A COMMON VIEW ON BROAD AND CONTRASTIVE FOCUS EVENTS

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Abstract: This paper proposes a cognitive view on sentence stress patterns to discuss focus elements in both broad and narrow focus contexts. The cognitive perspective is based on the hypothesis that prosodic phrases correspond at the cortical level to cognitive binary relations between speech objects of utterances. On this view, cognitive relations are produced by a generic information packaging (IPk) mechanism that pairs constituents with different cognitive functions. At the utterance level, cognitive relations are implemented by prosodic phrases (relations) where different pitch features mark their two functional constituents. Our proposal is to assign sentence stress patterns with corresponding cognitive structural patterns of utterances. One of the two constituents of cognitive and prosodic relations is nuclear and projects its cognitive function to the whole cognitive unit which it belongs to. The paper proposes a nuclear accent analysis by connecting the cognitive functions of constituents with their phonetic/phonological features. The contours analyzed in the paper as hierarchies of cognitive/prosodic relations are selected from those used by Ladd (2008) to exemplify sentence stress patterns in broad focus statements with ascending and descending contours, and in contrastive focus statements. We conclude that, in the new perspective, different cognitive structural patterns can be assigned to contrastive/broad focus statements in different semantic contexts.

Keywords: cognitive relation, prosodic phrase structure, nuclear element, prominence, focus

1. Introduction

The nuclear accent position is an important feature that characterizes the prominence pattern of prosodic phrases. Ladd (2008: 215-216) presents two competing approaches of prominence patterns of contours. The first one is the Normal Stress (NS) view Chomsky (1968), Cinque (1993) and Zubizarretta (1998) and the second one is the Highlighting (H) view, presented in the Bolinger's works; e.g. Bolinger (1965). Referring to the NS view, Ladd concludes that "there is one pattern of prominence that can be specified by rule for every sentence. This pattern assigns a single most prominent stress – primary stress – to one word of the sentence. Normal stress has no meaning or function: it is simply the result of phonological rules on surface syntactic structures". The phonological rules aim to identify the nuclear accent position in order to associate it with the primary stress of utterance. The NS view is applied only to utterances without contrastive focus on their constituents. The following rule is formulated in Bocci et al. (2020) based on Katz & Selkirk (2011): "If the sentence does not contain any occurrence of the [focus] feature, the nuclear pitch accent is assigned to the rightmost element" which has a certain acoustic prominence.

Ladd (2008) analyzes different intonational contour types by using the NS view in order to identify the sentence stress of the related utterance. In the case of the rise-fall-rise contour of *yes-no* question (1b) he concludes that the primary accent is on the word *driving* and the word *instructor* bears the L phrase accent Ladd (2008: 46, 143). This leads to the sentence-initial position of the normal stress corresponding to rising-falling

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pitch movements. The word *driving* is the first and the last word which bears a pitch accent within the contour, the Normal Stress Rule is satisfied and the nuclear accent is accepted on this word.

(1)   a.   I hear Sue's taking a course to become a driving instructor.
       b.   **A driving** instructor!?

The rise-fall-rise contour is also analyzed in Ladd (2008: 144) within the broad focus statement (2b) with four constituents. An L* pitch accent is applied to the word *dancing* and the H phrase accent is applied to the last word *tonight*. In the NS view the first constituent *I thought* bears the sentence stress because its pitch accent is more prominent then the L* pitch accent on *dancing* having a wide pitch range and the former one could be interpreted the constituent with the primary accent of utterance. The verbal phrase of the subordinate clause *she was dancing* is treated as a post-focal constituent with small variation in pitch range.

(2)   a.   I hear Sue's taking a course to become a driving instructor.
       b.   **I thought** she was dancing tonight.

The present paper proposes a cognitive view that takes into account all accented words as possible candidates for the nuclear position including the word *instructor* in the first case, and *dancing* and *tonight*, in the second. At the cognitive level, all words of utterances are speech items that compete for the nuclear position. We claim that the results of the cortical competition is reflected by utterances at the prosodic level and the nuclear positions can to be deduced by interpreting the prosodic features of constituents.

In the Highlighting (H) view, a nuclear accent and a sentence stress deduced by a phonological rule is not accepted. Those that support the H view claim that the nuclear position can be assigned on any word which the speaker intends to highlight. In Ladd (2008: 216) this claim is illustrated using Bolinger's work:

> focused words are marked by pitch accent, all pitch accents are individually meaningful, and no one of the pitch accents in an utterance is primary. … In all utterances speakers highlight words according to what they want to say in a specific context.

Ladd illustrates the limitations of this view by using the broad focus statement (3b). The phonological rule identifies sentence stress on the last constituent *francs* bearing an accent with a wide pitch range. Ladd argues that in the case of the word *five* bearing the "information of interest" he has no other rule for identifying the normal stress on the word *five* because the pitch accent with the wide pitch range is also on the last word *francs*. Therefore, he considers the H view cannot deduce in this case the sentence stress on *five* when the pitch accent with significant pitch range is on *francs*.

(3)   a.   What did they give you for participating in the experiment?
       b.   Five **francs**.

Ladd considers that the Focus-to-Accent (FTA) theory "narrows the gap between NS theory and H theory" because the new theory distinguishes between semantic focus and pitch accent and treats the parts of utterances with contrastive focus (CF) involving narrow focus (semantic focus) and the parts of utterance without CF as phrases with normal stress that projects its "focus" function to the whole phrase (broad focus). In Ladd's opinion the "focus" constituent that projects its semantic function to the whole phrase is determined by "language-specific rules or structural principles". In the FTA view the sentence (3b) is analyzed as a narrow focus statement in the particular context of the new information on *five*, even the answer **Five francs** has no contrastive focus meaning. In a narrow focus statement, the sentence stress is on the focus word *five* without engaging the NS rule.

The present paper proposes a cognitive basis for the normal accent rules that can be applied in both broad and narrow focus contexts in order to identify the nuclear constituents of utterances as it results after the speech object representation. The main hypothesis about intonational contours is that they convey the cognitive structure of cortical representations of the respective utterances. Thus, the pitch movements during prosodic words are the result of the F0 frequency modulation by the neuronal output variations of the respective speech constituents during the speech generation process. The cognitive structure of speech object representations is conveyed by the prosodic structure that organizes the corresponding words at the utterance level. In this view, the normal stress position within contours is the consequence of speech object packaging (information packaging) and can be identified by applying a cognitive perspective on F0 contours of utterances.

The cognitive model presented in section 2 involves a cortical mechanism of Information Packaging (IPk) which is responsible for binding speech objects into hierarchically organized cognitive relations marked at the utterance level by prosodic phrases (relations). The cognitive model consists of the functional category definitions including the category of nucleus, and rules for nucleus identification at prosodic phrase level. The cognitive model was also used to explain to explain phrasing and nucleus position in the main Romanian contour types Jitcă (2019) or in contours of English sentences with different information structures Jitcă (2020, 2022).

In section 3 several contours with different focus positions in broad and narrow focus contexts are discussed, in order to identify their cognitive structure differences. Important conclusions summarize the results of this research which lead to a better understanding of information structure of utterances in a direct relationship with their intonational contours.

2. The Information Packaging model

Section 2 summarizes the main aspects of the cognitive model and defines the functional categories of the two structural levels of cognitive relations and their related prosodic phrases (relations). Cognitive relations are binary information units with two contrasted constituents and we named them Cognitive Units (CU). At the cognitive level, utterances are structured by CU hierarchies reflected by prosodic phrase hierarchies, at F0

contour level. The contrast between CU constituents is a functional one and is conveyed by their contrasted tonal features. In the cognitive view, prosodic words are marks applied to words at the utterance level in order to encode the structural information of the corresponding speech objects from the cognitive level. The aim of utterance partitioning consists in identifying the CU hierarchy of utterances.

2.1 Structural levels of cognitive relations

The cognitive model defines the two structural levels of cognitive relations within perceptual object representations by using a set of four functional categories. As the block diagram in Figure 1 presents, the predicate and argument categories defines the first structural level and "theme" and "rheme" categories, the second level.

Regarding predicate-argument structure, Quilty-Dunn (2020) states that "Perceptual Object Representation (PORs) comprise of separate constituents for individuals and properties". He exemplifies this claim by using the sentence *This is a fish* where the constituent *This* corresponds to the individual, *fish* corresponds to the property 'fish', and the syntactic relation between them functions to express the instantiation of fish by the individual. This sort of structure is a canonical example of predicate-argument structure (where *fish* functions as predicate and *This* as argument).

Hurford (2003) considers the predicate-argument structure as "the core of phylo-genetically and ontogenetically primitive (pre-linguistic) mental representations" and claims that "structures of modern natural languages can be mapped onto these primitive representations".
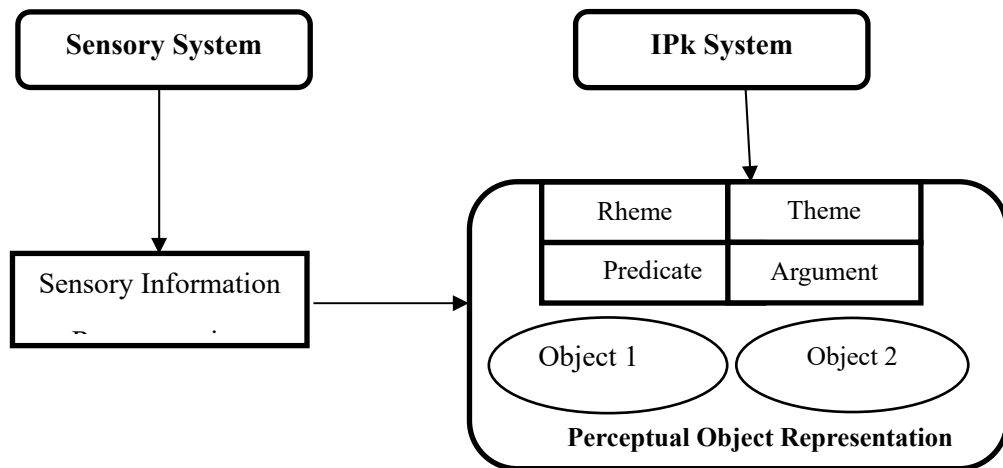

Figure 1. Perceptual Object Representation

At the perceptual object representation level, speech objects become events with a temporal unfolding that are packed into cognitive relation hierarchies. Discussing the common structures of event representations at both perception and memory levels, Zacks (2020) presents the part-subpart structure of two related events as the first structural level

of perceptual representations of events. The part-subpart structure has exactly the same meaning as the argument-predicate structure which describes in Quilty-Dunn (2020) relations within perceptual object representations.

The cognitive model defines CU_argument and CU_predicate functional categories for describing the structure argument-predicate o cognitive relations. CU prefix indicates that the functions have cognitive meaning. At the utterance level, the CU_predicate constituent is marked by the lower target tone, while the CU_argument element is marked by the higher target tone of prosodic phrases (relations).

Gabelentz' model summarized in von Heusinger (2002) presents the argument-predicate structural level in terms of a psychological subject (PS) related to "that about which the hearer should think", and a psychological predicate (PP) related to "what he should think about it". This means that CU_argument is equivalent to the PS category and CU_predicate, to the PP.

In line with Zacks's view presented in Zacks (2020), the part-subpart structure is determined by the spatial delimitation of events in the representational space of their phonetic features and he proposes a second structural level determined by the existence of the temporal delimitation between events on the microbiological time axis. One constituent of cognitive relations is the "cause" event and the other event of the respective relation, is the "effect" event. In this cause-effect view on the order of events, the former event precedes the latter event on the time axis at the neural level. With respect to language, we can speak about the "theme" and " rheme" events, even the semantic theme event does not always precede the semantic rheme event on the time axis of the speech output.

In other words, we can say that the cognitive events related to the speech objects of one utterance are represented in the space of their spatial and temporal features during the construction of their cognitive relation hierarchy or we can say that the temporal evolution of the IPk process of one utterance is encoded in the resulting cognitive representation.

The cognitive model introduces the CU_theme and CU_rheme categories to describe prosodic phrases (relations) at the second structural level. They are marked by different temporal features/shapes of pitch movement during the corresponding prosodic words; e.g. CU_theme is usually marked by slow pitch variation and the CU_rational element is marked by abrupt pitch movements.

The overlapping of the two structural levels is possible at the intonational contour level because the two contrasts are encoded by different acoustic cues of F0 contour involving the two dimensions of pitch variation: tonal target levels and shape or slope of pitch excursion (temporal features). The two structural levels, CU_predicate-CU_argument and CU_theme-CU_rheme, proposed by the cognitive model is a basis for the utterance partitioning description allowing to discuss functional elements in direct relationship to their prosodic features without invoking linguistic aspects.

2.2 Nucleus identification rules

Another aspect of the model refers to the nuclear element of cognitive relations that project its cognitive functions to the whole unit to which it belongs. Based on this

property of nuclear elements, lower-level CUs become functional elements with cognitive functions at the next higher-level relations. In this paper, we suggest the existence of one competition between constituents before their merging into a new unit and, after the nuclear element wins the competition, an exclusion of the non-nuclear elements from the high-gamma activity results but the nuclear one remains in the competition   for higher-level nuclear position.

Two nucleus identification rules are formulated and they correspond to the two types of nuclei: emphasized (prominent) and non-emphasized (non-prominent). Emphasis or prominence of phrases is present on CU_argument constituents when they are marked by high pitch accent with the target tone followed by a falling pitch variation during the last part of the accented syllable and/or on the next non-accented syllable(s). We formulate in (4) and (5) two Nucleus Identification Rules related to the two cognitive relation types: NIR_E, for relations with prominent CU_argument constituent and NIR_NE, for relations without prominent CU_argument constituent, respectively.

(4)   NIR_E: If the CU_argument of cognitive relations is an elementary constituent marked for prominence, then it bears the nuclear function in the current phrase. If an utterance has two constituents marked by prominence, then it is structured by two nested relations where the prominent constituents are the local and global nuclear elements.

(5)   NIR_NE: In cognitive relations without prominence on none of constituents, the CU_predicate bears the nuclear function.

In the present paper, NIR_E and NIR_NE rules are used to deduce local and global nuclei of prosodic phrases (relations) produced by the intonational contours analyzed in section 3.

2.3 The description system of IPk partitions

In view of the IPk model presented in this paper any simple or complex utterance may include a hierarchy of CUs each of them with its own partition. P and A labels were introduced to annotate CU_Predicate and CU_Argument constituents, and T and R labels to annotate CU_Theme and CU_Rheme within IPk partition descriptions. In the proposed description system, two labels are used for annotating one element of partition because it has functions at the two structural levels. Labels are linked by "+" and enclosed in round parentheses.

The description of IPk partitions is a sequence of two pairs of round parentheses separated by slash corresponding to the two CU constituents. In (6) all four possible IPk partition variants for one CU are presented:

(6)   a.   (A+T)/(P+R)
         b.   (A+R)/(P+T)
         c.   (P+T)/(A+R)
         d.   (P+R)/(A+T)

The description of one CU with lower level CU(s) as constituents encloses the description of lower level IPk partitions between brackets and places a functional label in the indices position after the right bracket.

The description of nested CUs needs to identify nuclear contituents at each level of utterance treee in order to deduce the cognitive functions of local CUs at the next higher level. In the cognitive descriptions of the contours analysed in the paper, the nuclear constituent is annotated by n and N labels in the local and global phrases, respectively.

3. Cognitive interpretation of focus in broad and narrow focus contexts

The section presents seven contours extracted extracted from the utterances of the seven sentences also presented in Ladd (2008) in the context of the discussions about their sentence stress patterns. We selected two sentences with rise-fall-rise contours, and five sentences including the syntactic group *five francs* in different semantic contexts. The cognitive descriptions of the contours consist of prosodic phrase (relations) hierarchies and the related nuclear accent hierarchies.

3.1 Nucleus identification in sentences with rise-fall-rise contours

The first sentence with rise-fall-rise contour is the echo *yes-no* question (1b) and it was selected for cognitive analysis in order to demonstrate that NIRs can be applied to both assertive and interrogative sentences. The contour of sentence (1b) is illustrated in Figure 2. The sequence of pitch accents H* L* applies to the contour the CU_argument-CU_predicate structure at the cognitive level. The cognitive structure is described in (7). At the second structural level, the first word is the CU_rheme (abrupt pitch movements) and the second word is the CU_theme (slow pitch movements). They are annotated by A+R and P+T, respectively, in (7).

The nuclear accent of the utterance is identified on the last word by applying the NIR_NE rule, the intonational phrase having a non-emphasized contour. The first constituent does not generate emphasis because its peak does not reach the top level during the accented syllable *dri*. The top level is reached during the last non-accented syllable *ving*. In the cognitive view, the last constituent has the nuclear position having the CU_predicate function. It is labelled by N in (7).

When the number of constituents increases, rise-fall-rise contours are structured by nested prosodic relations as in the case of the contour illustrated in Fig. 3 corresponding to the sentence (2b). At the lowest level, the utterance has two partitions. The first one is that of the main clause *I thought* and the subject *she (was)* of the subordinated clause. They are related as the CU_argument and the CU_predicate constituents. The CU_argument is non-prominent because the high target tone is followed by a tonal fall down to an intermediate high level of the CU_predicate. This marks the latter constituent as the local nuclear element (NIR_NE) that projects its CU_rheme function to the whole left lower-level CU. The cognitive structure of the contour is described in (8).
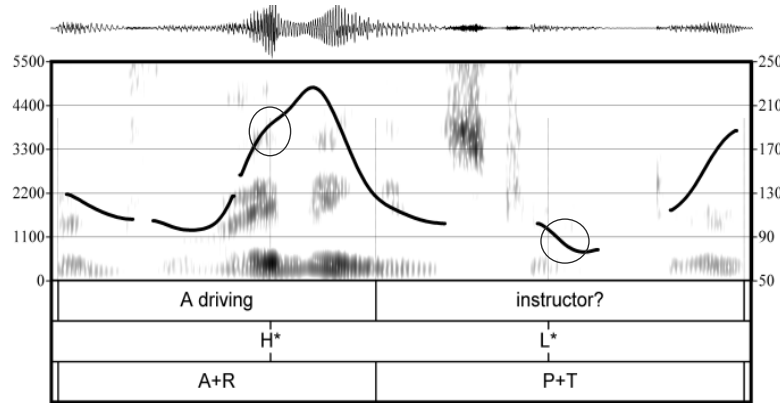
Figure 2. The contour of one utterance of the English echo question *A driving instructor*?

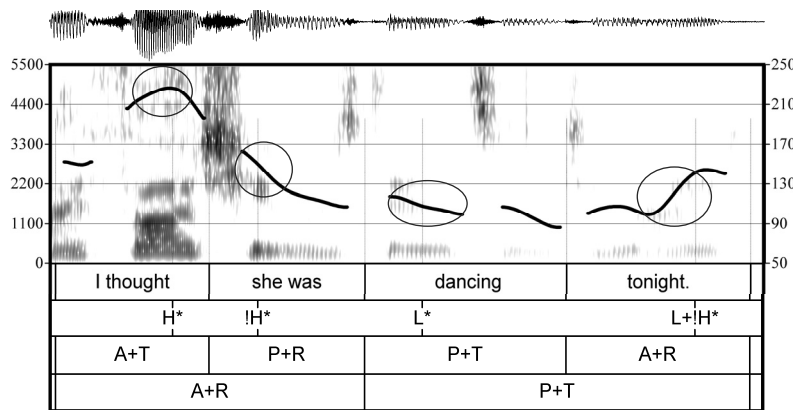(7)   A driving^{A+R}/ instructor$^{P+T}_N$?

Figure 3. The contour of one utterance of the broad focus statement
*I thought she was **dancing**$_F$ tonight*

(8)   [[I thought^{A+T} / she was $^{P+R}$]$_{A+R}$ /[dancing$^{P+T}_N$ /tonight^{A+R}]$_{P+T}$

The righ lower-level CU is that of the verb *dancing* and the adverb *tonight* as the CU_predicate and CU_argument element, respectively. The CU_argument *tonight* has no prominence because the contour does not fall after the target tone is reached. Thus, the verb *dancing* bears the nuclear element at this level (NIR_NE).

At the global level, the group *I thought she was* is the CU_argument and CU_rheme constituent which is in contrast with the last group *dancing tonight* with the CU_predicate and CU_theme functions. None of constituents has prominence and the global nuclear element is the global CU_predicate *dancing* (NIR_NE).

At the semantic level, the focus event can be related to the group *she was dancing* because a set of alternatives may be assigned to it. In the cognitive view, we can understand why the first constituent *(I) thought* does not bear the primary accent contrary

to Ladd's interpretation based on the phonological reasons. In all types of sentences the primary accent is carried by the global nuclear element and it results after the utterance partitioning and the nucleus identification on a cognitive basis.

3.2 Utterances with descending phrase-final contours

Ladd (2008) has a special interest in describing different sentence stress patterns of the same syntactic group *five francs* in different semantic contexts. We propose a cognitive description of patterns in the analysed contexts. One of them is that produced by the broad focus statement (3b). Its descending contour is represented in Fig. 4 where the word *five* has a high level pitch movement and the word *francs* has a wide range falling movement. This leads to the CU_argument function of the former element and the CU_predicate function of the latter one. The sentence structure is described in (9). The constant high level marks the word *five* as the CU_rheme element while the slow falling pitch movement during the word *francs* marks it as CU_theme element. The phonological normal stress rule identifies the sentence stress on the last constituent *francs* because the falling pitch movement makes it acoustically prominent and it is in the righmost sentence-position.
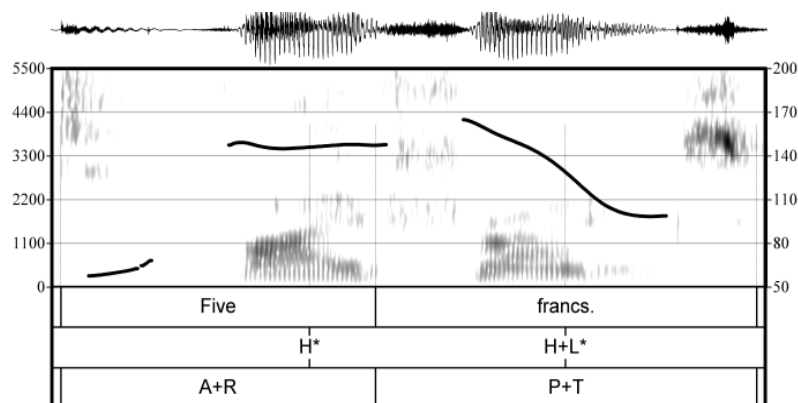

Figure 4. The contour of one utterance of the broad focus statement *Five francs*$_F$

(9) Five^{A+R} / **francs** $_N$$^{P+T}$

The same decision results after applying NIR_NE rule to the analysised contour. The descending contour has no emphasis because the word *five* is non-prominent. The CU_argument *five* reaches a high target tone but the tone is not followed by a falling pitch variation. The CU_predicate constituent *francs* begins with a tonal step up to a little higher level and then the falling pitch variation follows. Based on NIR_NE rule, the last constituent bears the nuclear function having the CU_predicate function.

(Ladd 2008) considers the phonological Normal Stress rule has problems when it has to decide the nuclear position of the numeral *five* in the case it carries new information. In this particular case, the sentence stress must be on *five* despite the fact that

the phonological rule associates the normal stress with the wide pitch range and the righmost position of the word *francs*. There is no phonological rule to associate a word in a non-final-sentence position to the nuclear function within broad focus statements. In the light the FTA theory the prominence that applies the nuclear function to the word *five* can occur only in the contrastive focus context exemplified in Ladd (2008) by the sentence in (10).

The contour of one utterance of the second clause of the sentence (10) is presented in Figure 5 and we use it to describe the sentence stress pattern of the group *five francs* with the primary accent on the word *five*. We consider that the sentence (10) is uttered with a neutral intonation despite the contrastive context suggested by the text. Thus, the sentence in (10) does not generate a narrow focus statement with non-neutral intonation. The cognitive analysis has to be applied in both broad and narrow focus statement interpretations.
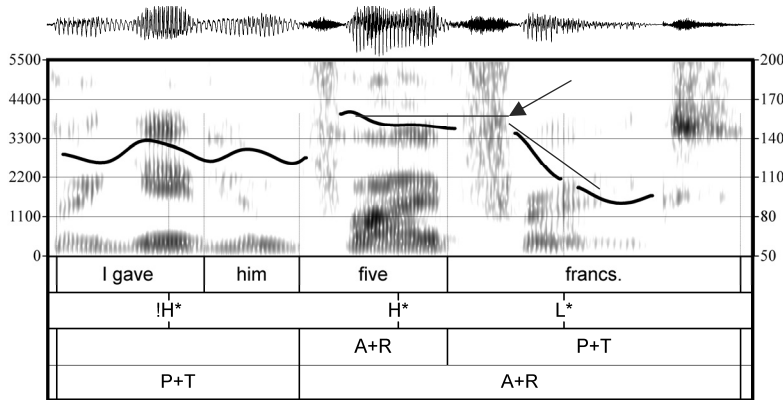

Figure 5. The contour of the clause *I gave him **five** francs* in the context of the narrow focus statement *I didn't give him three francs, I gave him **five**$_F$ francs.*

(10)   I didn't give him three francs,
         $[(I\ gave\ him)_{P+T} /(\textbf{five}\ _N{}^{A+R}/ francs^{P+T})_{A+R}]_{A+R}$

At the global level, the verbal group *I gave him* is the CU_predicate and CU_theme element and the noun phrase *five francs* is the CU_argument and CU_rheme element. At the local level, the word *five* is prominent having the highest tonal target followed by a falling pitch variation during the word *francs*. This leads to the nuclear function of the former constituent with CU_argument function (NIR_E rule).

The group *five francs* represented by the nuclear element *five* is the prominent CU_argument of the intonational phrase that bears the global nuclear function (NIR_E rule). *Five* is annotated by *N* in (10). We claim that the normal stress of the answer *five francs* of the question (3a) is generated in the same manner as the group *five francs* in the case of sentence (10) when it is uttered with neutral intonation. We consider that broad focus statements include all statements that do not introduce a new information element marked by narrow focus. Thus, normal stress can be identified in both cases of statement (3b), with the normal stress on *francs* and on *five*, by using NIR_NE and NIR_E rules, respectively.

   In (Ladd 2008), the case of contrastive focus on *francs* is also analysed, in the context of the sentence (11). The second intonational phrase produced by one utterance of the sentence is represented in Figure 6 where it can be observed that the word *five* with the CU_predicate and CU_thematic element (P+T label) is related to the verbal group *I gave him* with the CU_argument and CU_rheme functions (A+R label). The CU_argument constituent is non-prominent because it is followed by a tonal step up to the level where the word *five* begins its falling pitch movement. Thus, the numeral bears the local nuclear function having CU_predicate function (NIR_NE rule).

   At the second clause level, the group *I gave him five* is in contrast with the focus word *francs* which is the global CU_argument and CU_rhematic element (A+R label). The latter constituent is prominent, its highest target tone being followed by a falling pitch variation. The word *francs* is marked by emphasis which gives it the global nuclear function at the second clause level. Sentence (11) is uttered as a contrastive focus statement with non-neutral intonation.
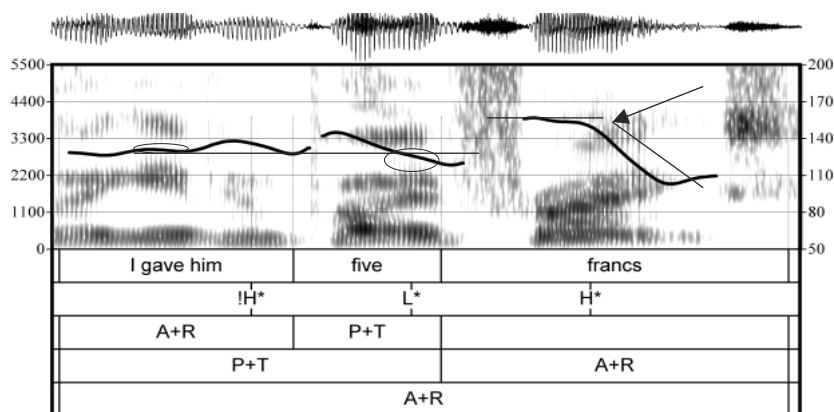

Figure 6. The contour of the clause *I gave him five **francs**$_F$* in the context of the contrastive focus statement *I didn't give him five pounds, I gave him five **francs**$_F$*

(11)   I didn't give him five pounds,
         $[[(\text{I gave him})^{A+R} /\text{five}^{P+T}]_{P+T} /\text{francs}_N {}^{A+R}]_{A+R}$

   We conclude that the sentence stress pattern in this contrastive focus context may be characterized as follows. The numeral *five* is grouped to the left with the verbal phrase and it bears the local nuclear element in the resulted group. The noun *francs* is the global CU_argument and nuclear element marked by emphasis (prominence).

   Ladd (2008: 214) introduces another sentence stress pattern for the group *five francs* within the double narrow focus statement produced "in relatively unusual circumstances ". It is exemplified by the utterance of the sentence in (12). The second intonational phrase of this utterance is presented in Figure 7 where it can be seen that both focus words *five* and *francs* have CU_argument functions and begin their falling pitch movements at very high tones. The word *five* is the CU_argument element within the embedded phrase where the verbal group *I gave him* is the CU_predicate. Its high

target tone near the top level and the following falling pitch movement produce emphasis at this local level and mark it as the local nuclear function (NIR_E rule). It is labelled by *n* in (12).

At the global level, the word *five* is the CU_predicate because its contour suddenly falls under the top level of the word *francs*. Thus, the latter constituent is a CU_argument marked by prominence because the top-level target tone is followed by falling pitch movement. This explains its global nuclear function (NIR_E rule), and it is labelled by *N* in (12).

The prominence pattern of the clause *I gave him five francs* in the double focus context differs from that of the sentence (11) by the local high prominence of the word *five*. The two prominence patterns have in common the global prominence of the word *francs* that marks it with global focus function.
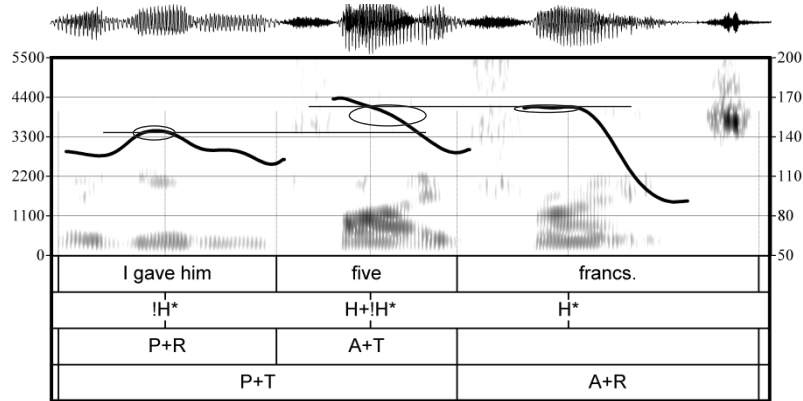

Figure 7. The contour of the clause *I gave him **five francs*** in the context of the narrow focus statement *I didn't give him seven euros, I gave him **five_f francs_F***

(12)   I didn't give him seven euros,
$$[[I \text{ gave him}^{P+R}/ \text{ five }_n^{A+T}]_{P+T}/ \text{ francs }_N^{A+R}]_{A+R}$$

The prominence pattern of the sentence (12) in the double focus context differs from that of sentence (11) by the CU_argument and nuclear functions of both words *five* and *francs* that are in agreement with their contrastive focus functions, at the semantic level.

The last prominence pattern of the clause *I gave him five francs* is related to the context of sentence (13) where "the phrase *five francs* is contrasted as a unit" to the word *a dollar* from the first clause Ladd (2008: 214). The group *five francs* taken as a unit, bears new information in the second clause leading to its focus function. Figure 8 represents the contour proposed by us to represent the sentence (13) because in database of Ladd's book the related utterance does not structuraly differ from that represented in Figure 6.

In Figure 8 we can see that the word *five* is grouped to the right with the word *francs* within the low-level CU. In their unit, the former constituent is the CU_argument having the higher target tone and the latter one, is the CU_predicate having the lower

target tone. In this low-level unit, the word *francs* is the nuclear element (NIR_NE). The high target tone of *five* does not generate prominence because it is followed by a tonal step up the a little higher tone and then it falls until the low boundary tone.

At the global level, the group *five francs* is the CU_predicate and CU_theme constituent, and the verbal phrase *I gave him* is the global CU_argument and CU_rheme element. The verbal phrase has no prominence and group *five francs* bears the global nuclear function (NIR_NE).

The sentence in (13) is a contrastive focus statement with new information but it is uttered as a broad focus statement. The last accent of the intonational phrase has a low type and marks *francs* as the global focus word in the same manner as in the case of sentence (9). Thus, the last utterance differs to the utterances represented in Figures 6 and 7 where the word *five* is grouped to the left with the verbal phrase in a lower-level group. In the utterance illustrated in Figure 8 the word *five* is related to the right with the word *francs* under the global focus unit.
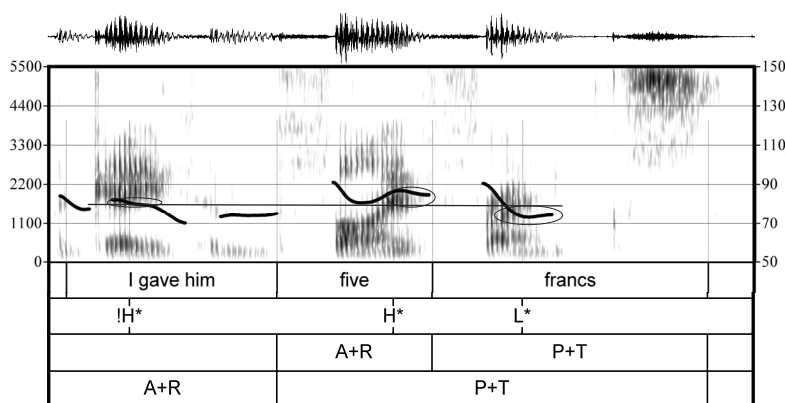

Figure 8. The contour of the clause *I gave him (five francs)*_F proposed in the context of the contrastive focus statement *I didn't give him a dollar, I gave him (five francs)*_F.

(13)   I didn't give him a dollar,
         [(I gave him)$_{A+R}$ /(**five** $^{A+R}$/ francs^{P+T} $_N$)$_{P+T}$]$_{P+T}$

In the first part of section 3 one *yes-no* question and two broad focus statements are presented, the first broad focus statements having ascending phrase-final contour and the second one, descending phrase-final contour. In the former case, we explain why the high target tone of the sentence-initial constituent does not produce emphasis and why the global nucleus is deduced by the NIR_NE rule on the global CU_predicate constituent of the utterance. In the latter case, the group *five francs* in the broad focus statement is presented. In the second part of section 3 the four prominence patterns of the clause *I gave him five francs* in the four narrow focus contexts are characterized by using the perspective and the categories of the cognitive model presented in section 2. The intonational phrase of the utterances related to the four contexts has different structural and nuclear patterns, presented in Figures 5-8 and described in (10)-(13). We consider that the words *five* and *francs* act as a unit only in the contour illustrated in Figure 8

corresponding to neutral intonation. Only in this case the two words are merged into a low level relation at the cortical level and their related prosodic words are the two parts of the same peak, at the prosodic level.

4. Conclusions

The paper proposes the cognitive model of information structure as a common basis in analysing prominence patterns of statements in broad focus and narrow focus contexts. The model formulates rules for the nuclear element identification and gives answers to the Ladd's question: "On what basis is a single word selected to bear the main accent". The rules formulated within the model for the nuclear accent identification legitimates nuclear elements to project their cognitive functions to the whole phrase/unit which they belong to.

The prominence of nuclear accents is a result of the competition between neurons which evocate speech items of utterances at the cortical level during their integration as perceptual objects. This neuronal mechanism gives a cognitive meaning to the nuclear element of phrases. Focus events are linguistic (semantic) events implemented by constituents with nuclear functions at the pragmatic level.

The paper proposes the cognitive perspective for the utterance partitioning description. The semantic information structure analysis has to use the cognitive description of utterances and then it may assign semantic functions to constituents. Halliday (1967) proposes the background-focus structure for describing the structure of prosodic phrases (intonation units) and Steedman (2000) also adopted it, but semantic focus constituents correspond to cognitive nuclear elements; this explains why focus category cannot be used in descripting the structure of phrases. Focus (nucleus) labels only signals the sentence/phrase accent and other cognitive categories are involved in phrase structure desriptions (CU_argument, CU_predicate, CU_theme and CU_rheme) because prosodic phrases (relations) have cognitive meaning. After the cognitive description, semantic category labels may be assigned to certain constituents with semantic functions at the information structure level.

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