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Comparison of English and Czech intonation

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4 Comparison of English and Czech intonation

The comparison of English and Czech intonation is presented in sections 4.1 to 4.5 below, each focusing on one of the viewpoints mentioned above, i.e. the length of the tone unit, the position of the nucleus in a tone unit, the word class functions of the nucleus bearers, the FSP functions of the nucleus bearers, and the pitch patterns of the nuclei.

4.1 Length of the tone unit

Tone units as the basic segments of spoken utterance correspond grammatically to clauses or smaller grammatical units like noun or adverbial phrases. Their length may therefore vary from one word to a sequence of ten words or more. Table 1 and Figures 1–4 below show the variation in tone unit length in the four texts under examination. The basic unit of length applied in this study is the word as the smallest independent semantic unit of language. Each language unit capable of free movement within a sentence has been dealt with as one word. Hesitation and contact interjections and particles (e.g. *mm, hm*) have been considered *words* as well. The total numbers of tone units in the four texts are comparable: *Protest-Cz* contains 505 tone units, *Protest-En* 540, and *Dialogue-Cz* and *Dialogue-En* each contain 521 tone units.

Table 1 — Tone unit length

Tone unit length	Protest-Cz		Protest-En		Dialogue-Cz		Dialogue-En	
	Occur.	%	Occur.	%	Occur.	%	Occur.	%
1 word	93	18.4	64	11.9	89	17.1	102	19.6
2 words	73	14.5	66	12.2	70	13.4	67	12.9
3 words	74	14.7	76	14.1	65	12.5	72	13.8
4 words	75	14.9	71	13.1	76	14.6	76	14.6
5 words	56	11.1	72	13.3	69	13.2	62	11.9
6 words	55	10.9	56	10.4	47	9.0	46	8.8
7 words	35	6.9	40	7.4	47	9.0	35	6.7
8 words	19	3.8	35	6.5	23	4.4	22	4.2
9 words	11	2.2	30	5.6	15	2.9	13	2.5
10 words	8	1.6	15	2.8	12	2.3	9	1.7
11 words	5	1.0	7	1.3	5	1.0	6	1.2
12 words	1	0.2	3	0.6	2	0.4	3	0.6
13 words	-	-	5	0.9	-	-	4	0.8
14 words	-	-	-	-	1	0.2	2	0.4
15 words	-	-	-	-	-	-	-	-
16 words	-	-	-	-	-	-	-	-
17 words	-	-	-	-	-	-	1	0.2
18 words	-	-	-	-	-	-	-	-
19 words	-	-	-	-	-	-	1	0.2
Total	505	100.0	540	100.0	521	100.0	521	100.0

Figure 1 — Tone unit length: Protest-Cz

Per cent

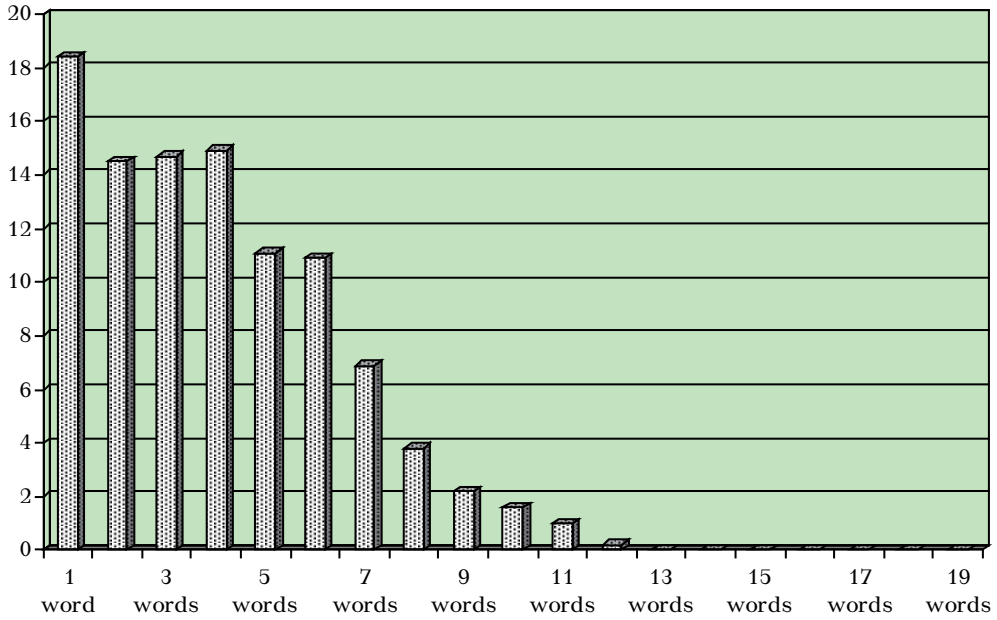


Figure 2 — Tone unit length: Protest-En

Per cent

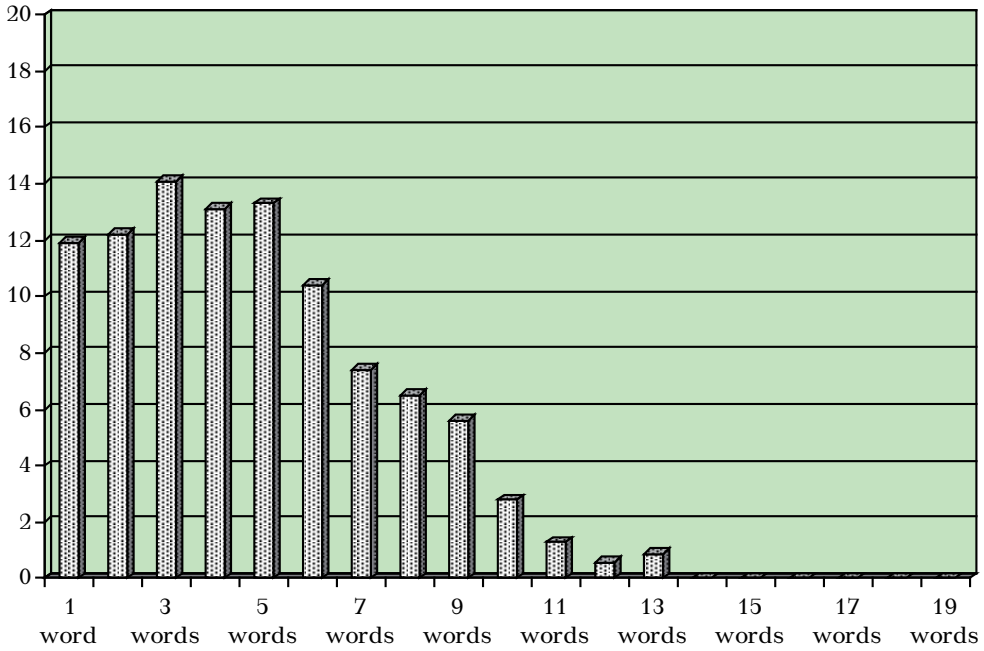


Figure 3 — Tone unit length: Dialogue-Cz

Per cent

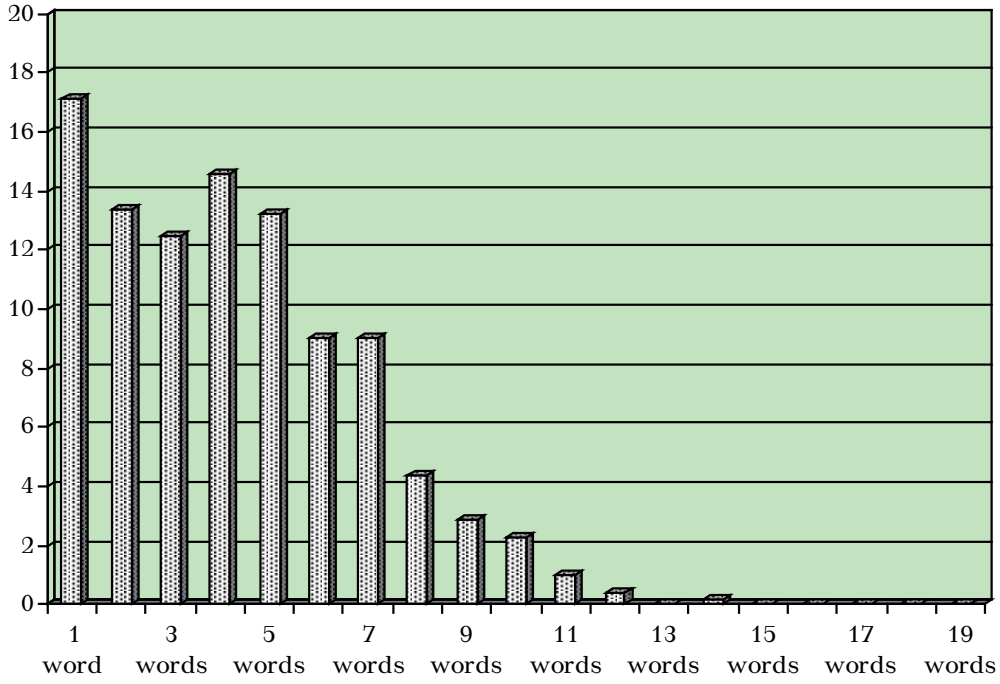
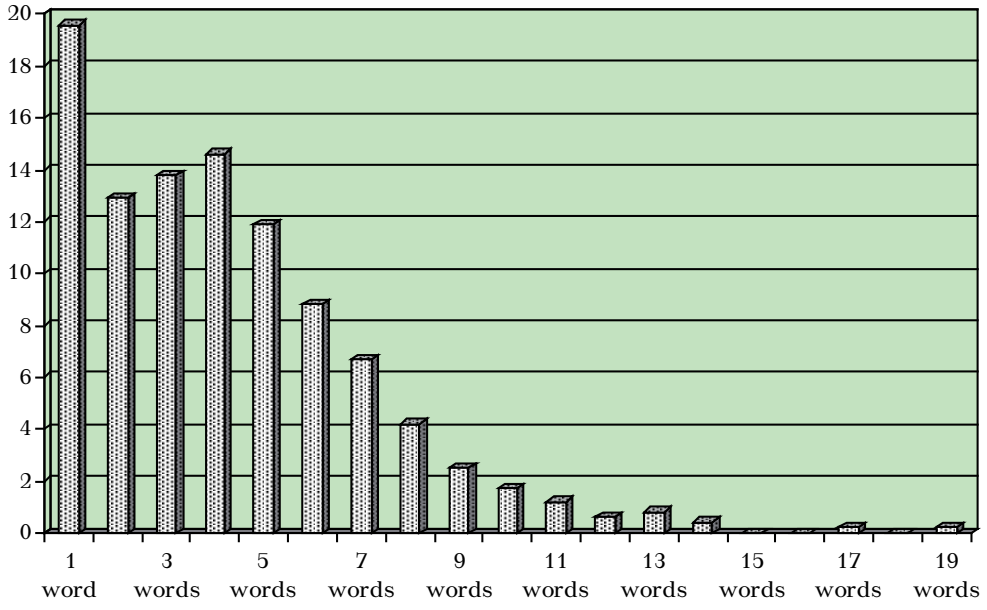


Figure 4 — Tone unit length: Dialogue-En

Per cent



The majority of tone units in *Protest-Cz, Protest-En, Dialogue-Cz* and *Dialogue-En* consist of one to six/seven words. In *Protest-Cz, Dialogue-Cz* and *Dialogue-En*, the most frequent tone unit length is one word. This high frequency of one word tone units is due to the frequent occurrences of hesitation and discourse markers[13], separated from the surrounding segments of speech by tone unit boundaries. One word tone units of this type are denoted by Chafe (1994) as *regulatory* intonation units. Tone units containing two, three, four, and five words are slightly less frequent and form groups of similar size. The structure of *Protest-En* differs from the structure of the other three texts in that it has a smaller proportion of one-word tone units: they are about as frequent as two-word to five-word tone units. This deviation may be due to a deliberate suppression of hesitation and discourse markers by the actors or the director of the performance. The frequency of tone units containing more than five words gradually decreases in each text from five/six-word tone units to twelve/thirteen-word tone units. The occurrence of tone units longer than 14 words is extremely unusual.

Table 2 — Average tone unit length in words

Protest-Cz		Protest-En		Dialogue-Cz		Dialogue-En	
Average	SD	Average	SD	Average	SD	Average	SD
3.99	2.43	4.74	2.75	4.25	2.57	4.20	2.84

Table 2 above shows the average tone unit lengths in the four texts. The lengths range from 3.99 to 4.74 words. The text with the smallest average tone unit length is *Protest-Cz* (3.99 words with a standard deviation (SD) of 2.43), followed by *Dialogue-En* (4.20 words; SD 2.84), *Dialogue-Cz* (4.25 words; SD 2.57), and *Protest-En* (4.74 words; SD 2.75).

The distribution of tone unit lengths in the examined texts presented in Figures 1–4 suggests certain tendencies in speech segmentation in English and Czech; the curves in the four charts are all very similar, with a marked deviation only in the first column of Figure 2, indicating the occurrence of one-word tone units in *Protest-En*. A more reliable comparison of tone unit lengths in Czech and English spoken utterances (scripted and non-scripted), however, would have to be based on a larger number of texts (different types of texts, different speakers, etc.). Possibilities of comparing the results with those of other studies are rather limited. A study of tone unit length in Czech and English scene scripts is not to my knowledge available. As to non-scripted texts, it is impossible to compare the figures relating to *Dialogue-Cz* with the results of Palková's experiments referred to in section 1.2.2 because Palková measured the length of tone unit in terms of syllables and rhythm groups rather than words. The only results that have a parallel in other authors' studies are the figures relating to tone unit length in the non-scripted text of *Dialogue-En*, which resemble the results of Altenberg's analysis of LLC dialogue S.12.6 (Altenberg 1987), and the results of Chafe's analysis of dialogues between adult American interlocutors (Chafe 1994: 65).[14]

13 Hesitation and discourse markers are included in this study in the category of interjections and particles; cf. section 4.3.

14 The average tone unit length assessed by Chafe is somewhat higher – 4.84 words. This figure, however, is based on the analysis of 'substantive' tone units only; 'regulatory' (mostly one-word)

The structure of scripted dialogues seems to differ from the structure of non-scripted texts: the non-scripted dialogues in the database (*Dialogue-Cz* and *Dialogue-En*) contain back-channel expressions, 'unsuccessful starts', unfinished sentences and repetition of words. The occurrence of such items in the two scripted texts (*Protest-Cz* and *Protest-En*) is very low (cf. e.g. the ratios of contact interjections and particles in section 4.3). It is difficult to assess the impact of this structural difference upon tone unit length. The average tone unit lengths in the Czech and English non-scripted dialogues are almost identical (4.25 in Czech and 4.20 words in English), but there is noticeable difference between the tone unit lengths in the scripted dialogues: the average in *Protest-Cz* is lower (3.99 words), and in *Protest-En* higher (4.74 words).

Though the tone unit lengths in *Dialogue-Cz* and *Dialogue-En* are similar, no conclusion can be drawn about the relationship between the 'amount of information' and the number of words necessary for its expression as the two texts are not semantically comparable. The two scripted texts (*Protest-Cz* and *Protest-En*), on the other hand, are comparable, i.e. they convey identical or almost identical amounts of information. The English text displays not only a higher average tone unit length (by 0.75 words) but also a higher number of tone units (540 compared to 505). The text as a whole is 27% longer in terms of words than the Czech source text (it contains 2562 words, as compared to 2014 words). Other pairs of 'equivalent' Czech and English literary texts indicate a higher proportion of words in English as well. The figures below have been acquired from the corpus of parallel texts *Kačenka* (1997). The percentages in the right column indicate the higher proportion of words in the English texts compared to the Czech versions. The proportion seems to be higher irrespective of whether the source language is Czech or English.[15]

Neblahý Juda (Hardy 1975)	*Jude the Obscure* (Hardy 1994)	+ 18%
Šťastný Jim (Amis 1959)	*Lucky Jim* (Amis 1962)	+ 23%
Synové a milenci (Lawrence 1931)	*Sons and Lovers* (Lawrence 1995)	+ 18%
Synové a milenci (Lawrence 1962)	*Sons and Lovers* (Lawrence 1995)	+ 16%
Seznam sedmi (Frost 1995)	*The List of Seven* (Frost 1993)	+ 15%
Žert (Kundera 1991)	*Joke* (Kundera 1970)	+ 24%

The explanation for this difference between semantically equivalent Czech and English texts is the synthetic versus analytical character of the languages: for the expression of a comparable semantic content, English needs more words than Czech. In view of this difference between the structure of Czech and English texts, the difference between *Protest-Cz* and *Protest-En* in the average tone unit length is not surprising. What perhaps deserves more attention is actually the fact that the average tone unit lengths in the non-scripted texts of *Dialogue-Cz* and *Dialogue-En* are almost identical. At the present stage

tone units and 'fragmentary' tone units, which would make the average lower, are not included.

15 The comparison is based on the editions indicated in parentheses, which are in most cases not the oldest editions of the books under examination. The fact that for instance a translation of Jude the Obscure published in 1975 is compared to the original text as published in 1994 does not invalidate the comparison because re-editions of original works of fiction usually do not differ significantly from the first editions. The two editions of the Czech version of *Sons and Lovers* (1931 and 1962), by contrast, represent translations provided by two different authors; the editions therefore naturally differ in the total numbers of words.

of investigation, the relationship between the amount of information conveyed by the text, the tone unit length and the total number of words in Czech and English natural conversation remains unclear and requires further investigation.

Below are examples of some of the tendencies suggested above:

(i) the occurrence of back-channel expressions (*aha*, *ano*, *um*, *m*, etc.), unsuccessful starts, unfinished clauses, and hesitation signals (*@*) in natural non-scripted texts (*Dialogue-Cz* 205–217; *Dialogue-En* O13–016 and 041–048)

(ii) the "lengthening" and splitting (resulting in a higher number) of tone units in the process of translation from Czech to English (*Protest-Cz* and *Protest-En* 05800–06000 and 07200–07400); the underlined figure indicates the number of words in the tone unit.

Dialogue-Cz

```
205,A,a /KDE to je tam ¦\na Poříčí#
      [and where it is there in Poříčí-Street]
206,A,tam =PROTI @#
      [there opposite @]
207,A,=NĚKDE @#
      [somewhere @]
208,A,počkej jak sou ty elektr- tric- ¦elektrický /\ZÁVODY#
      [wait where are those electr- tric- electric works]
209,A,nebo (nemužu) (si) u ¦Bílý /\LABUTĚ ¦/někde#
      [or (cannot) (refl.) by the-White Swan-Store somewhere]
210,B,¦na druhý straně \ULICE#
      [on the-other side of-the-street]
211,A,\/AHA#
      [I-see]
212,B,hned . hned u náměstí /REPUBLIKY#
      [right . right next-to the-Square of-the-Republic]
213,A,\ano#
      [yes]
214,B,jak @ no ten ten rohovej \BARÁK to prostě je#
      [where @ well that that corner building it simply is]
215,A,\AHA#
      [I-see]
216,A,už \VÍM#
      [now I-know]
217,A,vím \VÍM#
      [I-know I-kow]
```

Dialogue-En

```
013,A,^and [?@] !you're ((an !LS'E 'product)) 'with (([@:])) STA!T\ISTICS or 'something
                                                                              /are you# -.
014,B,^=UM# -
015,B,^[?]it's [?] . ^W\ELL# .
016,B,^I'm . em!{pl\oyed as a} :MATHEMA!T\/ICIAN# -

————————————

041,B,cos ^I _found this _very _difficult to !G\UESS#
042,B,on ^L\/OOKING *at him#*
043,A,*^M/ALCOLM#*
```

```
044,B,^[\M]#
045,A,- . ^oh D/\EAR#
046,A,( - sighs) - - - ^one for:gets 'how !time ![r\a] ^[?]\I 'think 'Malcolm's
                                                                    'TWENTY-S/EVEN#
047,A,^TWENTY-/EIGHT# -
048,A,per^haps a !bit M/\ORE#
```

Protest-Cz and *Protest-En*

```
Cz,05800,01,S,=MIMOCHODEM#
              [by-the-way]
En,05800,03,S,by the \WAY#

Cz,05900,06,S,když byste je ¦někdy chtěl \SETŘÁST#
              [if you-(aux.) them one-day wanted to-shake-off]
En,05900,11,S,sup¦pose you ¦\want to ¦\shake them \OFF one of these days#
Cz,06000,05,S,¦víte kde to je /NEJLEPŠÍ#
              [you-know where it is best]
En,06000,08,S,d'you know the ¦best ¦place to \DO it#
```

———————

```
Cz,07200,07,S,¦u toho ¦nádraží se prostě \NEDALO ¦psát#
              [by that railway-station (refl.) simply was-impossible to-write]
En,07221,07,S,it was im¦=possible to go on \/WRITING#
En,07222,05,S,¦down by that =RAILWAY ¦/station#

Cz,07300,06,S,¦vyměnili jsme to ¦před třemi \LETY#
              [we-exchanged (aux.) it ago three years]
En,07300,08,S,we've been here ¦three \YEARS now you know#

Cz,07400,07,S,¦/nejvíc pro mě ¦ovšem ¦znamená ta \ZAHRADA#
              [the-most for me however means the garden]
En,07400,10,S,@ of course what I ¦\really ¦/love is the \GARDEN#
```

4.2 Position of the nucleus in a tone unit

The tendency of speakers to place the nucleus on the last accented syllable within a tone unit (see sections 1.1.3, 1.1.2, 1.2.3 and 1.2.4) suggests that the nucleus is likely to occur at the end of a tone unit, possibly the final word. There are exceptions to this tendency (see section 1.1.5), however, and the analyzed material contains a number of examples of the placement of the nucleus elsewhere than on the last word of a tone unit. Table 3 below shows the positions of nuclei in the analyzed texts.

Table 3 — Position of the nucleus in a tone unit

Position from end of tone unit	Protest-Cz		Protest-En		Dialogue-Cz		Dialogue-En	
	Occur.	%	Occur.	%	Occur.	%	Occur.	%
1st word	415	82.2	373	69.1	375	72.0	344	66.0
2nd word	57	11.3	75	13.9	96	18.4	100	19.2
3rd word	18	3.6	52	9.6	35	6.7	49	9.4
4th word	8	1.6	20	3.7	10	1.9	19	3.7
5th word	5	1.0	10	1.9	4	0.8	6	1.2
6th word	1	0.2	6	1.1	1	0.2	2	0.4
7th word	0	0.0	4	0.7	0	0.0	1	0.2
8th word	1	0.2	0	0.0	0	0.0	0	0.0
Total	505	100.0	540	100.0	521	100.0	521	100.0

The examined texts testify to the tendency of the nucleus to occur at the end of the tone unit: in all four texts, the position of the nucleus on the last word of the tone unit is by far the most frequent. In the individual texts, this position occurs in 66–82% of all cases. It is most frequent in the Czech scripted text of *Protest-Cz* (82%), followed by the Czech non-scripted text *Dialogue-Cz* (72%), the English scripted text *Protest-En* (69%), and the English non-scripted text *Dialogue-En* (66%). The frequency of nuclei on other words than the final word of the tone unit decreases rapidly from the second word to the fifth word from the end of tone unit. Placing the nucleus further away from the end of the tone unit than the fifth word is extremely unusual.

Figure 5 — Position of the nucleus in a tone unit

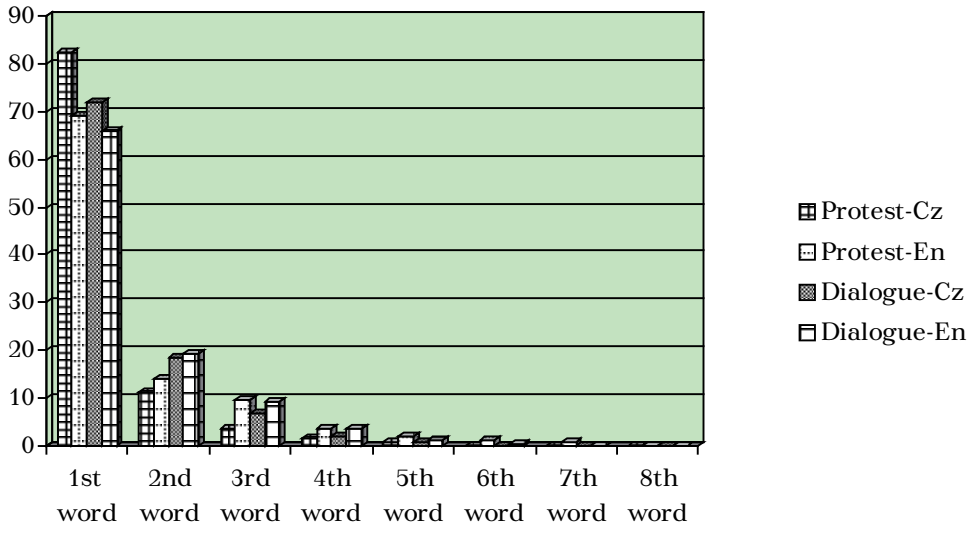


Table 4 — Average nucleus position

	Protest-Cz		Protest-En		Dialogue-Cz		Dialogue-En	
	Average	SD	Average	SD	Average	SD	Average	SD
Entire text	1.30	0.97	1.62	1.15	1.42	0.79	1.57	0.96
Tone units longer than 1 word	1.36	0.86	1.70	1.20	1.50	0.84	1.70	1.00

Figure 5 and Table 4 above show the average positions of the nucleus in the examined texts. The average is lowest (i.e. the nucleus is closest to the end of tone unit) in *Protest-Cz*: 1.30 (SD 0.79); it is followed by the averages for *Dialogue-Cz*: 1.42 (SD 0.79), *Dialogue-En*: 1.57 (SD 0.96), and finally the highest average for *Protest-En*: 1.62 (SD 1.15). The averages for the entire texts given on the first line of the table are influenced by the total number of one-word tone units in each text (in a one-word tone unit, the nucleus cannot fall on any other word but the first from the end). The second line of figures in Table 4 disregards the occurrence of one-word tone units and shows the average nucleus position in tone units longer than one word. The averages are naturally slightly higher, but the order of texts in regard to closeness of the nucleus to the end of the tone unit remains unchanged although *Protest-En* now displays the same figure as *Dialogue-En*.

Below are examples of some of the tendencies suggested by the data in Tables 3 and 4:

(i) the shift of the nucleus away from the end of the tone unit accompanying the translation of *Protest-Cz* to *Protest-En*.

(ii) the slightly more distant position of the nucleus from the end of the tone unit in *Dialogue-Cz* compared to *Protest-Cz*, reflecting the unprepared character of the text.

In the examples below, the underlined figure indicates the position of the nucleus in terms of number of words from the end of the tone unit. The nucleus bearers in the English text which are further away from the end of the tone unit than their Czech counterparts (the "shifted" nucleus bearers) are underlined.

Protest-Cz and *Protest-En*

```
Cz,02800,_1_,S,¦víte že jste se ¦za ta ¦léta ani moc /NEZMĚNIL#
               [you-know that you-have (refl.) in these years not much not-changed]
En,02800,_6_,S,@ you ¦haven't \CHANGED much in ¦all these ¦/years#
```

———————

```
Cz,03700,_1_,S,¦kdy jsme se ¦vlastně ¦viděli \NAPOSLED#
               [when did-we each-other actually see last]
En,03700,_4_,S,¦when ¦when did we last \SEE each other ¦/actually#
```

———————

```
Cz,15300,_1_,S,¦co to z nás člověče /UDĚLALI#
               [what it with us man they-did]
En,15331,_1_,S,¦good \lord#
En,15332,_4_,S,¦what did they \TURN us ¦into ¦over#
```

———————

```
Cz,15500,_1_,V,¦já bych to zas tak ¦černě /\NEVIDĚL#
               [I would it by-contrast so black not-see]
En,15500,_4_,V,I ¦really ¦don't think ¦things are as \BLACK as ¦/all ¦that#
```

———————

```
Cz,16200,_1_,S,kdybyste ale =VĚDEL#
               [if however you-knew]
Cz,16300,_1_,S,v ¦čem musím žít \JÁ#
               [in what must live I]

En,16200,_1_,S,you've no I\/DEA#
En,16300,_6_,S,the ¦sort of en¦vironment \I'VE got to put ¦/up with#
```

In the examples of unprepared speech selected from *Dialogue-Cz* (below), the speakers often add a discourse marker (e.g. *jo*) or an explanatory afterthought after the element carrying the peak of prominence. The frequent occurrence of these elements explains the slightly lower ratio of nuclei in final position in *Dialogue-Cz* as compared to the scripted text of *Protest-Cz*. Nucleus bearers that were shifted away from the final position by elements belonging to the structure of unprepared natural dialogues are underlined.

Dialogue-Cz

```
014,B,a ty chodíš . na na (chopy) na voběd k \VÁM ¦/jo#
      [and you go . for for (chopy) for lunch to your-building do-you]
015,B,tam tam se \VAŘÍ u vás#
      [there there (refl.) they-cook in your-buiding]
```

———

```
131,B,a vod tý doby \MÁLO se tam zapracovalo#
      [and since that time little (refl.) there has-been-done]
132,B,po stránce získání novejch =PROSTOR#
      [in regard-to acquiring new space]
133,A,to je \VOSTUDA#
      [it is a-shame]
134,B,a . v podstatě sou to =PŘEDVÁLEČNÝ poměry#
      [and . in essence are it pre-war conditions]
135,B,a . počty studentů narostly teda /HODNĚ#
      [and . the-numbers of-students have-grown well a-lot]
136,B,že jo vod tý =DOBY#
      [is-that not-true since that time]
137,A,\MASOKOMBINÁT#
      [meat-packing-plant]
138,B,a jako i jako ale i ty \BYROKRATI hodně narostli#
      [and so also so however also the burocrats a-lot have-grown]
139,B,dyť třeba já \NEVIM#
      [why for-example I do-not-know]
140,B,=PAMATUJU si#
      [I-remember (refl.)]
141,B,=říkalo se#
      [it-used-to-be-said (refl.)]
```

142,B,protože já tady pamatuju poměrně /DOST let na tý fakultě#
[becasue I here remember quite a-number of-years at this faculty]

———

280,B,néé voni to tam . \SPLETLI se ¦/tam#
[no they it there . made-a-mistake (refl.) there]
281,B,když když dávali /TITULEK ¦/na vobrazovku#
[when when they-were-putting the-subtitle on the-screen]
282,A,\/TITULEK#
[the-subtitle]
283,B,HOZNAU\EROVÁ ¦/jo#
[Hoznauerová is-it]

4.3 Word class functions of nucleus bearers

This section looks into the representation of different word classes (parts of speech) within the nucleus bearers in the examined texts. Since there are certain differences between the traditional Czech and English word class systems and between the individual approaches of grammarians within each language, it was necessary to adapt these systems into an eclectic one which would enable the comparison of Czech and English words. The word class system applied in this study is a compilation of the approaches presented in Dušková (1988), Quirk et al. (1985), Havránek and Jedlička (1960), and Karlík et al. (1995). This system contains the categories of nouns, adjectives, pronouns, numerals, verbs, adverbs, prepositions, conjunctions, wh-words, and a joint category of interjections and particles. Interjections and particles were put together because they share certain features and a clear distinction between them is in certain cases difficult to make. This joint category contains exclamations and contact particles, usually referred as discourse markers (e.g *well*, *oh*), polarity particles (*yes*, *no*), and intensives (e.g. *only*). Quantifiers, which are in some English grammars dealt with as a separate category, are classed as subcategories of adverbs, pronouns, and numerals.[16] Demonstratives and possessives are classed as subcategories of pronouns. Below is a list of all categories and subcategories of word classes distinguished in this study. The list contains explanations of the abbreviations used in Table 5. Further details about the word-class category system are presented in the Appendix.

N , ,	nouns
N ,att,	attributive nouns
N ,pos,	nouns in the possessive case
N ,pre,	only in Czech: phrases consisting of a preposition and a noun with the nucleus occurring on the preposition
Adj, ,	adjectives
Adj,att,	attributive adjective
Pro,per,	personal pronouns
Pro,pos,	possessive pronouns
Pro,dem,	demonstrative pronouns
Pro,oth,	other pronouns
Pro,qua,	pronouns used as quantifiers

16 Indefinite numerals in Czech correspond to English quantifiers and are classed as quantifiers within the category of numerals.

Num, ,	cardinal and ordinal numerals
Num,qua,	only in Czech: indefinite numerals comparable to some of the English quantifiers
V ,lex,	lexical verbs
V ,nlx,	non-lexical verbs (auxiliary verbs, modal verbs, copulas)
V ,adv,	only in English: phrasal verbs with the nucleus occurring on the adverbial element
Adv,ptm,	adverbs of place, time and manner used as adjuncts
Adv,mea,	adverbs of measure used as adjuncts
Adv,sen,	sentence adverbs (including modal adverbs/particles) used as disjuncts or conjuncts
Adv,qua,	adverbs used as quantifiers
Wh-, ,	wh-words
Pre, ,	prepositions
Con, ,	conjunctions
I+P,exc,	interjectional exclamations
I+P,pol,	interjections and particles predominantly expressing polarity
I+P,con,	interjections and particles predominantly functioning as contact means (including means of expressing hesitation)
I+P,int,	particles serving as intensives [vytýkací částice]

The analysis of *Protest-Cz*, *Protest-En*, *Dialogue-Cz* and *Dialogue-En* suggests that nuclei occur on words of all classes, though the frequency of certain word classes as carriers of the nucleus is very low. The examples at the end of this section illustrate the occurrence of the nucleus on the different word classes distinguished in this study. Table 5 and Figures 6 and 7 below indicate the frequency of the individual word classes within the nucleus bearers in the examined texts.

Figure 6 — Distribution of word classes as nucleus bearers (detailed view)

Per cent

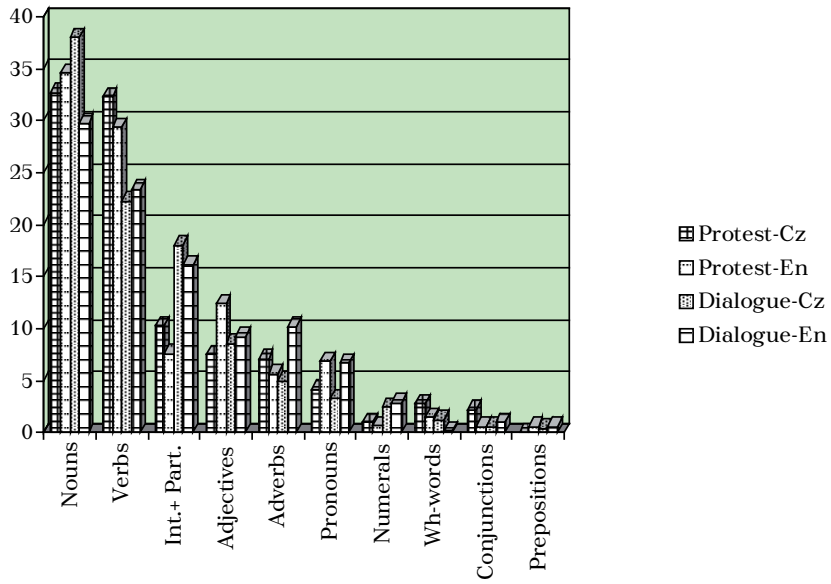


Table 5 — Distribution of word classes as nucleus bearers

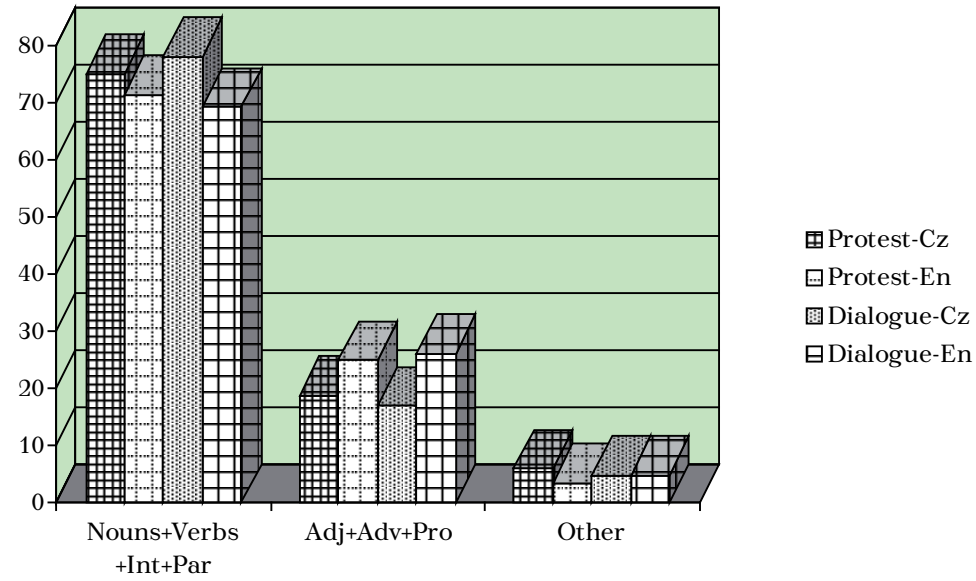
Word class	Sub-cat.	Protest-Cz				Protest-En				Dialogue-Cz				Dialogue-En			
		Occ.	Occ.	%	%	Occ.	Occ.	%	%	Occ.	Occ.	%	%	Occ.	Occ	%	%
Nouns	-	149	165	32.7		180	187	34.6		184	198	38.0		143	155	29.8	
	att	0				6				0				11			
	pos	0				1				0				1			
	pre	16				0				14				0			
Verbs	lex	152	163	32.3	75.3	122	159	29.4	71.6	106	116	22.3	78.3	99	122	23.4	69.3
	nlx	11				19				10				17			
	adv	0				18				0				6			
Int + Part	pol	30	52	10.3		26	41	7.6		19	94	18.0		28	84	16.1	
	con	14				7				65				50			
	exc	4				7				0				6			
	int	4				1				10				0			
Adj	-	29	38	7.5		56	67	12.4		27	45	8.6		31	48	9.2	
	att	9				11				18				17			
Adv	ptm	18	36	7.1		19	31	5.7		15	26	5.0		28	53	10.2	
	mea	6				2				5				0			
	sen	11				8				6				17			
	qua	1			18.8	2			25.0	0			16.9	8			26.1
Pro	per	8	21	4.2		11	37	6.9		5	17	3.3		14	35	6.7	
	dem	4				14				5				6			
	oth	4				3				2				5			
	pos	4				4				1				1			
	qua	1				5				4				9			
Num	-	4	5	1.0		4	4	0.7		7	13	2.5		15	15	2.9	
	qua	1				0				6				0			
Wh-	-		14	2.8	6.0		8	1.5	3.4		7	1.3	4.8		1	0.2	4.7
Con	-		11	2.2			3	0.6			3	0.6			5	1.0	
Pre	-		0	0.0			3	0.6			2	0.4			3	0.6	
Total			505	100.0	100		540	100	100		521	100	100		521	100	100

Table 5 and Figures 6 and 7 suggest that the two most frequent word classes within the set of nucleus bearers in the examined texts are the nouns, followed by the verbs. Nouns represent 29.8–38.0% of all nucleus bearers in the individual texts; verbs represent 22.3–32.3%.[17] The next most frequent word class in all the texts except *Protest-En* is the category of interjections and particles. The frequency of interjections and particles is highest in the non-scripted texts of *Dialogue-Cz* and *Dialogue-En*; it is lowest in *Protest-En*, where interjections and particles are less frequent nucleus bearers than adjectives. Nouns, verbs, and interjections and particles form 69.3–75.3% of all nucleus bearers in the four texts under examination. They are followed in frequency by adjectives (7.5–12.4%), adverbs (5.0–10.2%), and pronouns (3.3–6.9%). Adjectives, adverbs and pronouns counted together as one group represent 16.9–26.1% of the

17 The ratio of nucleus bearing verbs that are the intonation centre and the rheme proper of a whole sentence is, however, much lower, as suggested also by Urbanová 1984.

nucleus bearers in the examined texts. The remaining 3.4–6.0% of nucleus bearers are numerals (0.7–2.9%), wh-words (0.2–2.8%), conjunctions (0.6–2.2%), and prepositions (0.0–0.6%), jointly accounting for 3.4–6.0%. Conjunctions become nucleus bearers only in incomplete and unfinished clauses (cf. e.g. examples 065 in *Dialogue-Cz* or 239 in *Dialogue-En* in the database sample in the Appendix). The occurrence of nucleus bearing prepositions is, in *Dialogue-Cz*, also related to unfinished clauses; in the English texts, prepositions carrying a nucleus mainly occur before context-dependent pronouns. The percentages of nucleus bearing prepositions given in Table 5 and Figures 6 and 7 do not include nuclei in Czech prepositional phrases with an obligatory placement of accent on the preposition (see notes to column 5 in the Appendix). The nuclei in such prepositional phrases are included within nouns (16 occurrences in *Protest-Cz* and 13 in *Dialogue-Cz*), pronouns (1 occurrence in *Protest-Cz* and 3 in *Dialogue-Cz*) and interjections (2 occurrences in *Protest-Cz*).

Figure 7 — Distribution of word classes as nucleus bearers (summary)



In order to assess the 'utilizability' of the individual word classes as carriers of prosodic prominence, the figures in Table 5 have to be related to the overall distribution of word classes (i.e. without regard to intonation). Table 6 indicates the frequency of words (unstressed, stressed and accented) of different categories in one Czech and several English texts. The figures in column 1 are taken from Altenberg's (1990:185) study of approximately 50,000 words of conversation in the London-Lund Corpus. Since a similar study of Czech conversation was not available,[18] the overall distribution of word classes

18 A survey of word class frequency values is presented in Šmilauer 1972: 35; the values, however, could not be used, because they are based on written language.

in Czech was analyzed in a sample of 500 words from the text of *Dialogue-Cz*; the results given in column 2 of Table 6 are naturally much less reliable than the results of Altenberg's study. Columns 3, 4, 5, and 6 repeat the relevant ratios occurring in Table 5.

Table 6 — Comparison of the general distribution of word classes with the distribution of word classes as nucleus bearers (percentages)

Word class	All words		Nucleus bearing words			
	LLC %	Dialogue-Cz %	Protest-Cz %	Protest-En %	Dialogue-Cz %	Dialogue-En %
Nouns	14.3	11.4	32.7	34.6	38.0	29.8
Verbs	20.1	20.2	32.3	29.4	22.3	23.4
I + P	-	11.4	10.3	7.6	18.0	16.1
Adjectives	6.0	5.4	7.5	12.4	8.6	9.2
Adverbs	9.0	11.4	7.1	5.7	5.0	10.2
Pronouns	17.3	18.2	4.2	6.9	3.3	6.7
Conjunctions	6.3	9.4	2.2	0.6	0.6	1.0
Prepositions	9.2	6.7	0.0	0.6	0.4	0.6
Determiners	7.9	-	-	0.0	-	0.0
Other	9.9	5.4	3.8	2.2	3.8	3.1
Total	100.0	100.0	100.0	100.0	100.0	100.0

The capacity of different word classes to carry nuclear accents is determined by the ratio between the frequency of nucleus bearing words of a certain word class and the frequency of all the words of that word class, i.e. by the figures in columns 3, 4, 5 and 6 divided by the figures in columns 1 and 2. The coefficients indicating the capacity of word classes to carry prosodic prominence are given below in Table 7. These coefficients are only an approximate expression of the relative 'prosodic load' of different word classes in conversation.

Table 7 — Coefficients indicating the capacity to signal prosodic prominence

Word class	Protest-Cz	Protest-En	Dialogue-Cz	Dialogue-En
Nouns	2.9	2.4	3.3	2.1
Verbs	1.6	1.5	1.1	1.2
I + P	0.9	?	1.6	?
Adjectives	1.4	2.0	1.6	1.5
Adverbs	0.6	0.6	0.4	1.1
Pronouns	0.2	0.4	0.2	0.4
Conjunctions	0.2	0.1	0.1	0.2
Prepositions	0.0	0.1	0.1	0.1
Determiners	-	0.0	-	0.0
Other	0.7	?	0.7	?

The capacity to carry prosodic prominence seems to be highest in Czech nouns (2.9–3.3), followed by English nouns (2.1–2.4). The other two categories displaying a heavy prosodic load in both languages are adjectives and verbs (1.1–2.0). The only other group whose coefficient is higher than 1 are adverbs in *Dialogue-En* (1.1). All other word classes display coefficients lower than 1 (0.0–0.7). It was impossible to acquire the coefficient for interjections and particles in the English texts because their frequency is not explicitly given in Altenberg's (1990: 185) survey. They are included in the category of 'other' words. Interjections and particles display a relatively high coefficient in *Dialogue-Cz* (1.6), comparable to adjectives and adverbs, but they seem to be of lesser importance in the scripted text of *Protest-Cz* (0.9). With the exception of a slightly higher prosodic load of Czech nouns as compared to English nouns, the two languages do not display striking differences either in the general distribution of different word classes or the distribution of word classes as nucleus bearers. This finding is in agreement with the results of a similar study by Chamonikolasová (1995: 12), which is based on another scripted spoken text. (The text contained a slightly higher ratio of nouns than the present texts.)

Below are examples of nucleus bearers of the most frequent word classes.

Protest-Cz:

```
07300,_N_,S,¦vyměnili jsme to ¦před třemi \LETY#
          [we-exchanged (aux.) it ago three years]
07400,_N_,S,¦/nejvíc pro mě ¦ovšem ¦znamená ta \ZAHRADA#
          [the-most for me however means the garden]
```

Protest-En:

```
17881,_V_,S,how ¦often I =TELL myself#
17882,_V_,S,\WRAP it up chum#
17883,_V_,S,FOR\GET it#
17900,_V_,S,¦go and \HIDE somewhere#
```

Dialogue-Cz:

```
210,_N_,B,¦na druhý straně \ULICE#
         [on the-other side of-the street]
211,I+P,A,\/AHA#
         [I-see]
212,_N_,B,hned . hned u náměstí /REPUBLIKY#
         [right . right next-to the-Square of-the-Republic]
213,I+P,A,\ANO#
         [yes]
214,_N_,B,jak @ no ten ten rohovej \BARÁK to prostě je#
         [where @ well that that corner building it simply is]
215,I+P,A,\AHA#
         [I-see]
216,_V_,A,už \VÍM#
         [now I-know]
```

4.4 FSP functions of nucleus bearers

As indicated in chapters 1 and 2, the relationship between degrees of communicative dynamism and degrees of prosodic prominence carried by language units is rather complex. The highest degree of prosodic prominence within the distributional field of a tone unit is signalled by the nuclear accent (cf. section 1.1.3). The nucleus bearing word is thus prosodically the most prominent element within the tone unit in which it occurs. Each nucleus bearer represents a communicative unit or part of a communicative unit participating in the distribution of communicative dynamism within the distributional field of a sentence. It carries a certain degree of communicative dynamism as determined by the interplay of the non-prosodic and the prosodic factors of FSP and performs a certain FSP function. The field of distribution of communicative dynamism may extend over one or more tone units and may contain one or more nuclei.

The results of the analysis of the FSP functions of the nucleus bearers in the examined texts are presented in Tables 8–9 and Figure 8. Table 8 surveys the functions of nucleus bearing communicative units (grammatically realized as one word or a group of words, e.g. adverb, noun phrase, adverbial clause, etc.) within the basic distributional fields (fields of 0–level) as specified in the notes to columns 9–11 in the Appendix. Table 9 presents the functions of the nucleus bearers in distributional subfields (-1 and -2 level fields).

Table 8 — Distribution of FSP functions of nucleus bearers within 0–level distributional fields

FSP function	Protest-Cz			Protest-En			Dialogue-Cz			Dialogue-En		
	Occ.	%	%	Occ.	%	%	Occ.	%	%	Occ.	%	%
RhPr	380	75.3	75.3	383	71.0	72.3	336	64.5	67.2	263	50.5	53.4
Rh	0	0.0		7	1.3		14	2.7		15	2.9	
Tr	20	4.0	10.7	27	5.0	13.0	20	3.8	20.7	23	4.4	25.1
TrPr	34	6.7		43	8.0		88	16.9		108	20.7	
DTh	37	7.3	7.3	48	8.9	8.9	43	8.3	8.3	75	14.4	14.4
----	34	6.7	6.7	32	5.9	5.9	20	3.9	3.9	37	7.1	7.1
Total	505	100.0	100.0	540	100.0	100.0	521	100.0	100.0	521	100.0	100.0

In all four texts, nucleus bearers in distributional fields of 0–level most frequently perform rhematic functions. The ratio of rhematic functions (RhPrs and Rhs) is highest in *Protest-Cz* (75.3%), followed by *Protest-En* (72.3%), *Dialogue-Cz* (67.2%) and *Dialogue-En* (53.4%). Most of the rhematic nucleus bearers function as RhPr while Rhs contribute to the ratio of rhematic functions only negligibly. Rhematic functions are followed in frequency by transitional functions, representing 10.7–25.1% of all nucleus bearers. Within transitional elements, the ratio of TrPrs is generally higher than the ratio of Trs. All the thematic nucleus bearers are DThs, representing 7.3–14.4% of all cases.[19] A small ratio of nucleus bearers (3.9–7.1%) do not perform representative functions (----) within the basic distributional fields (cf. notes to columns 9–11 in 3.3).

19 The function of theme proper (ThPr) is related to unaccented elements.

Figure 8 — Distribution of FSP functions of nucleus bearers within 0–level distributional fields

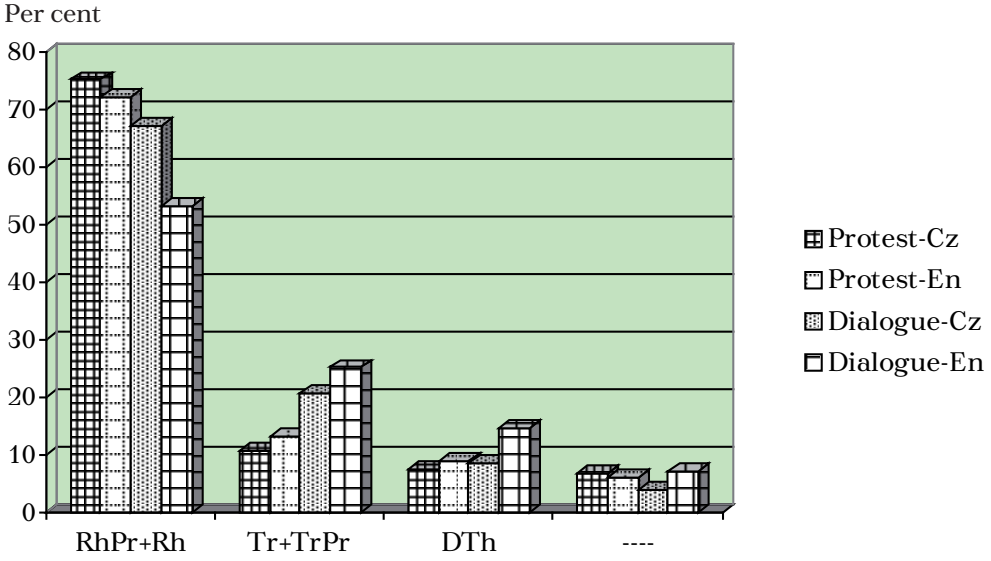


Table 9 — Distribution of FSP functions of nucleus bearers within distributional subfields

FSP function	Protest-Cz		Protest-En		Dialogue-Cz		Dialogue-En	
	Occ.	%	Occ.	%	Occ.	%	Occ.	%
RhPr, Rh	87	87.0	99	85.3	54	94.7	72	84.7
Tr, TrPr	8	8.0	6	5.2	1	1.8	8	9.4
DTh	5	5.0	11	9.5	2	3.5	5	5.9
Total	100	100.0	116	100.0	57	100.0	85	100.0

In distributional subfields, rhematic nucleus bearers form the largest group: rhematic functions are even more frequent than with nucleus bearers in basic distributional fields, representing 84.7–94.7% of all cases. The ratios of transitional and diathematic functions are very low (1.0–9.5%). Since these results are based on a relatively small number of occurrences of nuclei in distributional subfields, they can only serve as a confirmation of the general tendency of nucleus bearers to perform non-thematic functions.

A closer look at the results presented in Table 8 and Figure 8 suggests a very clear correspondence between the distributions of FSP functions in *Protest-Cz* and *Protest-En*. These semantically equivalent texts are comparable in the individual percentages of rhematic (72.3/75.3%), transitional (10.7/13.0%) and diathematic units (7.3/8.9%). The texts contain almost identical numbers of RhPrs (380 RhPrs in *Protest-Cz* and 383 RhPrs in *Protest-En*), i.e. identical numbers of peaks of communicative dynamism. Each of these peaks is related to one basic distributional field, which entails that the texts contain identical numbers of basic distributional fields of communicative dynamism. The two texts, divided into 380/383 communicative fields of 0–level, contain

380/383 communicative units functioning as RhPr and carrying the 'intonation centre nucleus' as specified in section 1.3. In addition to these 'intonation centre nuclei', the 380/383 distributional fields contain 91/125 nuclei of lesser prosodic prominence (cf. sections 1.1.5 and 1.2.5); these less prominent nuclei are carried by communicative units functioning as Rh, Tr, TrPr, and DTh. Another 34/32 nuclei occurring in these 380/383 distributional fields do not have any representative function at 0–level; they operate as signals of degrees of prosodic prominence at lower levels, i.e. within distributional subfields. The comparison of *Protest-Cz* and *Protest-En* presented in section 4.1 indicated that the English text contains a larger number of words (2562 compared to 2014) and a larger number of tone units (540 compared to 505) than the Czech text, and that the English tone units are on average longer than the Czech tone units (4.74 words/3.99 words). The comparison of the two texts from the point of view of FSP functions and the distribution of communicative dynamism over nucleus bearing units in this section suggests that the distributional fields in the English text are on average again longer than in the Czech text (6.9 words/5.3 words) and that these parallel, semantically identical texts contain almost the same number of communicative fields and the same number of peaks of communicative dynamism (380/383).

The results of the analysis of *Dialogue-Cz* and *Dialogue-En* are much more difficult to evaluate because the texts are not semantically comparable. In both texts, the percentages of RhPrs are lower (64.5/50.5) than in the scripted texts of *Protest-Cz*, and *Protest-En* and the percentages of other FSP functions are higher. This higher ratio of communicative units performing other functions than that of RhPr is probably related to the occurrence and the accentuation of elements which are typical of unprepared conversation (contact words or discourse markers, sentence adverbs, hesitation particles, etc.; cf. the distribution of word classes in section 4.3). These elements often receive a non-intonation-centre nucleus and come to perform transitional or diathematic functions. The application of the hypothesis suggested by the comparison of the parallel scripted texts, i.e. that equivalent texts contain equivalent numbers of distributional fields and peaks of communicative dynamism, would lead to the claim that *Dialogue-En* contains a smaller 'amount of information' than *Dialogue-Cz* because it consists of a smaller number of communicative fields (263/336). The average length of the basic distributional field in *Dialogue-En* (acquired by relating the number of basic distributional fields, i.e. the number of RhPrs, to the total number of words in the text) is longer than the average length in *Dialogue-Cz* (8.3 words in *Dialogue-En* compared to 6.6 words in *Dialogue-Cz*.)[20]

Below are examples of nucleus bearers performing different FSP functions: RhPr, Rh, Tr, TrPr, and DTh. The nucleus bearers in question and the FSP function they perform are underlined. For clarity only functions within basic distributional fields are determined. The interpretation of distributional subfields and of subordinate clauses and semi-clauses or parenthetized clauses (e.g. *Dialogue-Cz* 169) is available in colums 10 and 11 of the database in the Appendix.

20 The total numbers of words in *Dialogue-En and Dialogue-Cz* are 2188/2216.

Dialogue-En:

```
014,TrPr,B,^=UM# -
015,TrPr,B,^[?]it's [?] . ^W\ELL# .
016,RhPr,B,^I'm . em!{pl\oyed as a} :MATHEMA!T\/ICIAN#

_____

105,RhPr,B,"^wasn't :very :far A:W\/AY# .
106,RhPr,B,it ^might have ,been ,Bel:size :P\ARK#
107,RhPr,A,^oh well !that's ,where his :M\OTHER l/ives#
```

Dialogue-Cz:

```
018,Rh  ,A,jenže @ asi si začnu vařit \SAMA#
           [but @ maybe (refl.) I-will-start to-cook myself]
019,TrPr,A,protože už to tam =NEMŮŽU#
           [because already that there I-cannot]
020,RhPr,A,nelíbí se mi =ANI to ¦prostředí#
           [does-not-appeal (refl.) to-mi neither the atmoshpere]
021,RhPr,A,¦ani @ =JÍDLO neni dobrý#
           [nor @ the-food is-not good]

_____

168,DTh ,B,pani /HOZNAUEROVÁ#
           [Mrs Hoznauerová]
169,DTh ,B,jesi si =POSLOUCHALA#
           [if (aux.) you-listened]
170,RhPr,B,vo tom mluvila v /JEZERCE#
           [about it spoke in the-Jezerka-programme]
```

Protest-En:

```
02331,Tr  ,S,I was . I was A\/FRAID#
02332,RhPr,S,you ¦weren't going to \COME#
```

4.5 Pitch patterns of nuclei

The focus of this section is the distribution of different types of nuclei and the relation between the pitch direction of the nucleus and the communicative type of the sentence in which the nucleus occurs. The different types of nuclei distinguished in this study (cf. section 1.1.4) are fall (\), rise (/), fall-rise (\/), rise-fall (/\), and level (=). Of the basic communicative types of sentences, i.e. the declarative, interrogative, imperative and exclamatory sentences (cf. Dušková 1988:309), this study focuses only on the declarative and interrogative sentences; the examined texts do not contain enough instances of the other sentence types. The occurrence of nuclei in declarative and interrogative sentences will be dealt with in sections 4.5.1 (declarative sentences), 4.5.2 (yes-no questions), and 4.5.3 (wh-questions). Table 10 below indicates the overall frequency of nuclei in the examined texts without respect to sentence type. The table covers the occurrence of nuclei in both terminal and non-terminal intonation units, i.e. units closing the sentence and units occurring before the closing unit.

Table 10 — Distribution of different types of nuclei

Pitch direction	Protest-Cz		Protest-En		Dialogue-Cz		Dialogue-En	
	Occ.	%	Occ.	%	Occ.	%	Occ.	%
\	284	56.2	361	66.9	199	38.2	322	61.8
/	121	24.0	84	15.6	165	31.7	61	11.7
⋁	7	1.4	44	8.1	21	4.0	85	16.3
⋀	45	8.9	21	3.9	66	12.7	40	7.7
=	48	9.5	30	5.6	70	13.4	13	2.5
Total	505	100.0	540	100.0	521	100.0	521	100.0

The most frequent type of nucleus in all four texts is fall (38.2–66.9%), followed by rise (11.7–31.7%). The other types of nuclei each represent in the individual texts less than 10% of all cases with the exception of fall-rise in *Dialogue-En* (16.3%), rise-fall in *Dialogue-Cz* (12.7%) and level in the same text (13.4%). The comparison of the English texts (*Protest-En* and *Dialogue-En*) with the Czech texts (*Protest-Cz* and *Dialogue-Cz)* in regard to the representation of falls and rises suggests that in English, falls are at least four times more frequent than rises (their ratio is 4:1 in *Protest-En* and 5.25:1 in *Dialogue-En*), while in Czech the percentages of falls and rises are more even (their ratio is 2.3:1 in *Protest-Cz* and 1.2:1 in *Dialogue-Cz*). The occurrence of rises in the English texts is comparable to the occurrence of the fall-rises, rise-falls and levels, while in Czech, rises form a much larger group than these nuclei. A less detailed analysis, placing falls and rise-falls in one category of *falling tones* and rises and fall-rises in one category of *rising tones*, suggests that the general dominance of falling tones is stronger in English (69.5–70.8%) than in Czech (50.9–65.1%); rising tones are less frequent than falling tones in both languages, but their frequency is slightly higher in Czech (25.4–35.7%) than in English (23.7–28.0%).

4.5.1 Declarative sentences

Declarative sentences are generally the most frequent sentence type. Tables 11 and 12 below indicate the distribution of nuclei within terminal and non-terminal tone units of declarative sentences in the examined texts, as illustrated by examples at the end of this section.

Table 11 — Nuclei in declarative sentences: terminal tone units

Pitch direction	Protest-Cz		Protest-En		Dialogue-Cz		Dialogue-En	
	Occ.	%	Occ.	%	Occ.	%	Occ.	%
\	201	84.5	213	83.2	140	64.2	172	68.5
/	5	2.1	16	6.2	14	6.4	19	7.6
⋁	0	0.0	11	4.3	13	6.0	32	12.7
⋀	25	10.5	14	5.5	41	18.8	23	9.2
=	7	2.9	2	0.8	10	4.6	5	2.0
Total	238	100.0	256	100.0	218	100.0	251	100.0

Table 12 — Nuclei in declarative sentences: non-terminal tone units

Pitch direction	Protest-Cz		Protest-En		Dialogue-Cz		Dialogue-En	
	Occ.	%	Occ.	%	Occ.	%	Occ.	%
\	53	28.0	108	51.2	36	15.6	136	56.2
/	78	41.3	44	20.9	125	54.1	32	13.2
⋁	7	3.7	26	12.3	8	3.5	50	20.7
⋀	13	6.9	7	3.3	13	5.6	16	6.6
=	38	20.1	26	12.3	49	21.2	8	3.3
Total	189	100.0	211	100.0	231	100.0	242	100.0

A clear majority (64.2–84.5%) of terminal tone units of declarative sentences in all four texts contain a falling nuclear accent. The remaining types of nuclei each represent less than 10% of all cases with the exception of fall-rises in *Dialogue-En* (12.75%), rise-falls in *Protest-Cz* (10.5%) and rise-falls in *Dialogue-Cz* (18.8%). Comparison of the occurrences of falls in the individual texts indicates a very close correspondence between the Czech and English scripted texts (84.5% and 83.2%) and between the Czech and English non-scripted texts (64.2% and 68.5%) suggesting that in both languages, falls have perhaps a slightly less dominant role in non-scripted texts than in scripted texts. The distribution of nuclei in non-terminal tone units of declarative sentences, by contrast, points to certain differences between Czech and English. In the Czech texts, the most frequent type of nucleus is rise (41.3–54.1%); other relatively frequent types of nuclei are fall (15.6–28.0%) and level (20.1–21.2%). In the English texts, the most frequent nucleus type in non-terminal tone units is – as in terminal tone units – fall (51.2–56.2%). Other nuclei display much lower ratios.

Below are examples of nuclear accentuation in English and Czech declarative sentences. Examples 309, 310, 028, and 031 represent non-terminal declarative units; 311, 029, 032, 383, and 384 are terminal declarative units.

Protest-Cz

```
30900,_/,nd,S,jo ¦nedávno jsme /ČETLI#
           [oh the-other-day we-(aux.) we-read]
31000,_/,nd,S,s /ŽENOU#
           [I-with my-wife]
31100,_\,td,S,¦to . ¦to z toho \PIVOVARU#
           [that . that from the_brewery]
```

Dialogue-En

```
028,_/,nd,A,^sure !he'd H/ELP you#
029,_\,td,A,if you ^got ST\UCK#
030,00,00,B,( - - laughs) -
031,_\,nd,A,^I !I "^I've been a :{fr\iend of} :{M\alcolm's} :M\OTHER#
032,_\,td,A,for "^D\ONKEY'S *'years#*
```

———————

```
383,_\,td,A,[?@] ^I'm . "!too 'much con:cerned with :W\ORDS# - .
384,_/,td,A,^I'm !weak on AES:TH\ETIC as he p/uts it#
```

Some of the falls and rise-falls in the examined texts are followed within one tone unit by a rise in pitch carried by a language unit of low communicative importance. An example of such an occurrence is found in intonation unit 384 above. The final rise on 'puts' is interpreted as a 'low rise after a fall', which has a lesser prosodic prominence than the fall. This is an example of one of the modifications of 'a single nucleus intonation unit' described by Firbas (1972: 86, 1980: 130 and 1985: 19) or Cruttenden (1986: 48). Since the final rise in pitch changes the final contour of the intonation unit, it was necessary to adapt data from Tables 11 and 12 in order to obtain a valid survey of final pitch movement, which is presented in Figures 9 and 10 in section 4.5.4.

4.5.2 Yes-no questions

In standard conversation, interrogative sentences are much less frequent than declarative sentences. The ratio of yes-no questions in the examined texts is relatively low (especially in *Dialogue-En*), and the results of their prosodic analysis are therefore of limited reliability. Non-terminal intonation units of yes-no questions have been excluded from the statistics completely because the number of their occurrence is negligible.

Table 13 — Nuclei in yes-no questions: terminal tone units

Pitch direction	Protest-Cz		Protest-En		Dialogue-Cz		Dialogue-En	
	Occ.	%	Occ.	%	Occ.	%	Occ.	%
\	5	12.5	14	35.9	5	22.7	5	45.4
/	30	75.0	20	51.3	9	40.9	4	36.4
⋁	0	0.0	5	12.8	0	0.0	1	9.1
⋀	5	12.5	0	0.0	8	36.4	1	9.1
=	0	0.0	0	0.0	0	0.0	0	0.0
Total	40	100.0	39	100.0	22	100.0	11	100.0

Table 13 indicates the distribution of the five nucleus types within the yes-no questions in the examined texts. Rises are significantly more frequent and falls significantly less frequent compared to terminal declarative sentences (cf. Table 11). In all four texts, except *Dialogue-En*, rises (36.4–75.0%) are more frequent than falls (12.5–45.4%). *Dialogue-Cz* contains a very high percentage of rise-falls (36.4%; cf. unit 175 below). The ratios of levels, fall-rises, and rise-falls are otherwise relatively low (0.0–12.8%). As with declarative sentences, some of the falls and rise-falls within the examined questions are followed by a rise in pitch carried by a language unit of low communicative importance. Data from Table 13 have been adapted to a simpler survey of final pitch movement, presented in Figure 11 in section 4.5.4. Below are examples of the accentuation of terminal yes-no question tone units.

Protest-En

```
03700, \,tw,S,¦when ¦when did we last \SEE each other ¦/actually#
03800,/\,td,V,I ¦don't /\KNOW#
03900, \,ty,S,¦wasn't it at your ¦last \PREMIERE#
```

Protest-Cz

```
03700, \,tw,S,¦kdy jsme se ¦vlastně ¦viděli \NAPOSLED#
              [when did-we each-other actually see last]
03800, \,td,V,já \NEVÍM#
              [I do-not-know]
03900, /,ty,S,¦nebylo to . @ ¦na vaší ¦poslední /PREMIÉŘE#
              [wasn't it . @ at your last premiere]
```

Dialogue-Cz

```
175,/\,ty,A,ona je z pedagogického /\ÚSTAVU#
            [she is from the-pedagogical institute]
```

4.5.3 Wh-questions

The number of wh-questions in the material is even lower than the number of yes-no questions. The results of the analysis of terminal wh-question intonation units are presented in Table 14 below. Non-terminal units have not been included in the statistics because of a very low number of occurrences.

Table 14 — Nuclei in wh-questions: terminal tone units

Pitch direction	Protest-Cz		Protest-En		Dialogue-Cz		Dialogue-En	
	Occ.	%	Occ.	%	Occ.	%	Occ.	%
\	19	76.0	20	87.0	8	61.5	7	87.5
/	4	16.0	3	13.0	3	23.1	1	12.5
⋁	0	0.0	0	0.0	0	0.0	0	0.0
⋀	2	8.0	0	0.0	2	15.4	0	0.0
=	0	0.0	0	0.0	0	0.0	0	0.0
Total	25	100.0	23	100.0	13	100.0	8	100.0

The dominant pitch direction in wh-questions, unlike in yes-no questions, is the falling tone. Falls are clearly the most frequent types of nuclei in all four texts (61.5–87.5%). The next most frequent nucleus type is rise (13.0–23.1%), followed by rise-fall (0–15.4%); the material contains no fall-rise and no level. For a survey of final pitch movement within wh-questions, see Figure 12, providing a simplified survey based on Table 14. Within wh-questions, there was only one case of a low rise after a fall, modifying the final pitch movement within the tone unit (cf. unit 03700 in *Protest-En* below).

Owing to the low number of wh-questions in the examined material, the validity of these results is again rather low and would have to be verified by the analysis of a larger number of cases.

Below are examples of nuclei in terminal wh-question tone units.

Protest-En

```
03700, \,tw,S,¦when ¦when did we last \SEE each other ¦/actually#
03800,/\,td,V,I ¦don't /\KNOW#
03900, \,ty,S,¦wasn't it at your ¦last \PREMIERE#
```

Protest-Cz

```
03700, _\,tw,S,¦kdy jsme se ¦vlastně ¦viděli \NAPOSLED#
              [when did-we each-other actually see last]
03800, \,td,V,já \NEVÍM#
              [I do-not-know]
03009, /,ty,S,¦nebylo to . @ ¦na vaší ¦poslední /PREMIÉŘE#
              [wasn't it . @ at your last premiere]
```

4.5.4 Final pitch movement

The preceding sections have indicated the distribution of five types of nuclei in tone units of declarative and interrogative sentences. A more lucid view of accentuation in the two sentence types in the examined languages is presented in Figures 9–12 below. In these figures, the scale of five nucleus types is reduced to a scale of three basic pitch movements: falling (i.e. falls and rise-falls), rising (rises and fall-rises), and level. The figures take into consideration the occurrence of a low rise after a fall. Although the low rise, as suggested above, is less prominent than the preceding fall, it affects the contour of the tone unit. Precise data underlying Figures 9–11 are presented in Tables 11a-14a in the Appendix.

Figure 9 — Final pitch movement in declarative sentences: terminal tone units

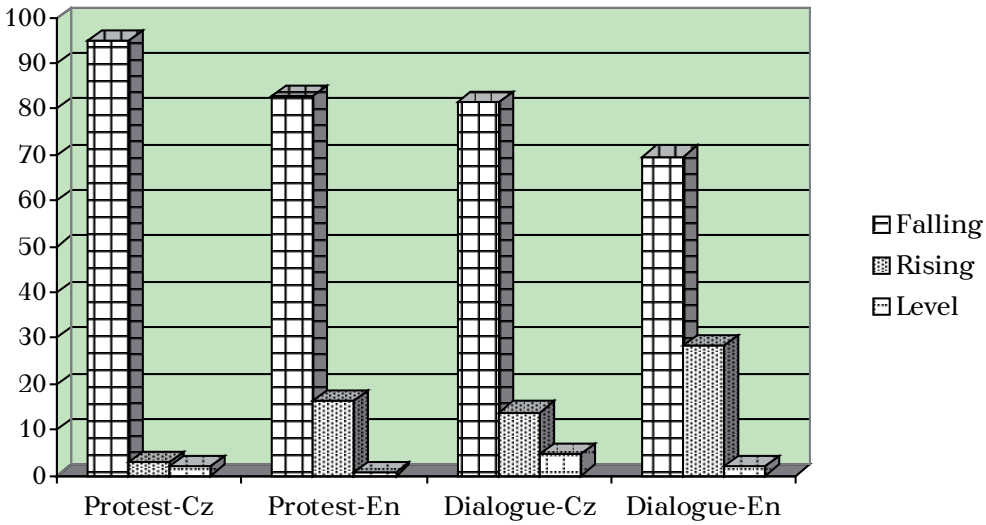


Figure 10 — Final pitch movement in declarative sentences: non-terminal tone units
Per cent

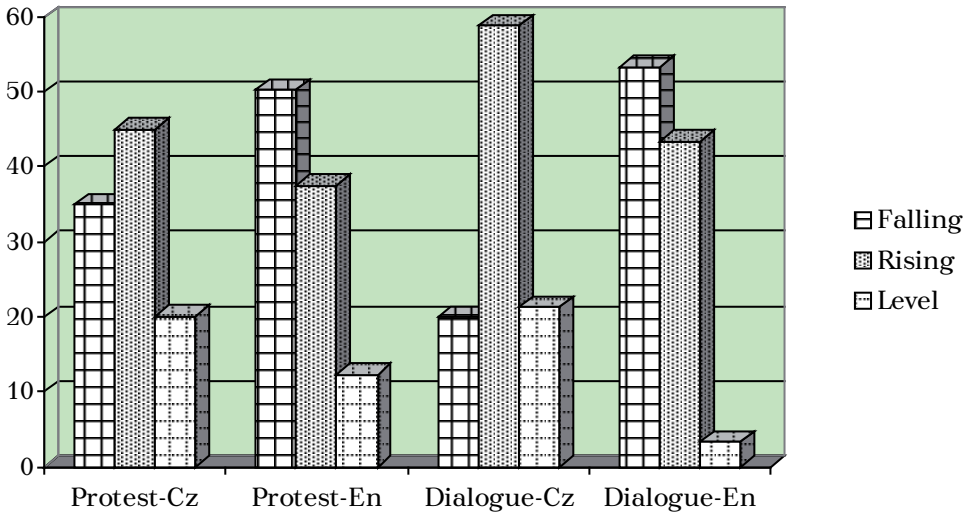


Figure 11 — Final pitch movement in yes-no questions: terminal tone units
Per cent

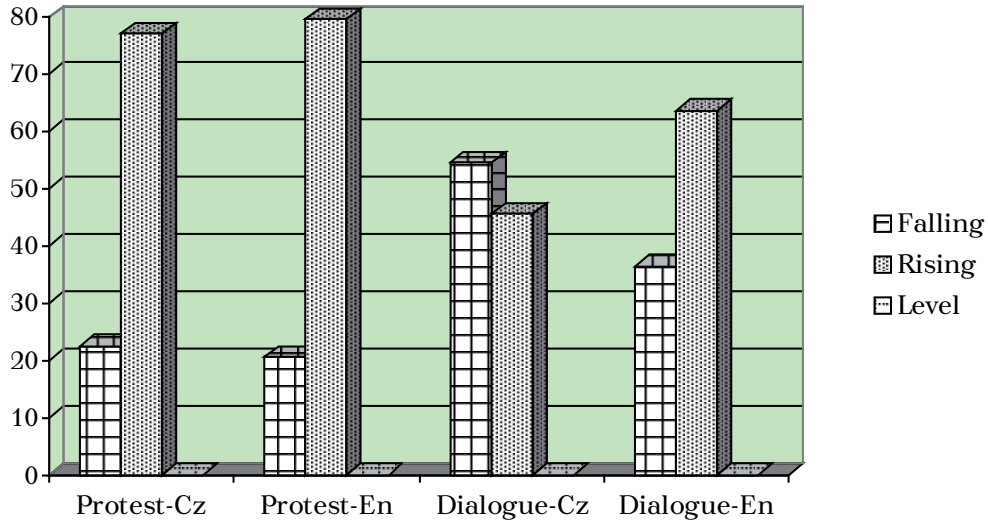
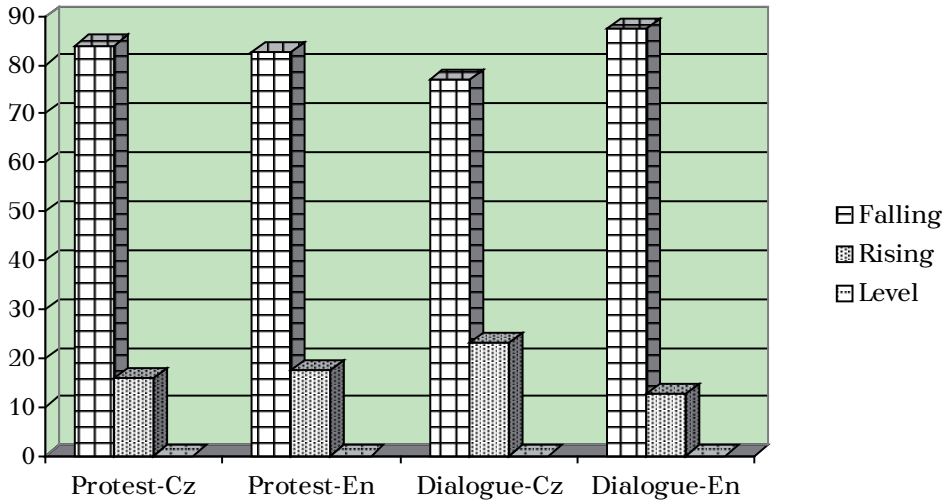


Figure 12 — Final pitch movement in wh-questions: terminal tone units

Per cent



The survey of final pitch movements provided by Figures 9–12 indicates the following tendencies in accentuation in English and Czech spoken texts. The prevailing final pitch direction in terminal tone units of declarative sentences in both English and Czech texts is the falling direction (69.7–95.0%); rising tones and especially level tones are much less frequent (2.9–28.3% and 2.1–4.6%). The analysis of non-terminal tone units of declarative sentences, on the other hand, reveals certain differences between English and Czech. Czech non-terminal units contain more often a rising pitch (45.4% and 58.9%) than a falling pitch (34.0% and 19.9%) while in English, this ratio is reversed, i.e. the falling pitch is more frequent (50.0% and 53.3%) than the rising pitch (43.3% and 45.0%). Level tones are more frequent in Czech (20.1% and 21.2%) than in English (3.3% and 12.3%). The prevailing final pitch of yes-no questions in the two English texts and the scripted Czech text (Protest-Cz) is rising (63.6–79.5%); the Czech non-scripted text (Dialogue-Cz) has a higher ratio of falling tones (54.5%) than rising tones (45.5%). This is mainly due to the relatively high proportion of rise-falls that seem to be quite frequent in natural non-scripted spoken Czech conversation and may also be speaker-specific. Wh-questions in both English and Czech texts most often contain a falling pitch (76.9–87.5%); a rising pitch is much less frequent (12.5–23.1%). Terminal units of yes-no questions and wh-questions in the present material do not contain any level tones. Owing to the low occurrence of interrogative sentences in the examined material, the validity of conclusions concerning the accentuation of questions is rather limited, and analysis of a larger sample is necessary to verify the present findings.