

Contrastive elements in Romanian declarative contours

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Abstract

The paper presents an intonational analysis of several Romanian declarative contours by using a functional account of the prosodic words and phrases at the communicative act level. The functional prosodic words and phrases transform the corresponding word(s) into constituents of communicative units. The intonational forms of communicative unit constituents bear functions at the information structure level. The intonational analysis has a functional description component which applies functions at information structure level to constituents of communicative units at any level of the utterance tree.

Keywords: Communicative units; information structure, topic, focus.

1 Introduction

In this paper we analyze the Romanian utterances from the communicative act perspective aiming to transform them into hierarchies of communicative units (CUs) each of them having their own Information Structure (IS). At the utterance level the intonation rebuilds (updates) the structure of the text by partially transferring the syntactic relations to the communicative level. The intonation contour of utterance transforms the word sequences into hierarchies of local and global relations between words, by using different prosodic marks for uttering them. Usually, intonational analyses are focused on identifying pitch accents, edge tones and break indices in order to characterize accentuation and phrasing elements and they are not interested in analysing hierarchies

of these relations between words, conveyed by prosody. These relations are communicative units at the utterance level. The characterization of communicative units can be made by information structure descriptions at each level of utterance tree hierarchy. We consider that prosody supports the communicative organization of utterances. Consequently, intonational analyses have to identify the communicative units and their functional elements at the information structure level.

In our previous works [8], [7], [9] we also treated hierarchies within utterances strictly at the intonational level as prosodic unit hierarchies but we observed that each prosodic phrase is produced by a tonal contrast between two complementary functional constituents marked by certain types of melodic contours: e.g. PUSH function was related to constituent which reaches high target tone within the respective prosodic unit (on the accented syllables) and POP function was applied to the tonal contrasted constituent having lower tonal target. We considered the PUSH constituents have function in pushing forward the communicative act but other discourse function has to be investigated and related to these contrasted elements.

In [9] we based the definition of prosodic units on the existence of a tonal contrast between these two paired constituents: PUSH and POP. That is different from the perspective of AM model implemented by ToBI system which relates the existence of prosodic units to break indices in their ends. We also introduced FOCUS function for semantic focused element annotation and thus, derived PUSH+FOCUS or POP+FOCUS functions result in our functional utterance descriptions. What it was not observed in our previous approach is the existence of two types of contrast within each prosodic unit: a tonal contrast between target tones of the two paired constituents and another contrast between the slopes and shape of F0 contour variations within contrasted constituents. The second type of contrast supports the topic-focus information structure and the former one is related to a second IS level that implies other discourse functions we named in this paper PUSH and POP function, respectively.

The goal of this paper is to propose an utterance partitioning model based on communicative unit hierarchies, each of units having their

proper information structure (IS). Information Structure model has two levels related to the two types of contrasts. The Halliday's IS model is also a two level model. It defines one IS level by the contrast between a foreground component (focus) and a background component of an information unit. We consider the focus-background IS description is suitable in the particular case of a very prominent prosodic component vs. non-prominent prosodic element, but in the most general case the contrast is produced between a focus constituent and a topic constituent, both of them having moderate prominences [6].

The second IS level of the Halliday's model refers to the theme and rheme aspects related to text organization. We consider the second IS level of our model has to be related to a certain aspect of the speech mechanism for supporting a certain discourse function and not to certain aspects of text organization. The second IS level is supported at the intonational level by the contrast between target tones of paired constituents.

The paper presents an intonational analysis framework which includes an information structure view and a phonological view in utterance partitioning. The first view takes into account the melodic contour shapes of elementary units (prosodic words) with their target tone and slope and shape characterization and relates them to the functions they have within CUs. The second view takes into account the pitch events within the prosodic units in order to understand the phonological/phonetic implementation of the functional constituents. Consequently, we added a functional perspective to the AM model and to the ToBI system [12], [11], [10], [1] in order to understand and to describe the role of intonation at the communicative act level.

In the second section we present the functional categories proposed for the intonational and IS analysis. In the third section the functional analysis is exemplified by presenting several declarative contours of Romanian neutral statements from these two perspectives: i. as sequences of pitch events and ii. as paired IS functional constituents within nested communicative units.

2 Functional categories at the communicative act level

The intonational analysis presented in this paper transforms utterances into hierarchical CU structures which include local contrast at each CU level between the constituents marked with complementary functions.

The topic and focus functions are two paired functions supported by the two constituents of one CU. The topic and focus function distribution between CU components conveys the role of the related words within different semantic and IS context: e.g. old vs. new information context. The topic-focus constituents can be marked by a slow vs. sharp pitch movements during their accented syllables or the following non-accented syllables. The focus event may or may not be prosodically marked by a tonal prominence because a second IS level overlaps the topic-focus structure and focus realization is influenced by the distribution of PUSH or POP functions within the respective CU.

In this paper we do not want to propose any significance to the PUSH and POP functions of the second IS level. We keep the name used in our previous papers and relate them to the tonal contrast between the target tones of the two paired constituents of CU: PUSH function is applied to the component with the higher target tone and POP function – to the other one containing the tonal minimum.

The proposed analysis organises an utterance into a CU hierarchy which is composed of instances of a single type domain (CU domain). CU domain may be intonational phrase (IP) or intermediate phrase (ip) or Compound Prosodic Domain (CPD): compound of prosodic words, compound of ips or compound of IPs. CPD is introduced in [11] for denoting the prosodic domain of units of the same type as the prosodic domain of their constituents: e.g. two contrasted prosodic words may produce a CU which is not an ip but it can be considered a compound of prosodic words.

The description of information structure consists of a sequence of functional labels that corresponds to CU constituents. In all descriptions presented in this paper topic and focus constituents are annotated by T and F labels and the PUSH and POP function by PH and PO

labels, respectively. Each constituent has two functions at the two IS levels and is annotated by a composed label resulted by linking two simple labels by “+” and enclosing them between round parentheses. Each CU is described by a sequence of two composed labels separated by slash.

Nested IS partitions can appear in our utterance partitioning due to the corresponding nested CUs instances within the utterance hierarchy.

3 A Functional analysis of Romanian declarative contours

The sentences used for generating the declarative contours for the functional analysis were selected from [5], where they are used to exemplify the relation between focus, prosody and word order in Romanian. The statements as well as the questions which have elicited them were uttered by a female speaker.

3.1 Short broad focus statement

The intonation of a short neutral statement in Romanian has a rising-falling pattern in an asymmetrical form with a lower falling pitch movement target tone than the tone in the beginning of the rising movement [3].

Fig. 1 illustrates the F0 contours of one neutral statement with a VO syntactic structure. It is the answers of the question (1).

- Ce este zgomotul acesta?* (1)
[What’s that noise?]
PLÂNge copilul.
[The baby is crying.]

The contour is an intonational phrase (IP) with two prosodic words (PWs). The rising movement during the first accented syllable *plân* in Fig. 1 aligns the peak with the post-focal syllable of the first word. The tonal jump before the post-focal syllable and the constant level during this syllable apply a focus function on the verb.

The slow fall during the $H + L^*$ pitch accent applies a topic function on the last word. Both words bear new information but the sentence-initial one bears the focus within the CU produced by the utterance. The contour in Fig. 1 is described in (2). In the indices position of each composed label we added a ToBI description of the corresponding melodic contour.

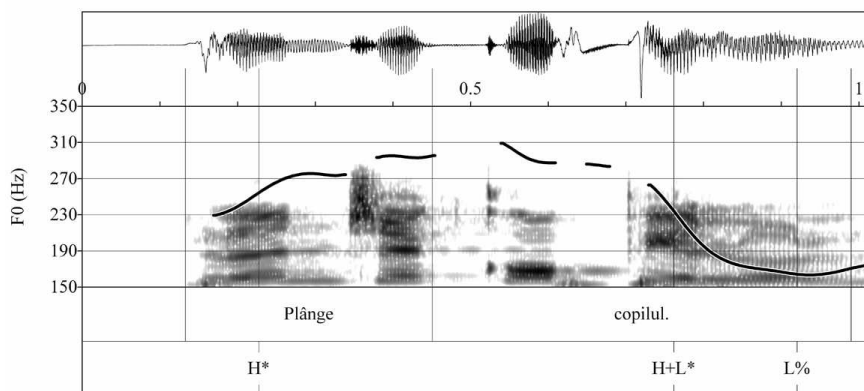


Figure 1. The F0 contour and the spectrogram of the utterance of the sentence *PLÂNge coPILul.* ‘The baby is crying.’

$$(PH + F)_{H^*} / (PO + T)_{H+L^*L\%} \quad (2)$$

In this case the contrast within CU is produced by the abrupt rising pitch movement after the first accented syllable during the H^* pitch accent and the slow falling pitch movement of the $H + L^*$ during the last prosodic word.

The $H^*/H + L^*$ pitch accent sequence describes Romanian broad focus statements [4]. This pitch accent sequence leads to a PUSH function on the first constituent and POP function on the last. The last pitch accent produces a low prominence and the last word bears the nuclear accent in Romanian broad focus statements.

3.2 Neutral statement with old-new information structure

The neutral statement (3) has a single word bearing new information (*DANEZA* ‘Danish’). The F0 contour extracted from an utterance of this sentence is illustrated in Fig. 2.

Ce limbă vorbește bine ? (3)
 [Which language does he speak well?]
VorBEȘte BIne daNEza.
 [He speaks Danish well]

The F0 contour of the initial prosodic word (PW) of the verb has a high target tone followed by an abrupt fall on the last non-accented syllable down to beginning low tone level. This melodic characteristic gives it a focus function within the CU which includes the verb and the adverbial *bine* ‘well’. Both verb and adverbial bear old information at the discourse level. At this local CU level, the verb is the focus element and the adverbial is the topic element. The topic function is signalled by the acoustic cue of slow rising pitch movement after the accented syllable. The end of pitch movement is synchronized with the end of the last non-accented syllable.

The word *daneza* ‘Danish’ bears the new information at the discourse level. Its F0 pattern has an abrupt falling pitch movement (H^* pitch accent) and thus it carries the global focus at IS level. The highest level of the last pitch accent within the utterance gives it a PUSH function at the global CU level. The functional description is given in relation (4).

$$\{ \{ (PH + F)_{H^*} / (PO + T)_{L+ < H^*} \}_{(PO+T)} / (PH + F)_{H^*L\%} \} \quad (4)$$

At the local level of the embedded CU the tonal level during the first half of the accented syllable of the adverbial is lower than that reached during the first part of the accented syllable of the verb. Consequently, a POP function is applied to the adverbial. The nuclear accent within the embedded CU is on the adverbial and it is also the global nuclear

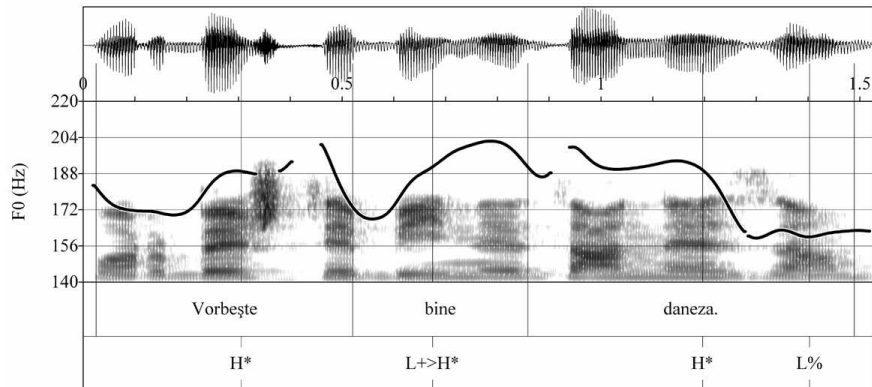


Figure 2. The F0 contour and the spectrogram of the utterance of the sentence *Vorbeste bine daneza.* ‘He speaks Danish well’.

accent because it is related to the minimum tonal level of the utterance. This CU can be atomized and labelled by $(PO + T)$. It is in contrast with $(PH + F)$ constituent of the object *daneza*.

The contour presented in Fig. 2 confirms that in Romanian old-new information statements the focus corresponds to the word which bears new information [2].

3.3 Neutral all-new statement

The statement in (5) is a long all-new sentence with a SVO_1O_2 structure. The communicative structure of the utterance consists of a two level hierarchy (two nested CUs) leading to local and global topic and focus events within the utterance.

- Ce se întâmplă în bucătărie?* (5)
 [What’s going on in the kitchen?]
MaRIa face o prăjiTURă pentru GEORge. [Mary is baking a cake for George.] ‘

The F0 contour in Fig. 3 shows that the constituent of the subject *Maria* makes pair with a complex constituent of the verbal phrase, at

the global CU level. The topic function of the subject is encoded by the $L + H^*$ pitch accent during its accented syllable and is located in a separate phrase (an intermediate phrase). In [5] it is also claimed that topic elements may be located in a separate phrase.

In the case of the utterance in Fig. 3 the first ip isolates the topic constituent and the global focus is located in the following complex constituent. In (6) the subject is annotated by T partial label (within $PH + T$ label) and the complex constituent by F partial label (within $PO + F$ label). The global PUSH function is due to the high target tone during the first accented syllable and global POP function is produced by the lowest target tone of the utterance during the last accented syllables.

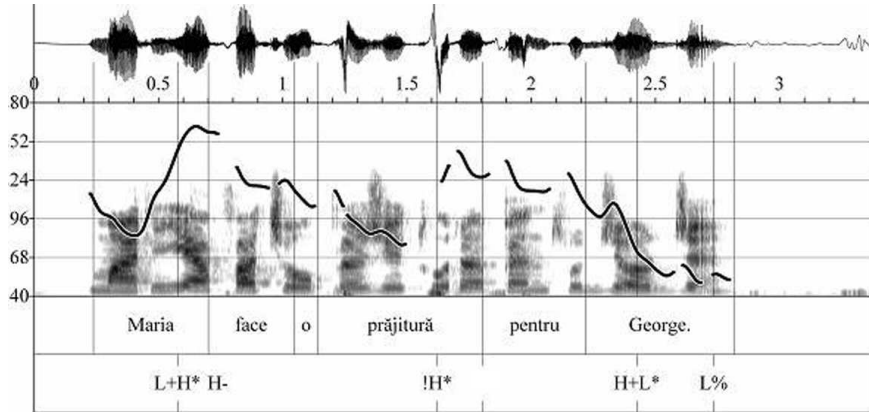


Figure 3. The F0 contour and the spectrogram of the sentence *MaRIa FAce o prăjiTURă pentru GEORge.* ('Mary is baking a cake for George')

$$\begin{aligned} & \{(PH + T)_{L+H^*H-} / \{ \{ (PO + F)_{!H^*} / (PH + T)_{H^*} \}_{(PH+T)} / \\ & \{ (PH + T) / (PO + F)_{H+L^*L\%} \}_{PO+F} \}_{PO+F} \end{aligned} \quad (6)$$

The complex right constituent includes the verb, the O_1 object and O_2 object which are uttered at lower target levels than the subject.

It is compound by two complex constituents (CUs): i. the left CU of the verb and O_1 object (*face / o prăjitură*); ii. the right CU of the preposition *pentru* and the O_2 object (*George*). The left CU contains the topic at the local level of verbal phrase and the right CU contains the focus element. They are annotated by $PH + T$ and $PO + F$ labels, respectively, in (6) in the index position.

At its turn the left CU has a focus on the verb (*face*) due to the constant pitch level of its pitch movement. The noun bears a topic function marked by keeping high tone during the last syllable after the high target tone is reached. It also bears a PUSH function due to its highest target tone. The topic element of O_1 object is more prominent and it bears the nuclear accent. Consequently, the left CU is also a $PH + T$ constituent at the higher level of the verbal phrase.

The right CU (*pentru / George*) within the CU of the verbal phrase is a focus constituent and has the following two constituents: i. the preposition (*pentru*), which bears a topic function at this local level due to its slow downstepped pitch movement; O_2 object (*George*) which has a focus function marked by the abrupt falling pitch movement. The O_2 object also bears a POP function due to its minimum tonal level. The nuclear function of the last accent of O_2 object gives a POP function to the whole right part of the verbal phrase constituent. Thus, the higher level CU having the left CU and the right CU as constituents is the complementary $PO + F$ constituent of the subject within the global utterance level.

As observed in [5] in Fig. 3 the contour is declining, with compression of the pitch range. The last pitch accent is the nuclear accent of the utterance having the minimum level for its target tone.

These examples illustrate how complex utterances can be partitioned by means of a CU hierarchy. CUs are partitioned by their topic-focus and PUSH-POP information structure.

4 Conclusions

In this paper we propose an improved framework for the intonation contour analysis by adding to the phonological annotation a functional

description of local and global communicative units. We introduced the term of communicative unit in order to relate it to information structure. CUs are units produced during cognitive process while the prosodic units are produced by information packaging process during the utterance of text. There are cases when CUs overlap prosodic phrases. This view permits a Romanian utterance analysis at the communicative level in relation to the phonological events.

The goal of this paper is to present how utterances can be partitioned into a hierarchy of communicative units. At each level CUs have their own topic-focus and PUSH-POP information structure. The topic and focus functions are discussed at the pragmatic level and we illustrate their relation to the semantic significance: e.g. in the statement (3) the word *daneza* is marked as global focus at the pragmatic level as it is described in (4) but it may be also thought as one element of a set of alternatives related to the question (3).

The PUSH and POP functions are discussed in this paper only at the pragmatic level and they are related to the contrast between the target tones of CU constituents. At the semantic level the PUSH and POP functions have to convey the aboutness principle formulated for IS at the text level. A pragmatic implementation of this function has to be found in the further work.

This utterance view of nested CUs and their corresponding nested partitions of Information Structure can potentially describe any utterance partitioning more accurately, based on its intonation contour interpretation. The logic of utterance organization can be understood by identifying all paired constituents, their hierarchical organization and their local and global information structure.

The description of utterances as a hierarchical CU and IS structures can shed new light within cross-linguistic analyses of intonational contours and more particular, on the discussion concerning focus position, nuclear accent position within prosodic phrases. This model can be a basis for defining the set of the phonological categories of pitch accents by understanding their F0 patterns in respect to their IS functions. Common features and different features can be deduced for equivalent contours of different languages implied in cross-linguistic analysis.

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