

The Fallacy of Invariant Phonological Correlates of Information Structural Notions

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This paper claims that there is no phonological focus, topic, contrast, or, for that matter, phonological ‘new’, ‘given’ or ‘backgrounded’ elements. In other words, the phonology is unable to define information structure. It is a common fallacy that information structural categories are expressed by invariant grammatical correlates, be it syntactic, morphological or phonological ones. The truth is that phonological and phonetic cues help speaker and hearer to sort out which elements in a sentence express ‘newness’, ‘givenness’, ‘topic’ and ‘focus’, and only in this sense, phrasing and accent structure (pitch accents and deaccenting) are important phonological correlates of information structure. Languages display variations as to the role of phonology to enhance categories of information structure, and this variation reflects what is found in the ‘normal’ syntax and phonology of languages.

Keywords: Phonology, Interface with semantics and syntax

1 Introduction

A series of definitions of the information structural notions as mental states and as grammatical entities are introduced in section 2, and the remaining of the paper investigates the role of phonology for information structure. The query is well-motivated since in many languages, foci and topics are accompanied by phonological changes. First, foci and topics have been identified with sentence-initial, pre-verbal or post-verbal positions in the sentence, a property which can be located at the interface between syntax and phonology (section 3). Topics and foci are sometimes considered the bearers of special accents, for instance falling for focus and rising for topic (section 4). Alternatively and more simply, they

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are identified as the accented parts of the sentence (section 5). Following Schwarzschild's (1999) proposal, it could also be that deaccenting is the most relevant phonological correlate of information structure, signaling givenness (section 6). And, in some analyses, foci and topics trigger an obligatory special phrasing, which requires a prosodic phrase (p-phrase) boundary to their left or to their right (section 7). A given constituent, by contrast, is obligatorily dislocated.

We will see in the following pages, however, that neither topics nor foci can be defined in purely phonological or phonetic terms, but that the properties just listed are grammatical correlates helping to highlight or to background constituents, and arising from purely syntactic or independent phonological features of the language. These phonological correlates improve speech processing in general, but are not necessarily associated with information structure. All phonological features accompanying focus or topics also have roles which have nothing to do with information structure, and inversely, a topic or a focus can be left unrealized in the phonology. I assume without discussing this point of view in detail that syntactic correlates of information structural notions are to be analyzed in the same way: word order, cleft formation, dislocation, focus movement cannot be definitional for notions such as topic and focus, but that they can be helpful in assigning a particular information structural role to a constituent.

2 Definitions

Following Kuno (1972), Prince (1981), Lambrecht (1994) and many others, the notions of information structure (IS) have an ambivalent meaning. They denote extralinguistic cognitive or mental states of referents, actions, locations, temporality, but also the formal and communicative aspects of language, thus the way these concepts are implemented in grammar. Chafe (1976) speaks about

‘information packaging’ and considers hypotheses about the receiver’s assumptions as crucial to discourse structure. These are hypotheses about the status of the referent of each linguistic expression, as represented in the mind of the receiver at the moment of utterance. In other words, it is the way the information is transmitted that is crucial, rather than the lexical or propositional content of a sentence, around which grammar usually centers. Prince (1981) defines information structure (packaging of information) in the following way:

‘The tailoring of an utterance by a sender to meet the particular assumed needs of the intended receiver. That is, information packaging in natural language reflects the sender’s hypotheses about the receiver’s assumptions and beliefs and strategies.’

The notion of Common Ground, introduced by Stalnacker (1974) has been central in many subsequent theories of information structure, as it shapes the background to which new information is added. The Common Ground is the knowledge which the speaker assumes to be shared by herself and her interlocutor.

For Clark & Haviland (1977), *given* is ‘information [the speaker] believes the listener already knows and accepts as true’, and *new* is ‘information [the speaker] believes the listener does not yet know.’

As regards the implementation of the concepts of information structure in grammar, I do not aim at an exhaustive listing of information structural categories in this short paper for lack of space and because it is not the main aim of this paper, and refer instead the reader to the introduction of this volume and to Krifka’s paper which concentrates on the semantic aspects of information structure. A ‘topic’ is analyzed there and here as a referent which the remainder of the sentence is about, possibly contrasting with other referents under dispute,

and crucially followed by a focus constituent. The topic has often been previously introduced into the discourse, but does not have to. In other words, the notions of ‘topic’ and ‘given’ are to be kept apart. Topics can be contrastive, in which case they include a focused constituent, they can be aboutness topics, frame-setting topics, contrastive or familiarity topics.

‘Givenness’ has been attributed a formal status by Schwarzschild (1999) who claims that a given constituent is one which is entailed by the preceding discourse. This use of givenness is of course restricted to text-givenness (previously mentioned in the discourse), as opposed to context-givenness (contextually salient).

A focus can be wide or narrow, it can be ‘out of the blue’, informational, contrastive, selective or corrective, etc. In an all-new sentence, every constituent is (or is intended to be) equally new and important. A wide or narrow focus is understood here in the sense of Rooth (1985, 1992). Beside the normal semantic value present in each expression, a ‘focus semantic value’ is a facultative additional value, understood as a set of alternatives, that is a set of propositions which potentially contrast with the ordinary semantic value. The ordinary semantic value is always contained in this set.

Summing up, a distinction must be made between the status of referents as mental states, which can be new (inactive at the point of their introduction into the discourse) or given (active), and the linguistic means which serve to distinguish between focused elements (designated expression in a set of alternatives), topicalized elements (serving as the main referent for the remainder of the sentence) and backgrounded elements (anaphoric or phonetically repeated expressions). As a tendency, we expect new elements to be marked with indicators of focus and given/backgrounded ones to be marked in the grammar as topics or as unaccented elements, though this mapping is violated in many cases.

3 Focus and Topics as Positions in the Sentence

It is conspicuous that topics are usually sentence-initial constituents. Halliday (1967), for instance, claims that the initial position is a necessary condition of a ‘theme’ (a topic). A topicalized element is often realized as a separate i-phrase (intonation phrase), see Féry (2006) for a prosodic explanation of topic fronting, and Féry (2007) for a prosodic account of focus fronting. But in fact, initiality does not seem to be obligatory and languages may place their topics in other positions, as well. In the following Japanese sentence (1), the topic *dezaato-wa* ‘desert’ is placed after a quantifier, and it is thus not initial.¹ A subscripted P shows a prosodic phrase (p-phrase), and a subscripted I an intonation phrase (i-phrase).

- (1) ((Daremo-ga)_P (dezaato-wa)_P (aisu-o tabeta)_P)_I (Japanese)
 everyone-NOM desert-TOP ice-cream-ACC ate.
 ‘As for dessert, everyone ate ice-cream.’

At best, a clear preference for placing topics at the beginning of a sentence can be observed, and the reason for this is neither phonological nor syntactic. If the speaker wants to establish a frame for the rest of the sentence or if an aboutness topic is needed, (see Jacobs 2001), an early introduction of the topic is well-motivated for the sake of communication, as well as the placement of the comment afterwards (leading to the topic-comment structure of categorical sentences). A parallelism can be drawn with novels, like those of Jules Verne, or Honoré de Balzac, in which the narration begins after the characters have been described in detail.²

If, as in (2), an element is given, or expresses an afterthought, it is preferable to dislocate it from the main clause, which typically contains the focused

¹ Thanks to Shin Ishihara for his help with Japanese.

² Thanks to Serge Pahaut for attracting my attention to this similarity.

information, and to place it in a position where prominence is poorest. A final dislocated element is deaccented and possesses no phonological prominence. This is illustrated with ‘anti-topics’ in Cantonese (2a) and French (2b).³

- (2) a. ((Go loupo)_P (nei gin-gwo gaa)_P, (ni go namjan ge)_P)_I. (Cantonese)
 CLF wife 2.SG see-EXP PTC this CLF man MDF
 ‘The wife you have seen, of this man.’
- b. ((Pierre l’a mangée)_P, (la pomme)_P)_I. (French)
 Peter it-ACC has eaten, the apple
 ‘Peter has eaten the apple’

Focus has also been associated with special focus positions in certain languages. Hungarian is described as a language which obligatorily places an exhaustive focus preverbally (É.Kiss 1998), while Italian has been analyzed as a language with clause-initial (Rizzi 1997) or clause-final (Samek-Lodovici 2005) foci. Aghem has been analyzed as a language with a post-verbal focus position called IAV for ‘immediately after the verb’ (see Horvath 1986 and Aboh 2006 for this strong claim). It is to be noticed that ‘dedicated’ focus positions are sometimes defined structurally or linearly, but that in-depth analyses seem to prefer a linear definition (see Hyman & Polinsky 2006 for Aghem).

An alternative explanation, which accounts for the Hungarian facts without forcing an association between focus and pre-verbal position, can be stated in the following way. Hungarian is a left-headed language, both at the level of the p-word and at the level of the p-phrase. Focus wants to be prominent and the preferred stress position is at the beginning of the main i-phrase, directly after the topic which forms an independent i-phrase. This position is occupied by the narrow focus, as often as possible, and happens to be the verb in all other cases (see Szendrői 2003 who gives a syntactico-phonological account of the

³ See also Frey (2004) who finds contrastive topics in the middle field in German.

information structural facts of Hungarian). But focus may also be located somewhere else. In (3), adapted from É. Kiss and Szendrői, both the VP and *Mary* are focused and *Peter* is given, but the indirect object, which carries a narrow focus embedded in the VP (my analysis), is post-verbal. Small caps indicate stress.

- (3) ((Tegnap este)_P)_I ((BEMUTATTAM Pétert)_P MARINAK)_P)_I
 yesterday evening PRT-introduced-I Peter-ACC Mary-DAT
 ‘Yesterday evening, I introduced Peter to Mary.’ (Hungarian)

In Italian, as in other Romance languages, given elements are moved away from the matrix clause, and, in many cases, it is this necessary evacuation which causes finality of focus, see (4), adapted from Samek-Lodovici (2005). In other cases, though, a narrow focus finds itself in the postverbal position, even if it is not its canonical position. Italian is a language with final stress, both at the level of the p-word and at the level of the p-phrase, and syntactic reorganization helps prosody in moving narrow foci to the rightward position, as far as possible.

- (4) ((L’ho incontrato a PARIGI)_P, (Luigi)_P (ieri)_P)_I (Italian)
 (I) him have-met in Paris, Luigi, yesterday
 ‘I met Luigi in Paris yesterday.’

As for Aghem, Hyman & Polinsky (2006) claim that the IAV position is not reserved for focus, and that focus is not necessarily in the IAV position. In their analysis, some constituents appear obligatorily in this position independently from their focused or non-focused status. The preference for this position is explained independently by binding facts.

In sum, topics and foci may preferably occupy special positions in which general properties of the language allow them to carry prominence. But this is always a tendency which optimizes communication, and may arise from

independent grammatical components, like accent position preferences, binding and scope relationships.

4 Bearers of Special Accents

Bolinger (1958) introduced a distinction between accent A, a falling accent, and accent B, a fall-rise accent, and Jackendoff (1972) and Liberman & Pierrehumbert (1984) related the former to focus and the latter to topic, as in (5). *Manny* has accent B, and *Anna* accent A.

- (5) {What about Manny? Who did he come with?}
 ((Manny)_P (came with Anna)_P)_I (English)

Büring (2003) for German, and Steedman (2000) for English establish an obligatory relationship between contours and roles in letting pitch accent contours participate to the definition of topics and foci. Other attempts to relate forms of accents to specific information structural roles are found for other languages as well. For instance, Frota (2000) claims that narrow foci in Portuguese are always associated with a certain kind of accents. In the same way, Baumann (2006) and Baumann & Grice (2006) relate the form of accents to givenness in German.

Some excellent works have been published which propose a pragmatic relationship between tones and meanings, like ‘assertiveness’ or ‘statementhood’ (L-), ‘concessive continuation dependence’ (H%) for Bartels (1997), and ‘newness’ (H*) ‘prominent, but not part of the predication’ (L*) or ‘elements in a scale, but not part of the predication’ (L*+H) for Pierrehumbert & Hirschberg (1990). Marandin et al. (2005) relate the melody of final contours in French to the anticipated revision from the part of the speaker of the hearer.

These authors refrain from associating tones with information structural roles like topic and focus.

The relation between topics, foci or givenness and special contours is at best unstable. The lack of necessary association between accents and roles can be illustrated with examples in which different kinds of accents are used for topics and foci from the ones which have been proposed in the literature. Consider (6) which elicits a double focus in German. The answer to a double wh-question can consist of a single-pair answer, and I assume that this is the case in (6). The second focus, *den Dekan*, has a falling contour as it is the last accent in the sentence. But the first focus, *die Präsidentin*, has a rising contour without necessarily being a topic. This contour arises because in a sequence of two accents, the first one has a rising and the second one a falling contour, independently of the role of the constituent.

- (6) {Wer hat wen gesehen? }
 ((Die PRÄSIDENTIN)_p, (hat den DEKAN gesehen)_p (German)
 the president has the dean seen
 ‘The president has seen the dean.’

As far as topics are concerned, the preference for sentence-initiality is paired with a preference for rising tones. It may be the case that the rising tone is just reflex of non-finality of this accent.

To sum up this section, topics and foci have been analyzed by some linguists as the bearers of obligatory special contours. But the necessity of this relationship is not firmly established, and in fact, there are too many counterexamples showing that other accents can do the job in some contexts. In German, a focus has a falling contour because it is the last accent in the sentence, and the tone of a topic is rising because it is not the final accent.

Again, the preference for associating some specific contours with information structural roles is to be explained by general properties of the language.

5 Bearers of Accents

The preceding section has shown that there is no necessary relation between focus/topic on the one hand and special contours on the other. A concomitant question bears on the necessity of accents (and of deaccenting) in general in relation to focus/topic. Jackendoff (1972:247) formulates a rule which obligatorily relates a focus with an accent. "If a phrase P is chosen as the focus of a sentence S, the highest stress in S will be on the syllable of P that is assigned highest stress by the regular stress rules." Nearly all models relating focus with phonology rely on a direct correspondence between semantics and phonetics and requires an accent signaling in a direct way the presence of a focused constituent (see for instance Cinque 1993, Reinhardt 1981, Rooth 1985, 1992, Selkirk 1995, 2002, 2006, Schwarzschild 1999, Truckenbrodt 1999, Zubizarreta 1998 and many others).⁴

There are of course systematic and trivial exceptions to this rule, like the numerous tone and phrase languages⁵ which do not use accents at all. Xu (1999) shows that focus in Mandarin Chinese raises the pitch range of a focused word, and compresses the postfocal domain, but Mandarin has no accent in the usual sense of this term. West Greenlandic, a typical phrase language, has no lexical accent, and no tone, but still prosody is used in an interesting way. A focused

⁴ And nearly all models suggest that the correspondence between semantics and phonology goes through the intermediary of so-called F-marks which signal focus in the syntax (Selkirk 1995, this volume, Schwarzschild 1999, Féry & Samek-Lodovici 2006).

⁵ Many tone languages use F_0 only for lexical tone distinctions, or to increase or decrease the pitch ranges used in prosodic domains, but not for associating prominent syllables with special, pragmatically induced meanings, as is the case for pitch accents (see Hartmann, this volume).

constituent, a p-phrase, has phrasal tones with altogether larger excursions, and the whole register of the focused phrase is raised (see Arnhold 2007). Other tone languages mostly use syntactic and morphological operations to signal focus, and nearly no prosody at all, except for the melodies resulting from the changed phrasing.

The crucial question, however, is whether languages with pitch accents necessarily use them for topics and foci, or whether there are exceptions. In all-new sentences, i.e. in sentences with wide focus, Nuclear Stress and the preceding secondary accents are by-products of syntactic structure. Each p-phrase has a prosodic head, realized with a pitch accent, and the last head is called Nuclear Stress. The heads always fall on a lexical stress. This has been recognized by Chomsky & Halle (1968), Cinque (1993), and by a number of other syntactically oriented linguists. Things are completely different for narrow focus, which triggers an accent as the result of its pragmatic and semantic structure. Without entering into the details of the association between narrow focus and pitch accent, it may be observed that the relationship between the two holds in most cases. A ‘straightforward’ narrow focus is associated with a pitch accent, so that Jackendoff’s generalization may be claimed to hold without exception for such cases.

There are some interesting complications, though, for which a refinement of the relation between focus and accent is called for. One type of complication is the so-called Second Occurrence Focus (Partee 1999, Rooth 2004, Beaver et al. 2004, Féry & Ishihara 2006) which combines elements of association with focus and givenness. *Only vegetables* in (7b) is associated with the focus operator *only*, and is thus a focus, but it is also given, because it is repeated from (7a). The example comes from Partee (1999).

- (7) a. {Everyone already knew that Mary only eats [vegetables]_F} (English)
- b. If even [Paul]_F knew that Mary only eats [vegetables]_{SOF}, then he should have suggested a different restaurant

Rooth (2004) and Beaver et al. (2004) find only weak correlates of accent, and no pitch excursions on postnuclear SOF, but Féry & Ishihara (2005), examining SOF in the prenuclear position, find that a pitch accent is indeed present. The height of a SOF pitch accent is intermediate between the one of a narrow focus and the one of a given prenuclear constituent. In other words, SOF is realized in a position which allows prenuclear accents, but in the postnuclear region, accents are much lower, though significantly different from a non-focused word. This fact points to the importance of the phonology of a language in general in order to understand the accent pattern.

Another type of systematic exceptions has been investigated by Féry & Samek-Lodovici (2006), who find that in some cases, pitch accents may compete. This happens for instance when two adjacent or embedded foci compete for accent, and only one can win, as illustrated with the following sentences in (8), adapted from Rooth (1992).

- (8) {Who was fighting with whom?}
- a. [A old MAN]_F was fighting with a [young BOY]_F
- b. [A OLD man]_F was fighting with a [YOUNG man]_F
- c. [A OLD man who was wearing a Texan HAT]_F was fighting with a [YOUNG man who was wearing a Texan hat]_F

In (8a) the subject is contrasting with the object, and nuclear stress applies. In (8b), Rooth's case in which the adjectives are in contrast with each other is illustrated. The contrast on the adjectives suppresses the unmarked accent on

man in the subject.⁶ It must be observed that the question elicits both a focus on the subject and on the object, and that since the first occurrence of the subject is new, an accent is expected on the noun. Féry & Samek-Lodovici (2006) provide a purely prosodic explanation for the absence of stress on *man*. In their view, it is the adjacency between this word and the contrastive adjective (both are in the same p-phrase) which forces deletion of the stress on *man*.⁷ A longer, identical subject and object do not force deletion of the accent on *hat* in the subject,⁸ as shown in (8c), showing that a purely anaphoric explanation for deaccenting *man* is not enough. If it were, the entire subject would be deaccented by virtue of being identical to the object.

This section has concentrated entirely on focus, and has shown that an accent is associated with a focus as far as possible. But the relationship maybe loosened in some special constellations. As far as topics are concerned, the examples (1) and (2) already showed that ‘topic’ is not necessarily associated with an accent, depending on which topic is under consideration. Aboutness, familiarity, implicational and contrastive are the most well-known.

6 Deaccenting

If accent is not a reliable predictor of focus, could deaccenting the backgrounded part of the sentence be a better correlate of information structure? Givenness, like backgroundedness is often indicated with lack of accent.

Immediate problems arise with this view. Givenness is not obligatorily associated with deaccenting, as shown in (9).

⁶ The accent on *man* in the object would be suppressed anyway, because of givenness and postnuclearity.

⁷ Rooth (1992) provide a semantic explanation in which *man* is deaccented because of anaphoricity.

⁸ Though it is reduced (see Selkirk 2002, 2006 for the difference between focus and FOCUS).

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- (9) {Who was loved by two men, Audrey or Lucy?}
 b. It was Lucy.

In Schwarzschild's (1999) terminology, *Lucy* in (9b) is 'entailed' by the previous question. But the fact that it was Lucy (and not Audrey) who was loved by two men is not. Givenness, thus, cannot be interpreted in a single way, and be always associated with deaccenting. Instead, givenness must be complemented with, or even replaced by 'entailment,' a semantic notion.

The second problem arising with an association of givenness with deaccenting is often a prosodic operation eliminating one of two adjacent accents, as illustrated in (8b-c). In short, deaccenting cannot be viewed as expressing uniquely givenness, as givenness cannot be assumed to be always accompanied by deaccenting.

7 Obligatory Phrasing

The last phonological correlate which has been claimed to be an obligatory phonological indicator of focus is phrasing. Prosodic phrasing is one of the most interesting aspects of the phonology of information structure, one of the reasons being its universality. No language can be said to lack prosodic phrasing. In the same way as our articulatory organs define and limit the segments we use in our inventories of sounds, our vocal tract is limited by air pressure and respiratory needs, which force the division of a long string of speech into smaller chunks of phrasing. And because these smaller prosodic chunks are compulsory, grammar use them for its own needs and insert breaks and tonal boundaries at syntactically and semantically relevant places, helping in this way both production and comprehension of speech. Another reason why prosodic phrasing requires our attention is that the syntactic reorganization of constituents in non-canonical word order, like clefting, dislocation, topicalization,

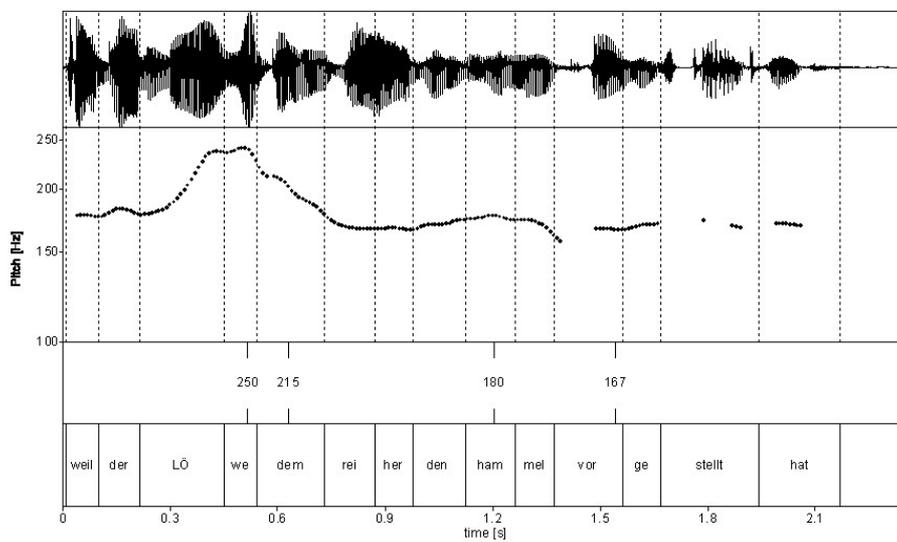
scrambling, and so on always goes together with reorganization of phonological phrasing. Because of the widespread view that phonology comes after syntax, phase-wise or as a whole module, it is seldom asked, and even more seldom answered, whether syntax may be influenced by the needs of prosody (but see for instance Samek-Lodovici 2005, Ishihara 2003, 2006 and Féry 2006, 2007 for answers).

To express information structure, tone languages and phrase languages use syntactic and morphological means, accompanied by prosodic phrasing. As an example, it has been claimed that Chichewa, a Bantu tone language, inserts an obligatory right boundary after a focused constituent, separating the focused constituent from the rest of the sentence (see Kanerva 1990). In Chichewa, phrasing is realized by non-intonational means, like sandhi tones at the lexical level, and segmental lengthening.

In German and English, the effects induced by topics and foci are obvious. Beckman & Pierrehumbert (1986) have been influential in claiming that the absence of downstep (boosting of the F_0 associated with a high pitch accent) on a focused constituent was synonymous with an intermediate phrase boundary. In their approach, an intermediate phrase, which is a domain equivalent to the one which is called p-phrase in this paper, is the domain in which downstep applies. If downstep (or catathesis, as they call the phenomenon) is interrupted, their model predicts an obligatory boundary to the next intermediate phrase. Another line of thoughts associate prosodic phrasing with syntax (Gussenhoven 1992, Féry & Samek-Lodovici 2006). In this perspective, prosodic phrasing is triggered by syntactic structure, and only marginally by information structure. Fig.1 shows an example in which a different focus structure (narrow focus in the left pitch track, wide focus in the right one) does not affect the phrasing. The only change observed in relationship with narrow focus is a raising of the high tone on the narrow focus.

- (10) a. *Weil der LÖWE dem Reiher den Hammel vorgestellt hat*
 because the.NOM lion the.DAT heron the.ACC wether presented
 has
 ‘Because the lion presented the wether to the heron’
- b. *Weil der HUMMER dem LÖWEN den RAMMLER VORGESTELLT hat*
 ‘because the lobster presented the lion to the rabbit.’

a.



b.

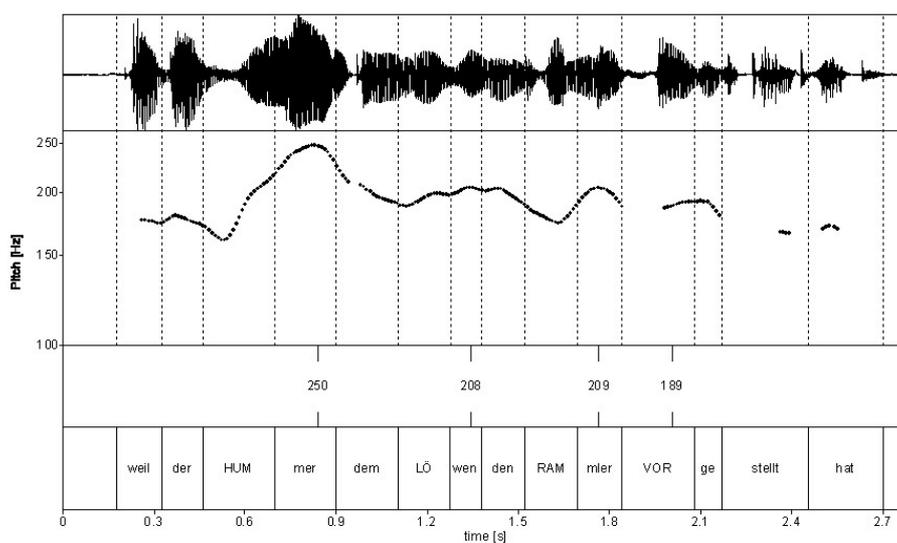


Fig.1: a. *An all-new sentence.* b. *A narrow focus on the first argument.*

Phonetic phrasing, with boundary tones and breaks, is extremely elusive because it is subject to fluctuations due to style, tempo, familiarity between speaker and hearer and so on, but once prosodic phrasing is understood as the part of grammar at the interface between syntax and phonology, it may not be necessary to rely on existing phonetic cues. To make a long story short, focus does not change the phrasing in raising the voice on the accented syllable, but it does change the phrasing in causing changes in syntactic structure.

8 Conclusion

This paper has uncovered a common misconception: that an information structural category needs to be associated to an invariant phonological (or for that matter, any grammatical) property. It was shown that the phonology is an important part of grammar for the implementation and signaling of information structure. Focus requires prominence, givenness require lack thereof, and topics are preferably located in positions in which their processing is optimal. Phonology is supportive in providing the necessary cues, but does not enter in the definition of the concepts.

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