

## MELODEMES IN SPEECH: THEIR STABILITY AND CONFUSIONS

ZDENA PALKOVÁ

### ABSTRACT

The melodeme, a stabilized contour of F0 which serves as a means of communicating a particular type of attitudinal modality, distinguishing declarative, interrogative and progredient modes, is a relevant part of sentence intonation in Czech. The melodeme is usually carried by the last phonetic word of a phrase. Differentiation between variants of individual melodemes is sufficient in theoretical description as well as in acoustic reality of neutral standard speech. In common speech, especially expressive or emotional, confusion between the intention of the speaker and the interpretation of the listener cannot be ruled out. In the study we use a perceptual probe to investigate similarities between contours of different melodemes and acoustic features that affect their recognition when isolated from context.

**Key words:** intonation, intonation phrase, stress-group, melodeme, types of mode, F0 contours, listening test, Czech language

### 1. The notion of the melodeme in the description of Czech intonation

**1.1** In many languages, intonation is used as a functional means of prosodic structure (Coulthard, 1992; Ladd, 1996; Brazil, 1997), especially when expressing syntactic/pragmatic notions like finality, interrogation etc. (see Cruttenden, 1997; Hirst and DiCristo, 1998; Fox, 2000; Gussenhoven, 2004). In Czech, the use of intonation as a means of expressing attitudinal modality is the most clarified part of the phonological description on the utterance level. Research conducted in this direction has a long tradition with an empirically well-founded theoretical basis right at its beginning (Chlumský, 1928; Petřík, 1938; Romportl, 1951; Daneš, 1957). It is based on the description of intonation contours in a pre-defined part of a text, the so-called melodemes.

A melodeme is a set of F0 patterns that mediate the same function, i.e. they indicate the same type of utterance. Individual patterns (“contours” in Czech terminology) are characterized by a stable sequence of pitch changes whose direction is obligatory (Daneš, 1957; Romportl, 1963; Palková, 1994). The melodeme usually stretches only over a part

of the sentence intonation; its bearer in neutral utterances is the last stress-group (SG) of a phrase or completed utterance. The set of melodemes and their variants have been described primarily for neutral speech.

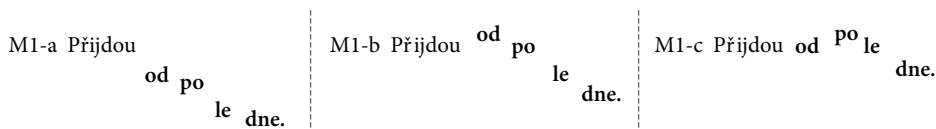
**1.2** Three basic melodemes have stabilized as a means to express attitudinal modality in Czech. In this paper we focus on the description of the basic theoretical schemes of melodemes in their primary phonological function of distinguishing sentence types, the adequacy of their mutual distinction and robustness against the necessary variability of everyday speech. As mentioned, the description of melodemes in neutral utterances can usually be restricted to the movement of F0 in the last SG of a higher prosodic unit. If the utterance contains a narrow focus the melodeme is stretched from the place of prominence till the end of the utterance (Daneš 1957; Palková, 1978, 1994, 2005). In reality, other factors influence the form of intonation contours, especially in expressive or emotional speech (Palková, 1997; Palková and Janíková, 1999; Palková and Volín, 2006).

For a schematic description of melodic contours, we use a simple code which indicates the expected direction of F0 in the SG carrying a melodeme. The symbols H and L are used to denote the pitch changes within a pre-defined part of a text (thus differently to Pierrehumbert, 1980, or to ToBI, e.g. Beckman et al., 2005). In our schemes, H denotes higher fundamental frequency (high) and L denotes lower fundamental frequency (low); compared to the previous tone, > is a slight decrease, < a slight increase, while = represents equal level. We place the symbol \* before the first (thus stressed) syllable of the melodeme-bearing SG, the / sign indicates the boundary between a melodeme-bearing SG and a syllable or syllables in the preceding context; the symbol in brackets indicates the direction of melody for other syllables in the SG.

## 2. Inventory of melodemes and their contours in the schematic description

**2.1** *Conclusive falling melodeme* (declarative, M1) is used as the basic form of declarative and imperative sentences and wh-questions. These types of sentences are not further distinguished by intonation, only a different frequency in the use of the individual variants can be assumed.

A drop in melody from the first (stressed) syllable of the melodeme-bearing SG to the end of the utterance is usually considered to be a defining feature of Melodeme 1, common to most of its variants. It can be empirically demonstrated that an unmarked conclusive contour of Melodeme 1 (M1-a) occupies an autonomous status within the



**Figure 1.** Sketches for variants of Melodeme 1. The melodeme-bearing stress-group is in bold-face; text: They will come in the afternoon.

overall declining trend of the utterance and is not dependent on it (Volín, 2004). Scheme for M1-a: \*H(L)L.

In addition, we distinguish two contours within Melodeme 1 that indicate not only the type of utterance but also a certain form of emphasis.

The M1-b variant is characterized by an increase in the first syllable of the melodeme compared to the last syllables of the preceding context (cf. Daneš, 1957). Scheme for M1-b: </ \* H(L)L.

The variant M1-c is characterized by a rise in the middle of the SG with the decline after them. Its rise-fall course somewhat violates the primarily falling character of Melodeme 1. This variant is also considered to signal a context (narrow) focus (see Palková, 2008). Scheme for M1-c: \*LH(L)L.

**2.2 Conclusive rising melodeme** (interrogative, M2) is used as the basic form of yes/no questions. In Czech, the yes/no question has the same grammatical construction as declarative sentence, the use of the melodeme is distinctive.

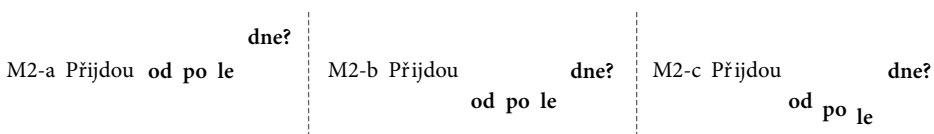
The basic feature of all contours of this melodeme is a step rise between two syllables of the last SG (not a gradual increase over consecutive syllables). The location of the rise differentiates two subtypes of the melodeme (hereafter A, B). The difference between them is fully displayed in units (SGs) with three or more syllables. A more detailed research (e.g. Veroňková, 2006) allows us to further modify its description.

Subtype A is characterized by rising course on the last syllable of the SG, the preceding syllables keep low F0. We will distinguish three modifications.

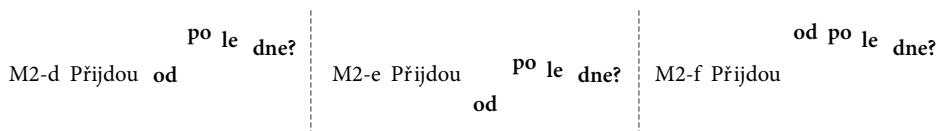
The default (basic) variant, M2-a, is sufficiently characterized by the above mentioned description. Scheme for M2-a: \*L(=)H.

In the second variant, M2-b, the beginning of the contour is lowered compared to the syllables of the preceding context. Scheme for M2-b: >/\*L(=)H.

The third modification, M2-c, is a decrease over the initial syllable of the SG followed by a rise at its end. This variant occurs especially for longer SGs. (Veroňková, 2006: 42f., 95f.). Scheme for M2-c: >/\*L(>)H.



**Figure 2.** Sketches for variants of Melodeme 2, type A. The melodeme-bearing stress-group is in bold-face; text: Will they come in the afternoon?



**Figure 3.** Sketches for variants of Melodeme 2, type B. The melodeme-bearing stress-group is in bold-face; text: Will they come in the afternoon?

Subtype B is characterized by an increase after the SG onset, the course is rising-falling.

The basic variant M2-d displays a relevant increase on the second syllable of the SG. The first syllable is at a low F0 level, the syllables following the increase gradually decrease slightly, but do not reach the level of the first syllable. Scheme for M2-d: \*LH>(>).

Another variant of this type, M2-e, is characterized by the decrease of the beginning of the melodeme compared to the syllables of the preceding context. Scheme for M2-e: >/\*LH> (>).

We will also consider a non-standard variant, the so-called Prague question, M2-f. The characteristic increase is realized on the first syllable of the melodeme-bearing SG, and the difference from the last syllable of the preceding SG is relevant. The following syllables gradually decrease like in the variant M2-d. Scheme for M2-f: L</\*H>(>).

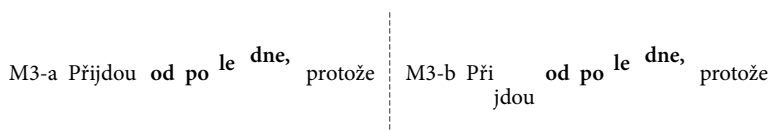
**2.3 Inconclusive melodeme** (non-final, progradient, M3) suggests that the utterance will continue. From the perspective of syntactic structure the melodeme is most distinct at the end of clauses in complex or compound sentences and at the end of the phrases within longer syntactic units. The acoustic form of Melodeme 3 has a number of variants and its characteristics are the least distinct. However, there are two basic types (hereafter A, B).

One of the types features a melody rising stepwise on consecutive syllables of the SG, which will be further denoted as M3-a. Scheme for M3-a: \*LH<(<).

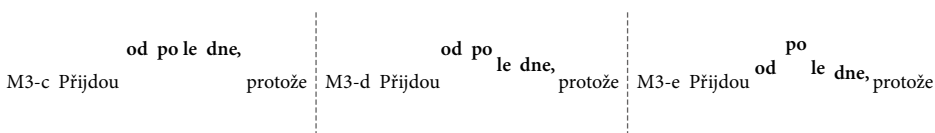
Sometimes this characterization is supported by the low level of the last syllable of the preceding SG as well, M3-b. Scheme for M3-b: </\*LH <(<).

Daneš considers the decline in the context before the first syllable melodeme-bearing SG to be a distinctive feature of Melodeme 3 (1957: 51). However, an acoustic analysis of broader sound material did not confirm this assumption (Volín, 2008).

The second type of Melodeme 3 is represented by contours having higher melody in the whole SG compared to the level of preceding context. The contour of the SG itself varies, we will mention three variants.



**Figure 4.** Sketches for variants of Melodeme 3, type A. The melodeme-bearing stress-group is in bold-face; text: They will come in the afternoon, because...



**Figure 5.** Sketches for variants of Melodeme 3, type B. The melodeme-bearing stress-group is in bold-face; text: They will come in the afternoon, because...

Variant M3-c has more or less straight course. Scheme for M3-c: < /\*H=(=).

Variant M3-d has a slight decline at the end. Scheme for M3-d: < /\*H(=)>.

Variant M3-e features a greater rise in the middle of the SG, similar to Melodeme 1. Scheme for M3-e: < /\*LHL.

### 3. Aims of the present research

Research focused on sentence intonation in Czech with respect to its communicative functions shows that the traditional description of melodemes and their contours distinguishes different types of utterances in their neutral form and corresponds to the perceptual interpretation of the listener (Janíková, 2002a, b; Palková and Veroňková-Janíková, 2004). Simple schemes are also usually sufficient as the basic information and guidance for speech communication education or for interlingual comparison (Petr, 1986; Palková, 2005; Volín, 2010).

The current demands on the description of spoken communication require the extension of the studied material to common language communications and texts with a certain degree of expressiveness and emotionality. In such texts of common speech, however, confusion of various functional types of intonation well distinguished in theoretical description can be expected. This hypothesis motivates the research presented in this contribution.

**3.1** The schematic characterization of melodemes suggests which contours are similar to each other and what constitutes their difference in the current description. Tab. 1 contains an overview of the above mentioned variants. The symbol / denotes the beginning of the melodeme in cases where the relation to the last syllable preceding the contour is taken into account. The symbol # is used to denote the sub-standard variant of the rising melodeme, the “Prague” question. Groups of similar schemes are marked by the same background in the table. The contours in the group always have a similar basic direction of pitch changes.

**3.2** Let us summarize the basic similarities and differences of the schemes.

In the contours of the declarative melodeme M1-b and the non-final melodeme M3-d the first syllable of the SG is higher than the last syllable of the preceding context, and

**Table 1.** Schematic characterization of melodemes: similarity of melodic schemes.

M1	a	b	c			
	*HL	< /*HL(>	*LHL			
M2	a	b	c	d	e	f
	*L(=)H	> /*L(=)H	> /*L(>)H	*LH>(>)	> /*LH>(>)	L/*H>(>)
M3	a	b	c	d	e	
	*LH<(<)	< /*LH<(<)	< /*H=(=)	< /*H>(>)	< /*LH>	

a decline follows. Discrimination then depends on the size and resulting position of the decline. The similarity of these two schemes is a common cause of uncertainty in distinguishing concluded and continuing utterances. A similar course can be found in the contour of the interrogative melodeme M2-f, where the rise, typical for yes/no questions, occurs between the beginning of the SG and the preceding syllable. The last SG itself has a falling course. The contour, however, is narrowly regional.

The contours of the interrogative melodeme M2-a and of the non-final melodeme M3-a begin at a lower level, followed by a rise. A question (M2-a) is characterized by one strong rise within the SG, while the impression of inconclusiveness (M3-a) is induced by a gradual step increase over the SG's syllables. In description this distinction is presented as an opposition, while in actual speech the size of the pitch changes is often decisive. The difference is therefore well pronounced only in SGs of three or more syllables. Discriminating questions from the non-final contour is aided by the interrogative variant M2-c in which the low first syllable is followed by another fall before the characteristic rise on the last syllable.

Contours M1-c (conclusive), M2-d (interrogative) and M3-e (non-final) are always three-step schemes and the characteristic changes share the same direction. The beginning of the melodeme-bearing SG is at a lower level, followed by a rise and then another decrease. The differences lie in the size and proportions of the two pitch changes and they can be easily schematized in theoretical description. If we use 3 pitch height steps (1 – lowest, 3 – highest), then M1-c: 2-3-1; M2-d: 1-3-2, M3-e: 2-3-2. In the reality of everyday speech, however, the pitch changes and their proportions are not stable. The importance of relation between the pitch level of syllables at the edges of the contours and the syllables in the neighbouring context then increases.

It can be concluded that the confusion of contours used with various communicative intent may potentially occur for all the three melodemes.

**3.3** The observation of everyday speech demonstrates that a misunderstanding in recognizing the melodeme function by listeners may actually occur but is less frequent than one might expect with such a diversity of variants and such a quantity of variable factors. It is likely that the shared language experience of the speaker and the listener contains more relevant characteristics than the theoretical description depicts. It is therefore necessary to identify more signals for the differentiation of contours belonging to different melodemes.

A well-established foundation for the extension of the description is present in the ability of the listener to recognize the type of melodeme based on a given sound contour in accord with the speaker's intention (as to the issues of perceptual verification of communicative functions see, e.g. t'Hart, Collier and Cohen, 1990; Kohler, 2006; Rietveld and Chen, 2006; Gussenhoven, 2006). In spontaneous speech, however, the fact that the pragmatic intention of the speaker can remain vague for the speaker himself or herself presents a difficulty. The uncertainty as regards conclusiveness/inconclusiveness is a common example.

One of the topics important for the progress in the description of sentence intonation in Czech seems to be the question to what degree the communicative (pragmatic) information attributed to the melodeme is carried by the melodeme contour itself and/or to

what extent it is also affected by the wider context (Palková and Veroňková-Janíková, 2004; Veroňková, 2008). The perceptual test presented here is a partial probe to this topic.

## **4. Discrimination and confusion of melodemes**

### **4.1 Material**

The overall conditions under which the listener assigns pragmatic function to a given intonation contour should be as close as possible to real speech situations. The source material therefore consisted of two-minute monologues in which speakers were asked to tell a coherent story based on a series of six images (the fairy tale *The Sorcerer's Apprentice* illustrated by J. Lada). The speeches were unprepared and the speakers were free to change the storyline at will. The audio recording was made in a recording booth of the Institute of Phonetics. 21 first-year students of Czech studies at Charles University in Prague were employed (10 male and 11 female); their technique and style of speech was informal, and their speech alertness adequate to allow fluent speech.

A set of intonation samples, each lasting one intonation phrase, were isolated from the monologues. The items varied in number of SGs and syllables (2–5 SGs, 3–12 syllables), their syntactic structure was as varied as possible (sentences, phrases, elliptical clauses), and semantically they allowed more variants of potential context. The set as a whole represented a diverse material in which the listener could expect anything in terms of linguistic form, and had no guidelines for determining the type of utterance in terms of content. However, in the original context the pragmatic attitude of the speaker was unmistakable in each sample.

This set of samples was used to prepare a listening test with 37 items. The primary objective was to investigate the variability of the non-final melodeme (M3) and its distinguishability from the declarative melodeme (M1), i.e., the sensitivity of listeners to concluded and non-concluded utterances. The core of the test was formed by 12 items of concluded utterances (M1) and 22 items of non-final utterances (M3). Three items of interrogative utterances (M2) were added to confront the listeners with the third type of sentence modality and to demarcate its intonation shape. In the test, the interrogative items were located in the first and second third, the order of the other items was randomized.

An unbalanced number of cases in different modality types is an obstacle for statistical interpretation of data; on the other hand, this selection represents a similar frequency of occurrence that the listener meets in narrative monologues. Two interrogative items (M2) used in the test had to be taken from a read text because of the lack of questions in the free narratives. The listeners were familiar with the nature of the source material, as they had participated on similar speaking tasks in the past. Potential asymmetry in sentence type occurrence was mentioned in the instruction.

In the test the listeners judged whether they hear an item as a declarative utterance, a non-final utterance or a question. Each audio item was repeated three times. The listeners recorded their judgments to a sheet with the items specified in written form. The results

were obtained from 130 native listeners, mostly students of the Faculty of Arts, philological specializations, aged 19 to 24 years.

## 4.2 Results

An earlier experiment based on neutral read texts indicated a relatively high success rate in the recognition of sentence modality by listeners (Palková and Veroňková-Janíková, 2004). In the total number of judgements (about 1000 answers for each type), declarative utterances were recognized in 89%, questions in 97%, non-final utterances in 85%. In only 11% of the test items, the listeners' evaluation agreement decreased beneath 75%. No significant confusions were found for questions.

The aim of the present experiment was to ascertain whether end how reliably listeners recognize the pragmatic intention of the speaker according to the intonation phrase finishing with a melodeme in speech that is more similar to common communication, with certain expressiveness and without the support of broader context. With respect to the arrangement of the test, the hypotheses concerned the potential confusion between declarative and non-final utterances.

As for few the samples of the interrogative melodeme (M2) in the test, their positive identification was predicted. Potential confusions between questions and the two other utterance types were expected as casual evaluations only, scattered among individual items. In this respect, some unforeseen results of the experiment appeared, prompting useful questions for further research. That is the reason to their presentation here despite their weak statistical value.

### 4.2.1 Discrimination of melodemes

Results based on the total set of answers (4810 judgements) are summarized in Table 2. The melodemes realized by the speaker are listed in rows of the table while the listeners' judgements can be found in the columns. The left part of the table shows the absolute number of judgements, the right the results in %. Correct judgements are marked with grey background.

The results confirm a high correlation between the intention of the speaker and the judgement of the listener (Yates  $X^2 = 4045.6$ ,  $p < 0.001$ ). Even for partial comparison of the results for M1 and M3, which formed the substance of the test sample, the result is the same (Yates  $X^2 = 1909$ ,  $p < 0.001$ ).

**Table 2.** Discrimination of melodemes based on all responses.

Σ of judgements	Recognition						
	M1	M2	M3		%M1	%M2	%M3
M1	1203	118	239	1560	77	8	15
M2	5	379	6	390	1	97	2
M3	337	315	2208	2860	12	11	77
	1545	812	2453	4810			



**Table 3.** Discrimination of melodemes based on listeners' consensus, threshold  $\geq 60\%$ .

$\Sigma$ of items	Recognition consensus $\geq 60\%$					% of items	Recognition consensus $\geq 60\%$				
	Realization	M1	M2	M3	X		tot	Realization	M1	M2	M3
M1	9	1	0	2	12	M1	75	8	0	17	100
M2	0	3	0	0	3	M2	0	100	0	0	100
M3	1	26	18	1	22	M3	5	9	82	5	100
	10	812	18	3	37						100

The extent of the listeners' consensus on individual items may serve as another indicator of stability of the melodemes' functional role. We consider (arbitrarily) listener judgements to be consensual if at least 60% of the listeners agree on the type of melodeme. The results are shown in Table 3.

If the consensus threshold is set to 60% only three items (8.1% of the samples) are left undecided (column X of the table). In all three cases the answers vary between the declarative melodemes M1 and the non-final melodeme M3. If we raise the consensus threshold to 75%, as in the experiment on the read text mentioned above (Palková and Veroňková, 2004), nine items (18.9%) remain undecided.

Overall, this way of reviewing the test results also confirms the relevance of melodeme intonation contours in the material employed.

#### *4.2.2 Discussion: Confusion of melodemes in listeners' evaluation*

In the evaluation of the three melodemes there were 1020 judgments where individual listeners evaluated a particular melodic contour differently from the intended realization of the speaker (21.2%). (In the experiment on read speech it was less than 11%.)

The data in Table 3 also show that most of the items (81.1%) were evaluated both consensually among the listeners and in line with the original realization of the speaker (30 items with consensus  $\geq 60\%$ ). However, four items (10.8%) were evaluated with sufficient consensus among the listeners ( $\geq 60\%$ ) but differently from the speaker's intended realization. These samples prove that there is overlapping between contours of different melodemes when the contour is isolated from the support of broader context. As an unforeseen result, the realization of declarative or non-final utterances could appear to the listeners as a question.

The test material is not sufficiently balanced to allow for any general conclusions about the potential robustness of individual contours types in the perception of the listener. The restricted number of interrogative samples could somehow encourage listeners to assign other items to this type. Nevertheless, the listeners' agreement in the evaluation of individual cases is too high to dispute its value. The way Melodeme 2 is used seems to be symptomatic even with a limited number of samples. A true question is identified by the listeners with minimal variance (see Table 2). In speech with a certain degree of expressiveness and without the support of broader context, a contour of another melodeme may be understood as a question, too.

#### 4.2.3 Discussion: Confusion of melodemes in view of intonation contour analysis

Comparing contours that were judged contrary to the intention of the speaker with cases judged correctly supports the relevance of certain characteristics for discriminating melodeme contours mentioned in Section 2.5. Especially cases in which the contours of conclusive or non-final melodemes were mistaken for a question demand discussion.

The F0 course of individual samples is indicated schematically as a sequence of values of F0 in syllable sonority centers being displayed by two points for each syllable (with exceptions commented upon). The analysis of F0 was conducted in Praat (Boersma and Weenink, 2012). Each of the charts shows 2 contours with a partly similar course of F0; one of them was recognized in line with the intended realization of the speaker, the other was evaluated as a question. An interruption of the contour signals the division of the text into stress groups (SG). The melodeme-baring stress-groups are marked by filled points of contours.

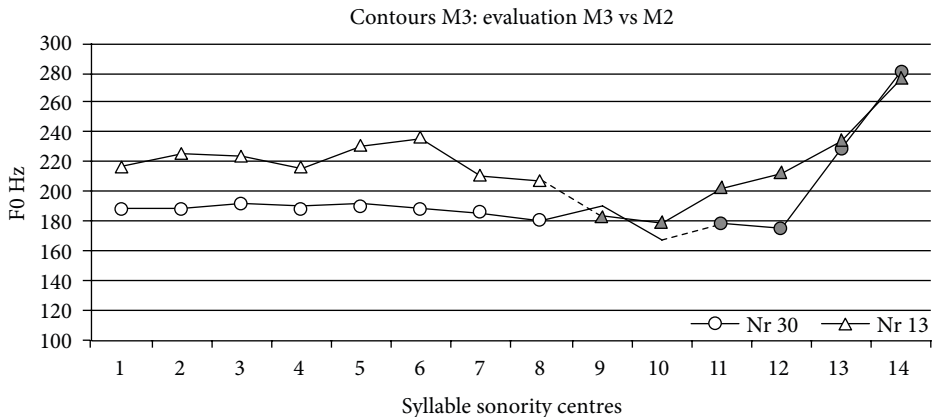
Perceptual evaluation of the selected samples is shown in Table 4. The number of listeners was enlarged for this purpose to 188, with results of a supplementary probe. Misinterpretations of the contour as questions are marked with grey background.

**Table 4.** Perceptual evaluation of the selected samples.

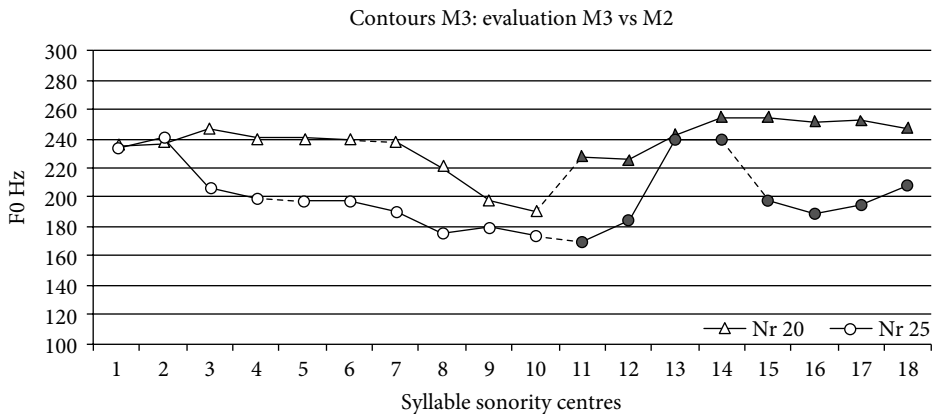
Nr.	n= 188 Realization	Listeners' judgement		
		M1%	M2%	M3%
13	M3	5	2	93
30	M3	5	71	24
20	M3	6	10	84
25	M3	6	79	15
19	M1	56	0	44
35	M1	4	87	9

a) In samples 13 and 30 the melodeme is realized on the last (i.e. second) SG of the intonation phrase. The polysyllabic melodeme in sample 13 holds a gradual rise of F0, which is characteristic for M3-a. Evaluation of sample 30 as a question is probably encouraged by the decrease of F0 in the first syllable of the (disyllabic) melodeme. The direction of the pitch changes similarly as in the contour M2-c, and promotes a stronger impression of pitch increase between the syllables, as in M2-a.

b) Samples 20 and 25 have the same number of syllables in the melodeme, but differ in the number of SGs. In sample 20 the melodeme is carried by the second (last) SG, which consists of a four-syllable word, the course is an example of variant M3-e, the word-order provides emphasis. Sample 25 has 4 SGs (syllables: 3-5-2-2, the syllables of the first two SGs are only represented by one point in the chart with the exception of their last syllables). The melodeme begins on the third (penultimate) SG, because it carries a narrow focus, with distinct expressivity. The question-like nature is strengthened by the significant rise on the second syllable of the melodeme (i.e. on the second syllable of the



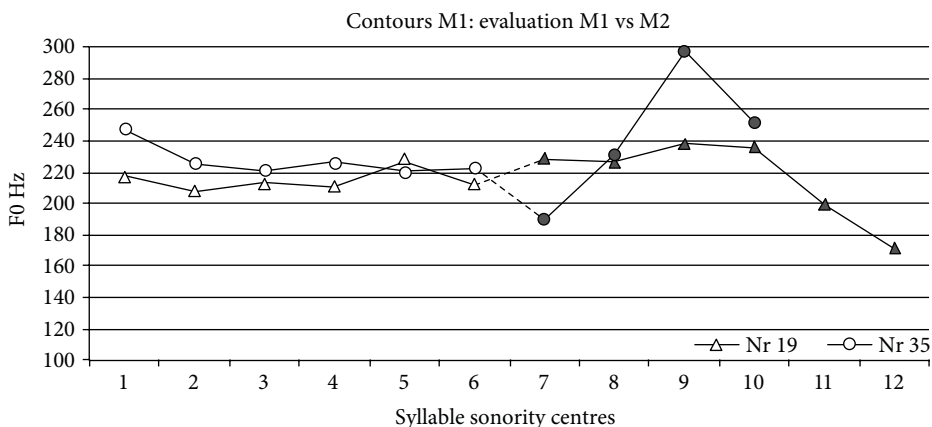
**Figure 6.** Example of inconclusive melodeme contour evaluated as question (No. 30)  
text 13 "... v nedalekém království..." ("... in a nearby kingdom ...")  
text 30 "... čarodějnický klobouk..." ("... a wizard's hat ...")



**Figure 7.** Example of inconclusive melodeme contour evaluated as question (No. 25)  
text 20: "... Honzovi se to podařilo..." ("... Honza succeeded in it ...")  
text 25: "... způsobil čarodějovi velkou škodu..." ("... caused great damage to the sorcerer ...")

penultimate SG) and the decrease in the fourth SG as a whole. The whole SG is reminiscent of the variant M2-d.

c) In samples 19 and 35 the melodeme is realized on the last (second) SG. Sample 19 can unequivocally be considered an M1 contour. This evaluation is probably reinforced by its apparently low ending below the F0 level of the whole unit. It corresponds most to the scheme M1-b. Uncertainty may arise from the fact that the decrease occurs as late as in the third syllable, which is similar to contours M3. Sample 35 is the variant M1-c by origin, which ends above the level of the whole unit in expressive speech. The impression of a question seems to be supported by a low pitch at the beginning of the melodeme,



**Figure 8.** Example of conclusive melodeme contour evaluated as question (No. 35)  
text 19: "... zkoušel to všelijak..." ("... tried it all kinds of ways ...")  
text 35: "... ty máš nos dlouhý..." ("... your nose is long ...")

a significant increase over the first syllable and a subsequent decline, but not sinking below the level of the whole. The contour is similar to the scheme M2-e.

### 4.3 Conclusion

The melodeme, a stabilized contour of F0 which serves as a means of communicating a particular type of attitudinal modality, is a relevant part of sentence intonation in Czech.

The comparison of abstract patterns representing in the traditional description variants of the three basic melodemes distinguishing declarative, interrogative and progredient modes suggests that overlaps between contours of various melodemes must be expected, in particular in a non-standard form of speech communication and in expressive or emotional speech conditions. Results of our present research support this hypothesis.

Confusion in listeners' perception of contours belonging to different melodemes shows the usefulness of a more detailed description of intonation patterns with the same function. Simultaneously, it confirmed the need to go in search of further features which will allow us to particularize the differences between contours of mutually diverse communicative value.

The results of the tests and the individual examples presented in this paper suggest that in common speech the listener's correct identification of the speaker's communicative attitude mediated by the melodeme is affected by speech qualities outside this part of intonation. Besides the commonly admitted aid of semantics, the influence of broader acoustic context appears important.

The melodeme is realized on a sub-section of the intonation phrase, most often on its last SG. But it is a feature bound to the whole utterance by its functional nature. Especially in expressive or emotional speech, the intonation in an utterance is often modified by sizeable changes F0 on the individual SGs throughout. To recognize the pragmatic inten-

tion of the speaker mediated by the melodeme, it is necessary that these fluctuations are relatively compensated on the background of pitch proportions in a longer section of text.

In our tests discussed above, the melodeme was presented only in the context of its intonation phrase. Evidently, in some cases the information passed to the listeners was insufficient. In earlier research examining the influence of the text length on melodeme stability in read speech, the intonation phrase was likewise used as the context (Palková and Veroňková-Janíková, 2004; Veroňková, 2008).

With respect to the results obtained in the present experiment under conditions more similar to common speech, the text to be observed needs enlargement. The proposal to follow sound stream of the whole utterance, namely an utterance composed of two intonation phrases at least, seems to be a suitable next step in our contemporary research.

### ACKNOWLEDGEMENTS

This study was supported by the Programme of Scientific Areas Development at Charles University in Prague (PRVOUK), subsection 10 – Linguistics: Social Group Variation.

---

### REFERENCES

- Beckman, M., Hirschberg, J. & Shattuck-Hufnagel, S. (2005). The original ToBI system and the Evolution of the ToBI Framework. In: S.-A. Ju (Ed.), *Prosodic Typology*. Oxford: Oxford University Press, pp. 9–54.
- Boersma, P. & Weenink, D. (2011). Praat: doing phonetics by computer [Computer program]. Version 5.3, retrieved on October 1, 2011 from <<http://www.praat.org>>.
- Brazil, D. (1997). *The communicative value of intonation in English*. Cambridge: Cambridge University Press.
- Coulthard, M. (1992). The significance of intonation in discourse. In: M. Coulthard, (Ed.), *Advances in spoken discourse analysis*. London – New York: Routledge, pp. 35–49.
- Cruttenden, A. (1997). *Intonation*. Second Edition. Cambridge: Cambridge University Press.
- Daneš, F. (1957). *Intonace a věta ve spisovné češtině*. Praha: Academia.
- Fox, A. (2007). *Prosodic features and prosodic structure*. Oxford: Oxford University Press.
- Gussenhoven, C. (2004). *The phonology of tone and intonation*. Cambridge: Cambridge University Press.
- Gussenhoven, C. (2006). Experimental approaches to establishing discreteness of intonational contrasts. In: S. Sudhoff et al. (Eds.), *Methods in empirical prosody research*. Berlin – NewYork: Walter de Gruyter, pp. 321–334.
- řHart, J., Collier, R. & Cohen, A. (1990). *A perceptual study of intonation. An experimental-phonetic approach to speech melody*. Cambridge: Cambridge University Press.
- Hirst, D. & Di Cristo, A. (1998). *Intonation systems*. Oxford: Oxford University Press.
- Chlumský, J. (1928). *Česká kvantita, melodie a přízvuk*. Praha: Česká akademie věd a umění.
- Kohler, K. (2006). Paradigms in experimental prosodic analysis. In: S. Sudhoff et al. (Eds.), *Methods in empirical prosody research*. Berlin – NewYork: Walter de Gruyter, pp. 123–152.
- Ladd, D. (1996). *Intonational phonology*. Cambridge: Cambridge University Press.
- Janíková, J. (2002a). Phonologically relevant F0-patterns and their limits in yes-no-questions and pro-gredient utterances in Czech. In: *Forum Phonetikum*, 70. Frankfurt am Main: Hector, pp. 51–67.
- Janíková, J. (2002b). Územní preference v percepci zjišťovací otázky. In: Z. Hladká & P. Karlík (Eds.), *Čeština – univerzália a specifika*, 4. Praha: Nakladatelství Lidové noviny, pp. 313–315.
- Petr, J. et al. (1986). *Mluvnice češtiny I*. Praha: Academia.

- Palková, Z. (1978). Zvukový aspekt kontextové vázanosti. *AUC, Slavica Pragensia XXI*, pp. 51–58.
- Palková, Z. (1994). *Fonetika a fonologie češtiny*. Praha: Karolinum.
- Palková, Z. (1997). Modelling intonation in Czech: Neutral vs. Marked TTS F0-Patterns. In: A. Botinis, G. Kouroupetroglou & G. Carayiannis (Eds.), *Intonation: Theory, Models and Applications*. Athens: ESCA a. University of Athens, pp. 267–270.
- Palková, Z. (2008). Stoupavoklesavá kontura F0 v současné češtině: Distribuce a funkce. In: *AUNC, Studia Slavica XI*, pp. 5–20.
- Palková, Z. & Janíková J. (1999). Positionally determined differences in F0-patterns validity in Czech. In: *Proceedings of 14th ICPhS. San Francisco: ISPhS*, pp. 1545–1548.
- Palková, Z. (2005). Výslovnost a intonace. In: A. Adamovičová et al. (Eds.), *Čeština jako cizí jazyk. Úroveň B2*, pp. 362–387. Praha: UK a MŠMT.
- Palková, Z. & Veroňková-Janíková, J. (2004). Influence of context to distinguish melodemes. In: R. Vích (Ed.), *Speech Processing, 13th Czech-German Workshop*. Praha: ÚRE AV ČR, pp. 53–58.
- Palková, Z. & Volín, J. (2006). Clause position within a sentence: Human vs machine recognition. In: *Proceedings of Speech Prosody*. Dresden: TUD, pp. 113–116.
- Petřík, S. (1938). *O hudební stránce středočeské věty*. Praha: FF UK.
- Pierrehumbert, J. (1980). *The phonology and phonetics of English intonation*. PhD thesis, MIT.
- Rietveld, T. & Chen, A. (2006). How to obtain and process perceptual judgements. In: S. Sudhoff et al. (Eds.), *Methods in empirical prosody research*. Berlin – NewYork: Walter de Gruyter, pp. 283–320.
- Rompotl, M. (1951). *K tónovému průběhu v mluvené češtině*. Praha: Královská česká společnost nauk.
- Rompotl, M. (1963). *Základy fonetiky*. Praha: SPN.
- Veroňková, J. (2006). *Rozdíly v průběhu základního tónu relevantní pro percepční rozlišování melodémů v češtině*. Doktorská disertační práce, FF UK, Praha.
- Veroňková, J. (2008). Vliv průběhu F0 prvního mluvnického taktu na určení melodému. *AUC Philologica 2, Phonetica Pragensia XI*, pp. 155–172.
- Volín, J. (2008). Variabilita neukončujících melodií ve světle shlukové analýzy. *AUC Philologica 2, Phonetica Pragensia XI*, pp. 172–179.
- Volín, J. (2010). *Fonetika a fonologie*. In: V. Cvrček et al. (Eds.), *Mluvnice současné češtiny (esp. § 4.5.4)*. Praha: Karolinum, pp. 35–64.

---

## STABILITA A ZÁMĚNY MELODÉMŮ V ŘEČI

### Resumé

Podstatnou částí intonace věty v češtině je tzv. melodém, stabilizovaná kontura F0, která je prostředkem pro vyjádření postojové modality a rozlišuje výpověď ukončenou, neukončenou a zjišťovací otázku. Jejím nositelem bývá poslední mluvnický takt promluvového úseku. Varianty jednotlivých melodémů jsou dostatečně odlišeny v teoretickém popisu i ve zvukové realitě neutrálních standardních projevů. V běžně mluvené řeči, zejména expresivní, však nelze vyloučit záměny. Příspěvek sleduje podobnosti mezi konturami odlišných melodémů a zvukové vlastnosti, které ovlivňují jejich rozpoznání. Výsledky percepční sondy dokládají možnost záměn mezi záměrem mluvčího a interpretací posluchače, zejména při minimalizaci kontextu, který má posluchač k dispozici.