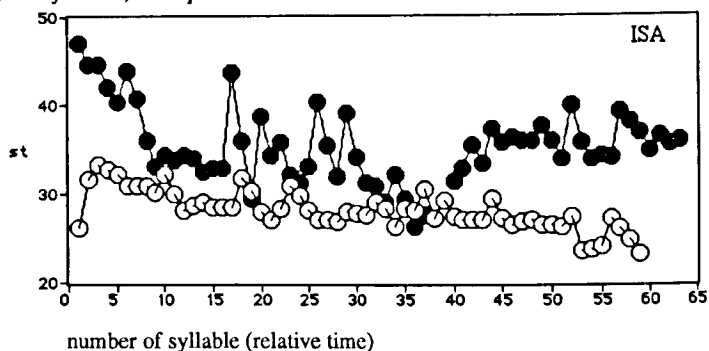


Figure 2. Comparison of one sentence by two male speakers representing Finnish radio (STT) news (= white dots) and commercial MTV news (= black dots). Comparison on a semitone scale shows the relative monotone F0 contour (= a more narrow grid) of the STT speaker in relation to a more variable MTV speaker.

Table 3. Contrastive information on fundamental frequency distribution.

Lang.-sex	N speaks	N sent.	N periods	F0 (st)	sd (st)	F0 (Hz)	range (st)	min (st)	max (st)
Fi-F	7	26	11056	39,8	2,9	164,6	16,2	30,1	46,3
Ge-F	2	17	9887	42,7	3,0	193,3	15,1	35,4	50,5
Br-F	4	23	11237	41,8	2,7	183,2	12,5	35,5	48,0
Am-F	3	14	6400	42,4	3,3	193,2	16,5	33,8	50,3
Fi-M	12	70	23307	32,0	2,6	105,4	14,6	24,3	38,7
Ge-M	3	27	6053	32,8	3,3	109,8	15,1	25,5	40,6
Br-M	4	26	9139	36,9	3,3	139,2	15,9	28,7	44,5
Am-M	6	32	15766	35,2	3,7	126,1	19,1	25,1	44,1

F=females, M=males
 Sums (N): Number of speakers, number of sentences, number of periods
 Averages: F0 semitones, standard deviation, F0 Hz, range, minimum and maximum values in semitones

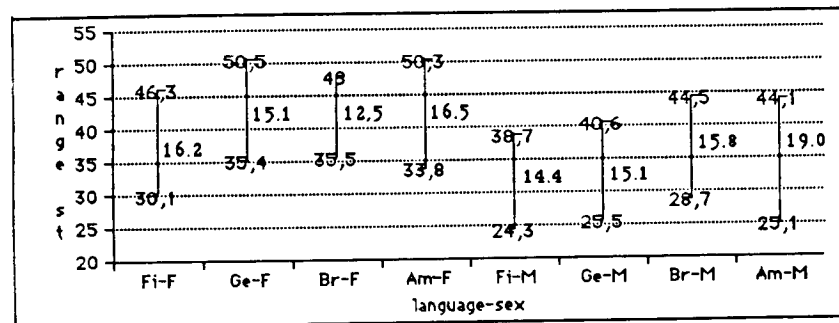


Figure 3. Average ranges of F0 in semitones among female and male speakers in Finnish, German, British English, and American English newscasts. The minima, maxima and the total range are indicated.

F0 distribution

Table 3 shows the statistics of the F0 distribution. The min. and max. values and the variation range of F0 are mainly affected by the intervals between F0 peaks and valleys as well as high sentence starts and low ends.

In the female data, the highest F0 mean values were observed in Ger (193.3 Hz; 42.7 st) and in AmE (193.3; 42.4). BrE had medium values (183.2; 41.8). Seven Finnish speakers had considerably lower values (164.6; 39.8).

In the male data, the highest mean F0 values were found in BrE (139.2 Hz; 36.9 st). American men had the medium

values (126.1; 35.2). The lowest values were observed in Ger (109.8; 32.8) and in Fin (105.4; 32.0) males.

Fig. 3 shows among other things that the Fin female F0 ranges are only about 2 st higher than those of the BrE males.

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