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Intonation and prosodic systems

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1 Intonation and prosodic systems

Intonation, the occurrence of various tunes or melodies in utterances, is the result of the operation of a set of prosodic systems. Each language has a specific intonation system, and in a particular communicative situation, speakers of different languages may apply different tunes. The discussion of English intonation presented in section 1.1 is based on the traditional British ‘contour’ analysis, especially the conceptions presented by Crystal (1969), O’Connor and Arnold (1973), and Cruttenden (1986), who summarize and further develop some of the earlier intonation systems. The discussion of Czech intonation in section 1.2 draws mainly on Palková (1994), Daneš (1957) and two grammars of Czech: *Mluvnice češtiny 1* [A grammar of the Czech language] (Petr et al. 1986) and *Příruční mluvnice češtiny* [A handbook of Czech grammar 1] (Karlík et al. 1995). Section 1.3 deals with the correlation between the intonation systems of the two languages.

1.1 The intonation system of English

Crystal (1969: 5, 140, 195) views intonation as a complex of features from different prosodic systems; prosodic systems are defined as “non-segmental characteristics of speech referable to variations in pitch, loudness, duration and silence, other vocal effects being irrelevant to their identification”. Crystal lists the following prosodic systems: pitch direction (or tone), pitch range, pause, loudness, tempo, rhythmicality, and tension. Relevance of the prosodic systems listed above for the description of intonation decreases from the first to the last; the discussion of intonation in this survey will focus on the most relevant prosodic systems, i.e. pitch direction and pitch range, while other prosodic systems will receive less attention. Pause will be discussed in connection with speech segmentation (tone-unit identification); rhythmicality will be mentioned in connection with rhythm groups in Czech; loudness and tempo will not be described in detail, although their effects have been taken into consideration in the actual prosodic analysis of texts (for example the effect of tempo on the segmentation of utterances into tone units).

1.1.1 Identification of the tone unit

Connected speech is divided by means of intonation into tone units which are perceived by the listener as relatively complete. Crystal (1969: 204) defines a tone unit as “the most readily perceivable, recurrent, maximal functional unit to which linguistic meanings can be attached”. Tone units may correspond to clauses, but very often to smaller grammatical units, e.g. noun or adverbial phrases; a tone unit may consist of a single word. Different authors refer to tone units by different names. The expression tone-unit is used by Crystal;¹ Cruttenden uses the term intonation-groups; O’Connor and Arnold speak about tone groups and word groups, while other authors use the expressions sense-groups, breath-groups, phonological phrases, phonological clauses,

1 The same term (spelled without a hyphen, i.e. ‘tone unit’) is applied in Svartvik and Quirk 1979 and Svartvik 1990.

intonational phrases, and intonation units. This study makes use of the traditional term *tone unit*.

According to Crystal (1969: 204–207), a tone unit is a segment of speech identified phonologically as a unit containing one peak of prominence (a nucleus, a primary accent) and divided from neighbouring tone units by tone unit boundaries indicated by two phonetic factors – a pitch change following the nucleus and a slight pause. The pitch change takes the form of a step up (after falling tones), or a step down (after rising tones), at the beginning of a new tone unit to the natural level of the speaker's voice. The pitch change and the pause clearly identify tone unit boundaries in non-hurried speech; in fast, unprepared speech, however, identification of tone unit boundaries is sometimes ambiguous. In very fast and drawled sequences, the two indicators are less reliable: the pitch change at the beginning of a new tone unit may be difficult to detect, and a pause between tone units may be missing completely. On the other hand, pauses may occur *inside* tone units in the form of hesitation pauses. Hesitation pauses, however, differ from pauses between independent tone units in that the two sections divided by the hesitation pause do not contain two peaks of prosodic prominence. Crystal (1969: 206) and Cruttenden (1986: 39–40) suggest that the junctural pause is usually accompanied by segmental phonetic modifications, especially the lengthening of the last syllable (stressed or unstressed) before the pause. In the absence of a pause in fast speech, the lengthening may act as a pause substitute. As an additional boundary marker, Cruttenden (1986: 24, 39) mentions the presence of anacrusis, i.e. unstressed syllables produced at a very high speed at the beginning of a tone unit. A consideration of the internal structure of the tone unit (the obligatory presence of a nucleus) and the boundary markers (pitch change, pause and/or lengthening of the last syllable, and anacrusis) helps to disambiguate identification of the tone unit in difficult cases. Still, there are circumstances (e.g. in the sequence of a tone unit ending with a relatively long tail and a tone unit beginning with a series of low, unstressed syllables) in which a clear indication of the tone unit boundaries is impossible and grammatical or semantic criteria have to be considered (cf. Crystal 1969: 206–207). In such circumstances, different transcribers may each provide a different prosodic analysis of an utterance.² These ambiguous cases, however, represent a relatively small percentage.

1.1.2 *The internal structure of the tone unit*

According to Crystal (1969: 207), a tone unit must minimally consist of one syllable (one monosyllabic word) carrying a prosodically important stress (accent), i.e. the nuclear tone, or nucleus. The presence of the nucleus is essential for the identification of the tone unit and for the perception of the tone unit by the speaker as complete. A complete tone unit usually consists of a group of words. Crystal (1969: 207–235) distinguishes the following parts of a tone unit:

prehead – head – nucleus – tail

2 See for example the different indications of tone unit boundaries by the transcribers of the Spoken English Corpus (Pickering et al. 1993).

The *prehead* is a stretch of utterance preceding the first stressed and usually pitch prominent (i.e. accented) syllable (the onset) in a tone unit. The syllables of the pre-head are unstressed, but occasionally they may carry some slight degree of 'inherent' stress.

The *head* consists of an unspecified number of stressed and unstressed syllables. It stretches from the first stressed and usually pitch-prominent syllable of the tone unit (the onset) up to the nucleus.

The *nucleus* is the most prominent stress of the tone unit; it is usually perceived either as a pitch glide (with nuclei on monosyllabic words) or as a pitch jump (with nuclei on words consisting of more syllables). The pitch jump is functionally equivalent to a glide. An exception to the presence of a glide is the level nucleus (see below), which takes the form of a sustention on the accentual syllable of the most prominent word. Levels are functionally equivalent to glides.

The *tail* consists of stressed or unstressed syllables following the nucleus; these syllables continue the pitch movement of the nucleus.

The nucleus is the only obligatory part of a tone unit; all the other parts are optional. Below is an example of a tone unit containing the nucleus and all the optional parts (318) and a tone unit containing only the nucleus and the head (319). The examples are taken from text S.1.6 of the London-Lund Corpus (LLC), without prosodic transcription for the moment. 'B' is the indication of the speaker. Dashes show the boundaries between the individual parts of the tone units; the word carrying the nucleus is printed in capitals. The end of each tone unit is indicated by the symbol "#".

[1] (LLC: S.1.6)

B (318) I - went to this - OTHER - person#

B (319) some years - LATER#

O'Connor and Arnold's (1973: 7-28) description of the structure of the tone unit is very similar to Crystal's. The minor differences seem to be mostly terminological. O'Connor and Arnold, for instance, recognize an optional presence of *stressed* syllables in the prehead as opposed to Crystal's *unstressed* syllables occasionally containing a 'slight degree of inherent stress'. In Crystal's system, the first stressed syllable of a tone unit belongs to the head, while O'Connor and Arnold would consider it (if it is not accented; see below) part of the prehead. O'Connor and Arnold do not use the expression onset for the first prominent syllable of the head. In view of the level of refinement of the prosodic analysis applied in this study, the differences above can be neglected. Differences in the sphere of *types* of nuclei between O'Connor and Arnold, Crystal, and Cruttenden will be explained below.

1.1.3 Degrees of prosodic prominence

There seems to be general agreement among scholars concerning the hierarchy of the prosodic prominence of different types of stress within the tone unit. The lowest possible degree of prominence is (i) the absence of stress occurring in the prehead, head, and tail. A higher degree of prominence is represented by (ii) (unaccented) stress occurring in the prehead and the tail. The next degree of prominence is (iii) accented stress occurring in the head. The highest degree of prominence is represented by (iv) the nuclear accented stress, i.e. nucleus. The terminology under (i)-(iv) above is that

used by O'Connor and Arnold. The same scale of prosodic prominence is referred to by Crystal using the terms (i) unstressed/absence of stress, (ii) stress, (iii) pitch-prominent stress, and (iv) nucleus; and by Cruttenden using the terms (i) unstressed/absence of stress, (ii) tertiary stress, (iii) secondary stress/accent, and (iv) primary stress/accent, or nucleus. All the authors agree that the nucleus is usually the last accented syllable in a tone unit. Crystal often refers to 'accented' as 'pitch-prominent'. Here the expression 'accented' will be preferred.

The prosodic and functional analysis in this study will mainly be concerned with the behaviour of the nucleus. Section 1.1.4 below deals with different types of nuclei. Prosodic features of lesser prosodic (and functional) prominence occurring in the prehead, head and tail will not be discussed in detail and will only be referred to when necessary.

1.1.4 The nucleus

Crystal describes different types of nuclei within the prosodic systems of pitch direction (or tone) and pitch range. Within the system of pitch direction, he distinguishes the following basic types of simple, complex and compound nuclei:

<i>Simple</i>		<i>Complex</i>		<i>Compound</i>	
fall	\	fall-rise	∨	fall+rise	\+/
rise	/	rise-fall	∧	rise+fall	/+\
level	>				

In addition to the basic types of nuclei, Crystal (1969: 225) includes in the tone system the following secondary types of nuclei: rise-fall-rise \wedge/\vee , fall-rise-fall $\vee\wedge$, rise-fall+rise $\wedge+/\vee$, fall-rise+fall $\vee+/\wedge$, and fall+level $\wedge+>$.

The simple system of pitch range consists of seven degrees of pitch difference between the beginning-point of the nucleus and the preceding head:

zero	∅	continuance	>	booster	↑
drop	↓			high booster	↑↑
low drop	↓↓			extra-high booster	↑↑↑

Continuance indicates pitch height equivalent to that of the preceding pitch-prominent (i.e. accented) syllable; zero indicates a very slight drop, corresponding to declination, i.e. the general tendency for the end of a tone unit to be lower than the beginning of the tone unit (cf. Cruttenden 1986: 126, 167 and Volín 2004: 125–136); a drop is a more perceivable step-down; a low drop represents a considerable step-down. The three boosters indicate a slight, high, and extra-high step-up from the pitch height of the preceding head.

O'Connor and Arnold (1973) and Cruttenden (1986) use a less refined scale, especially in the sphere of pitch range. In their systems, pitch range is not determined in complex nuclei, and in the simple fall and the simple rise, the beginning of the tone is indicated within a scale of only two relative degrees: high and low. The level is considered to be always of a medium pitch and is referred to as mid-level. The combination of different types of pitch direction and pitch range gives a system of seven simple and complex nuclei:

high fall (∖)	fall-rise (∨)
low fall (∩)	rise-fall (∧)
high rise (∕)	mid-level (>)
low rise (∿)	

Compound nuclei are referred to by Cruttenden (1986: 61) as 'split' nuclei, i.e. as split fall-rises and split rise-falls. O'Connor and Arnold (1973) work with only one type of compound tone, the high fall followed by a low rise. The other type, the rise+fall tone is not part of their system. Crystal's rise+fall, however, resembles O'Connor and Arnold's high fall preceded by a rising head, and the only difference between the two systems thus seems to be the classification of the rising accented stress as nuclear (Crystal), or non-nuclear (O'Connor and Arnold). Correspondence between the differently classified patterns (rise+fall and rising head followed by high fall), however, has to be verified by the analysis of a sufficient number of examples.

1.1.5 The prosodic prominence of successive nuclei

It is agreed that in a sentence consisting of several tone units, the most prominent nuclear tone is the final one. Within one tone unit, there is by definition only one nucleus (cf. Crystal 1969: 209). The nucleus is usually the last accented stress in a tone unit. The structure of a sentence consisting of several tone units thus resembles the structure of a single tone unit in that there is a tendency for the last accented stress to become the peak of prominence of the whole language unit.

[2] (LLC: S.1.6)

B (485) if you ^TRANSLATED the 'words#

B (486) ^back literally 'into FR\ENCH#

B (487) you ^found the con'struction was P\ER'FECT#

The examples above from the LLC, text S.1.6, contain a slightly simplified version of the LLC prosodic transcription. The first accented syllable in each tone unit is marked with the onset (∧). The last accented syllable is marked with a nuclear tone (∖=fall, ∨=fall-rise), and the word containing this syllable is in capital letters. Other stressed syllables in each tone unit are marked with a stress (˘). The stressed syllables between the onset and the nucleus are accented, while those following the nucleus are unaccented. In all three tone units, the peak of prominence, the nucleus, is on the last accented word. The most prominent of the three successive nuclei is the last nucleus on *PERFECT*.

There are modifications to the tendency for the last accented stress to become the peak of prominence, occurring both at the level of the tone unit and the level of a sentence consisting of several tone units. One deviation occurs in tone units containing two nuclei in the form of compound nuclei. The basic types of compound nuclei are fall+rise and rise+fall; in the LLC, secondary types occur occasionally, e.g. fall+level. According to Crystal (1969: 219), the *phonetically* dominant element of the compound nucleus is usually the first, but the second element is the major *functional* element, determining the meaning of the whole tone. Referring to the prosodic prominence of split nuclei, Cruttenden (1986: 50, 51, 61) suggests that falls are usually more prominent than rises and therefore in a tone unit containing a fall+rise, the rise is downgraded, and the most prominent element, i.e. the nucleus, is the fall. This observation is in agreement with Halliday (1970: 38), and O'Connor and Arnold (1973: 82–88). O'Connor

and Arnold consider both elements of the compound tone (high fall+low rise) as nuclei, but view the rise as less prominent than the fall. A detailed account of the prosodic prominence of the low rise after a fall is given by Firbas (1980: 130). The first modification to the tendency for the last accented stress to become the peak of prominence is thus the occurrence of a low rise after a fall within one tone unit. Similar modification applies to a sentence containing a fall followed by a low rise in separate tone units (cf. Cruttenden 1986: 103–104 and Firbas 1980: 130). Below are examples of this modification within one tone unit (107) and within two tone units integrated in a sentence (161 and 162). The booster before *MOTHER* (:) and the high booster before *AIMING* (!) indicate the relatively high pitch of the falls; the absence of any boosters before *LIVES* and *WAY* indicates the relatively low pitch of the rises.

[3] (LLC: S.1.6)

A (106) it ^might have 'been 'Bel:size :P\ARK#

B (107) ^oh well !that's 'where his :M\OTHER L/IVES#

[4] (LLC: S.1.6)

A (161) be^cause they're not "!\AIMING at so 'much#

A (162) in a ^W/WAY#

Firbas (1985: 20) suggests that a low rise 'loses' its prosodic prominence even when preceded by a fall-rise.

A second modification to the tendency is reported by Firbas (1980: 130) and Cruttenden (1986: 49–50). It concerns the sequence of 'parallel nuclei', usually two falls, in which the pitch range of the second fall is (at least slightly) narrower than that of the first one.

[5] (LLC: S.1.6)

B (7) IM^M\EDIATELY BEF/ORE#

B (8) I was ^teaching in a !SCH\OOL .{in ^EGYPT}#

In tone unit (8) the booster (!) before *SCHOOL* indicates the relatively high pitch of the fall. The pitch range of the fall on *SCHOOL* is wider than the pitch range of the fall on *EGYPT*; *EGYPT* is not marked with a booster because its pitch is relatively low. The transcription of the LLC uses braces to indicate subordinate tone units and hence subordinate nuclei.

1.2 The intonation system of Czech

The brief summary of the intonation system of Czech presented in this chapter demonstrates the approach of Czech linguists to intonation, and introduces the traditional terminology used in Czech intonation studies. Sections 1.2.1–1.2.5 deal with concepts parallel to those dealt with in sections 1.1.1–1.1.5 above.

Descriptions of the Czech intonation system by most Czech authors work with a three level hierarchy of linear units:

(i) syllable

(ii) rhythm group/stress group [přízvukový takt]

(iii) utterance unit [promluvo­vý úsek, výpovědní úsek, kólon]

[10]

'Usedl 'ke_stolu.

['He-sat-down 'at_the-table.]

The rhythm group is the smallest unit through which rhythmical qualities of speech can be realized. The largest unit of speech realizing the rhythmical qualities of a language is (iii) the utterance unit [promluvový úsek, výpovědní úsek], also referred to as 'sentence unit' [větný úsek] or 'colon' [kólon]. In descriptions of Czech intonation, the utterance unit is described as a group of rhythm groups unified through a certain type of pitch movement.

1.2.1 Identification of the utterance unit

Each utterance unit contains a peak of prominence referred to as the 'intonation centre' or 'sentence stress'. Utterance unit boundaries are signalled especially by a pause and a particular type of pitch movement referred to as 'cadence', 'intoneem' or 'melodeem' [kadence, intoném, melodém]. The intonation centre most usually occurs on the last rhythm group of an utterance unit. One utterance unit contains one peak of prominence; however, Palková (1994: 290, 305) argues, that in certain cases two or more peaks may be identified within one unit.

1.2.2 The internal structure of the utterance unit

The utterance unit consists of a certain number of rhythm groups. The focus of the examination of the internal structure of the tone unit in Czech intonation studies is on the identification of the size of an utterance unit in terms of the number of rhythm groups, number of syllables and duration in time. Daneš (1957: 14) suggests that speakers of Czech have a tendency to segment their speech after pronouncing nine to eleven syllables. Experiments carried out by Palková (cf. Palková 1994: 292–294) demonstrate that most utterance units consist of two or three rhythm groups, and the average number of syllables in one utterance unit is six to seven. The materials applied in these experiments were a scripted text read aloud by non-professional readers, and unprepared monologues.

In most studies of Czech intonation, the segmentation of texts into utterance units is related primarily to the syntactic and semantic structure of the utterance.

1.2.3 Degrees of prosodic prominence

Most Czech intonation studies do not explicitly mention any *scale* of prosodic prominence for prosodic features. However, they acknowledge the scale by distinguishing different types of stress: 'absence of stress', 'word stress', 'main stress', 'secondary stress', 'intonation centre' and 'sentence stress'.

Word stress or main stress occurs on the first syllable of each isolated word. In connected speech, some words become unstressed and are linked with a neighbouring stressed word to form a rhythm group (cf. section 1.2). Word stress or main stress is thus under certain conditions equivalent to the stressed syllable of the rhythm group. In addition to the main stress, longer words may carry (on each alternate syllable) a secondary stress [vedlejší přízvuk]. Secondary stress, however, is only realized in slow speech and its role is rhythmical, not phonological (cf. Krčmová 1995: 47). Since

rhythmicality will not be examined in this study, the existence of secondary stress will be ignored. Main stress or word stress will be referred to as ‘stress’ or ‘accented stress’.

The expression ‘intonation centre’ is used by Daneš (1957) and Krčmová (1995) to refer to the most prominent stress within an utterance unit; each utterance unit contains one intonation centre. Firbas (1992) applies the same expression to the most prominent accented stress within the distributional field/subfield of a sentence, which can contain one or *more* utterance units (for ‘distributional field’ see section 2.1); each distributional field/subfield contains one intonation centre. Dokulil (1986) works with the former concept of intonation centre, but denotes it as ‘sentence stress’.

The scale of prosodic prominence which most authors dealing with Czech intonation seem to distinguish has three degrees:

- (i) absence of stress
- (ii) stress (main stress, word stress)
- (iii) intonation centre (sentence stress)

1.2.4 The intonation centre

The intonation centre as the most prominent stress within an utterance unit most often corresponds to the stressed syllable of the last rhythm group of the utterance unit. The intonation centre indicates the most prominent word(s) in an utterance unit by prosodic means. Other means of indicating prominence are lexical and, especially important in Czech, syntactic – i.e. word-order. The intonation centre is marked by a certain melodic cadence (tone pattern) which starts on the intonation centre and extends over the whole rhythm group. In monosyllabic intonation-centre rhythm groups, the pattern starts and finishes on the one stressed syllable. According to Palková (1994: 161), the most important characteristics of the intonation cadence are the direction of the pitch changes, their position in the entire intonation pattern [intonací průběh] and the interval of the pitch difference. Other characteristics e.g. dynamic changes and changes in tempo and rhythm are of lesser importance.

Palková (1994: 307–317) identifies three basic types of melody in Czech (cf. also Daneš 1957, Dokulil 1986, and Krčmová 1995):

- (i) terminal falling melody (M1)
- (ii) terminal rising melody (M2)
- (iii) non-terminal rising melody (M3)

Terminal melodies are used in utterance units which conclude the sentence. The terminal falling melody (M1) occurs in declarative and imperative sentences and wh-questions. The terminal rising melody (M2) is used in yes-no questions. The non-terminal rising melody (M3) is used in tone units (clauses or sentence elements) occurring in a medial position; the melody indicates further continuation of the sentence in subsequent tone units.

For each of the melodies there are (at least) three realization variants. One of the marked variants of the terminal rising melody M2, cadence M2-3, is described by Palková (1994: 313) as marked terminal ‘rising’ cadence in which the rise characterizing a question is shifted to the first syllable of the rhythm group. Since the result of this shift is in fact a *falling* cadence (see figure under M2-3 below), I refer to it below

as ‘falling’. One of the marked variants of the rising melody M3, semicadence M3-3 is described by Palková (1994: 314) as marked non-terminal ‘falling’ semicadence. I observe Palková’s terminology in this case because the semicadence is indeed *falling* (see figures under M3-3a and M3-3b). Rising and rising-falling cadences in yes-no questions are referred to by Krčmová (1995: 51) as ‘anticadences’.

M1:

- (i) unmarked terminal falling cadence (M1-1)
- (ii) marked terminal falling cadence (M1-2)
- (iii) marked terminal rising-falling cadence (M1-3)

M2:

- (i) unmarked terminal rising cadence (M2-1)
- (ii) marked terminal rising-falling cadence (M2-2)
- (iii) marked terminal falling cadence (M2-3)

M3:

- (i) unmarked non-terminal rising semicadence (M3-1)
- (ii) marked non-terminal rising semicadence (M3-2)
- (iii) marked non-terminal falling semicadence (M3-3)

In Czech grammars and studies in intonation, different cadence types are indicated in a graphical manner *below* the text rather than by tonetic marks within the text, as is the case in English. In the examples below, one modification of such a graphical system (based on Palková 1994: 309–315) is used to illustrate the melodies listed above; these examples demonstrate the realizations of one sentence in the different cadence subtypes of M1, M2, and M3. Full stops indicate syllables (stressed or unstressed) preceding the cadence; dashes indicate the syllables of the word (or rhythm group) on which the cadence is realized. The intonation centre is on the first syllable of the cadence.

[11]

Vrátil se do Prahy.

[He-returned (refl.) to Prague.]

M1-1

· · ·
-
-
-

M1-2

· · · -
- -

M1-3

· · -
- -

[12]

Vrátil se do Prahy?

[Did-he-return (refl.) to Prague?]

M2-1

· · · -
- -

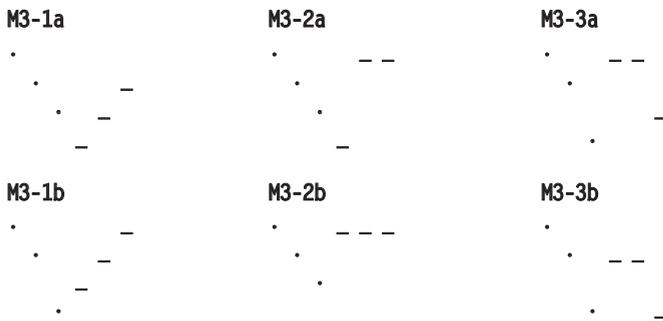
M2-2

· · · -
- -

M2-3

-
-
· · ·

[13]
 Vrátil se do Prahy, (protože)
 [He-returned (refl.) to Prague (because)]



1.2.5 The prosodic prominence of successive intonation centres

Sequences of intonation centres and their prominence are in Czech studies considered in close connection with the more general questions of functional sentence perspective (FSP) and word order. Word order in Czech is relatively flexible and is determined by the tendency to exhibit a gradual rise in the communicative importance of language units from the beginning to the end of a sentence. The most prominent language unit tends to occur in the final position. In a sentence which is prosodically divided into two or more utterance units that each contain an intonation centre, as well as in an utterance unit containing more peaks of prominence, it is the last one that is considered to be the most prominent. The occurrence of two or more peaks of prosodic prominence within one utterance unit is mentioned by Palková (1994: 290, 305), who provides a description of contextual conditions evoking two peaks of prominence, but does not raise the question of the hierarchy of the two peaks. The examples that Palková (1994: 305) uses (see below), however, suggest that the intonation centre is the one closer to the end of an utterance unit. The two peaks are indicated by quotation marks.

[14]
 "Jeden cestoval "vlakem
 "druhý přijel "na kole
 "třetí dokonce přiletěl vlastní "helikoptérou

["One travelled "by-train
 "one came "on a-bike
 "the-third-one even came in-his-own "helicopter]

The concept of two peaks of prominence occurring within one tone unit in Czech resembles the concept of compound nuclei in English. The correspondence of the two patterns, however, requires a closer examination of a sufficient number of examples.

1.3 Common features of the English and Czech intonation systems

The chapters above have presented the different approaches of English and Czech scholars to the study of intonation. The two approaches are marked by different levels of refinement in the analysis of prosodic patterns and the use of different methods of transcription.

English prosodic patterns have been studied in detail and refined transcription systems have been developed. English prosodic transcription reflects the four-degree scale of prosodic prominence, i.e. absence of stress, unaccented stress, accented stress, and nuclear stress. The English transcription systems are suitable for the transcription of large text corpora; the tonetic marks are incorporated into the text and do not require extra space. Large text corpora containing prosodic transcription are available for linguistic research, e.g. *A Corpus of English Conversation* (Svartvik and Quirk 1980) and its computerized version, the London-Lund Corpus, or the Lancaster IBM Spoken English Corpus.

Studies in Czech intonation focus on the analysis of the rhythm of speech and the identification of the pitch movement of the most prominent stress in an utterance unit. Less prominent types of stress have not been studied in detail. Czech intonation studies work with a three-degree scale of prosodic prominence, i.e. absence of stress, stress, and intonation centre. Most Czech transcription systems use a graphical method of indicating the pitch of syllables (see section 1.2.4), which requires extra space below the text; the method is therefore not suitable for the transcription of large texts. A more economic transcription system, incorporating tonetic marks in the actual text, has been applied by Müllerová et al. (1992).³

In spite of the differences between the two intonation systems, comparison is certainly possible (cf. Chamonikolasová 1997, and 2000). The present analysis draws on the common features of the English and Czech intonation systems as described by Crystal (1969), Cruttenden (1986), O'Connor and Arnold (1973), Daneš (1957), Dokulil (1986), Palková (1994), and Krčmová (1995). The focus of the prosodic analysis is on the identification and description of (i) the basic prosodic unit through which different melodies are realized in both intonation systems and (ii) the most prominent prosodic feature within this unit. The transcription method, which is a modified version of the prosodic transcription used by Cruttenden (1986), will be described in Chapter 3.

The basic unit of speech that the English intonation system works with is the 'tone unit', internally subdivided into prehead, head, nucleus, and tail. A parallel concept in the Czech intonation system is the 'utterance unit' (promluvový úsek, výpovědní úsek), internally subdivided into rhythm groups (přízvukový takt). The English tone unit is identified by the same characteristics as the Czech utterance unit (i.e. the presence of a peak of prominence and identically described signals of unit boundaries, cf. sections 1.1.1 and 1.2.1), but there is no direct correspondence between the internal subdivision of the tone unit and the subdivision of the utterance unit. English studies do not pay as much attention to rhythmicity and the concept of rhythm groups as do Czech studies; and Czech studies in turn do not work with the concepts of prehead, head and tail. The common features of the internal structure of the 'tone unit' and the 'utterance unit' is the presence of the peak of prominence. The identification of the 'nucleus' corresponds exactly to the identification of the Czech concept of the 'intonation centre' or 'cadence'. A close observation of the Czech cadence types (cf. section 1.2.4) suggests that they are identical with the types of English nuclei: the cadence in

3 This transcription, however, is limited to the indication of pauses and of the main direction of pitch movement. No distinction is made between junctural and hesitation pauses, and utterance unit boundaries are not clearly indicated.

melody M1-1, for instance, can be referred to as a low fall, the cadence in melody M1-2 as a high rise; M2-1 contains a low rise, M2-2 a rise-fall, and the cadence in M3-2b represents a level tone. The present analysis will naturally focus on the comparison of the phenomena shared by the two intonation systems, i.e. the segmentation of speech into tone or utterance units and the pitch movement of the nucleus or the cadence. The distribution of the other, less prominent, types of stress will not be studied systematically because there is no clear correspondence between the English and Czech theoretical backgrounds for their analysis. For the sake of clarity, English terminology, i.e. the expressions 'tone unit' and 'nucleus', will in subsequent chapters be applied to the description of both English and Czech materials. The expression 'nucleus' corresponds to 'intonation centre' as described by Daneš (1957) and Krčmová (1995): it denotes the most prominent accent within the *tone unit*. The most prominent accent within the *distributional field* (cf. section 2.1), i.e. Firbas's (e.g. 1992) concept of intonation centre, will be referred to as 'intonation centre nucleus'.