Intonation and pragmatic interpretation of negation in Greek

Mary Baltazani
University of Ioannina, Greece

46A Iros Konstantopoulou St,
Athens 16121,
Greece
marybalt@netscape.net

keywords: negation, information structure, pragmatics, intonation

Abstract

In this paper I present the intonational structure of different types of negative sentences in Greek, show how this intonational structure relates to information structure and describe the contexts each of the different types of negative sentences is used, that is, what sort of interpretation each of them receives. More specifically, I show how the sentence level tunes used in negative sentences are composed of parts such as the topic and focus, and how this articulation of intonational structure relates to the context of an utterance, thus connecting intonation and information structure. The findings reported in this paper are relevant to the larger field of the interpretation of prosody. There has been much unsuccessful effort to give some truth-conditional interpretation to prosodic entities, such as topic and focus, however no one meaning has been found to cover all the possible uses of prosodic focus. The pragmatic interpretation of prosody advocated in this paper overcomes such problems by connecting the interpretation of prosodic constituents with the context they are found in, not with any inherent truth-conditional interpretation.

Intonation and pragmatic interpretation of negation in Greek

Mary Baltazani
University of Ioannina, Greece

1. Introduction

In this paper I examine the relation between the Information Structure and intonation of negative utterances in Greek. The term 'Information Structure'(IS) refers to the division of an utterance in parts/constituents such as old-new information, focus-background, theme-rheme. Different Information Structure partitions of a string result in different pragmatic interpretations: the string with a particular partition can be felicitous in one context but infelicitous in another. Each of the Information Structure constituents has distinct prosodic realizations, i.e., is uttered with distinct and characteristic melodies. The idea that different contexts require different melodies of a particular sentence is uncontroversial (Bolinger, 1965; Halliday, 1967; Jackendoff, 1972; Ladd, 1980, 1996; Gussenhoven, 1984; Selkirk, 1984, 1995; Erteschik-Shir, 1986; Prince, 1986; Rochemont, 1986; Ward, 1988; Pierrehumbert and Hirschberg, 1990; Steedman, 1991; Vallduví, 1992; Roberts, 1996; Vallduví and Engdahl, 1996; Büring, 1997, 1999, 2003; Schwarzschild, 1999, among countless others). From the listener's point of view, in the absence of context, the implicit knowledge of the relation between Information Structure and intonation helps the listener recover the context of the utterances—that is, understand what they presuppose or implicate—by decoding the different melodic realizations.

In the 1990's, several proposals emerged describing the Information Structure of utterances through its manifestations in intonation and word order (e.g. Steedman, 1991, 2000a, 2000b; Vallduví, 1992; Büring, 1997, 1999, 2003). These new models, mostly examining Germanic and Romance languages, showed that the simple two-dimensional focus-ground model that existed up to that point is not adequate. They make finer distinctions within these two broad categories, thus being better able to predict the intonational structure of utterances and also what contexts trigger different interpretations of these melodic realizations. Typological studies like Vallduvi's work have shown that across languages, new and old information are linguistically encoded differently not only in intonation, but also in morphology and syntax. An Information Structure model of a particular language enables us to predict what context certain intonation, word order or morphological patterns are used in.

How many IS categories are necessary cross linguistically is an empirical question, and it should be answered language by language. In this study I use negatives in Greek to address this question. I show how their intonational structure relates to information structure and describe the contexts each of them is used in, that is, what sort of interpretation each of them receives.

This remainder of this article is organized in the following way: In section 2, I give a summary of the Information Structure models proposed for English. In section 3 I propose an Information Structure model for Greek based on the comparison between affirmative and negative utterances in Greek. Section 4 concludes this paper.

2. Models of Information Structure for English

In discourse, the contribution of utterances that the participants make as well as any beliefs and knowledge agreed upon by the participants are called the *common*

ground. At the outset of any discourse the common ground contains notions like *I, you, here, now,* and knowledge of the world. Utterances that are added to the common ground are, in the general case, assumed to conform to Gricean maxims of conversation, like be relevant, be informative, be perspicuous, be truthful (Grice, 1975), which are thought of as general implicit rules that govern conversation and which participants adhere to (without of course excluding the possibility that these maxims may be flouted).

One—but not the only—way conversation proceeds is by questions and answers: Questions direct the conversation and are seen as the *context* of the answers. The construction of 'appropriate' answers is governed by specific information structure, prosodic structure, and in some cases syntactic structure conditions: a rule of thumb very commonly used is that the *new information* in the answers corresponds to the wh-constituent in questions and the remainder is the *old information.* New and old information are encoded in different ways across languages and may be distinguished from each other through differences in their prosodic prominence, in their morphological marking, or in their syntactic position in a sentence. All these informational notions fall within the realm of Pragmatics, the part of grammar that deals with interpretation of sentences that is not truth conditional (i.e. not involving the truth or falsity of their propositional content) but which involves the appropriateness of an utterance in a particular context.

New information is very often encoded in languages through focus. The term *focus* is multiply ambiguous in the literature: it has been used to refer to the pragmatic notion of new information and the division of a sentence into a focus part and a ground part (see Erteschik-Shir, 1986; Prince, 1986; Rochemont, 1986; Ward, 1988; Vallduví, 1992; Büring, 1999; Roberts, 1996, among others), the prosodic notion of a prominent pitch accent (Pierrehumbert, 1980; Pierrehumbert and Hirschberg, 1990; Ladd, 1980, 1996, among others), the syntactic notion of F-marking of constituents as they become part of a phrase marker (in the sense of Selkirk, 1984, 1995; Rochemont, 1986), or the semantic interpretation of F-marked constituents (as a set of alternatives in the sense of Rooth, 1992, among others). Such ambiguity is unsurprising given the fact that very often these notions are just different facets of the same phenomenon as it is realized in the different components of grammar.

Old, or *given*, information on the other hand does not have such uniform realization. In prosody it might be realized as de-accented material or with a special 'topic intonation'. In syntax it might be elided, or moved to a peripheral position. The semantic contribution of topics has been formalized in different ways (for a discussion of these formalizations see Büring, 1997).

Algorithms predicting the information structural realization of utterances were until very recently lopsided, paying far more attention to the focus part than the ground part. Although the field was aware that both de-accented and topicalized material belongs to the given part of an utterance there was no model to account for the distribution of the given material until very recently, in the 1990's. The new models make finer distinctions among different occurrences of new and given material (de-accented or topicalized).

I discuss three models here (Steedman, 1991, 2000a, 2000b; Vallduví, 1992; Vallduví and Engdahl, 1996; Büring, 1999, 1997, 2003). These models examine mostly Germanic and Romance languages but also extend to languages like Hungarian and Turkish. Greek shares information structural properties with many of these languages.

The presentation here serves as the backdrop against which the description of the relation between information structure, intonation, and word order in Greek is presented in section 3.

In section 2.1 I present the background that information structure theories assume, Selkirk's theory of F-marking (1984, 1995); in section 2.2 I present three models of information structure. Section 2.3 presents a summary and a comparison of the three models.

2.1 Givenness, F-marking, and accenting

All three authors whose Information Structure models I discuss build on previous theories of F-marking to derive the distribution of accents within the Focus and Topic parts, especially on Selkirk's theory (1995) of F-marking, which is an amalgam of Selkirk (1984) and Rochemont (1986). I briefly discuss this theory here.

A pitch accent, say H*, aligned with a stressed syllable is the phonetic realization of focus in Selkirk's model. The word carrying the pitch accent is called the *focus exponent.* The focus is quite often an entire phrase containing the focus exponent. Focus in Selkirk is an abstract feature F assigned in the syntax. There are rules that allow F to 'project' to bigger constituents, termed the rules of *focus projection,* shown in (1). The highest syntactic node having the F-feature is called FOC. According to Selkirk: 'A wh-question expression focuses a constituent and an appropriate answer to a wh-question must focus the same constituent.' (Selkirk, 1995:553). This is the well-known question-answer condition.

(1)   F-projection rules
        1. An accented word is F-marked
        2. F-marking the head of a phrase licenses the F-marking of the phrase
        3. F-marking the internal argument of a head licenses the F-marking of the head

Example (2) shows how F-marking works. Capitals in the examples denote the presence of a pitch accent. In (2), accent on *brother* entails that it is F-marked, by rule 1. The NP *her brother* is also F-marked by rule 2. The NP is the internal argument of the verb and thus the verb can be F-marked, by rule 3, and in turn the whole VP is F-marked by rule 2.

(2)   Q: *What did Mary do*?
        A: *She* [[*praised*]$_F$ [*her* [*BROTHER*]$_F$]$_F$]$_{FOC}$

In a quite famous example shown in (3) (Chomsky, 1971), each of the F labeled constituents may count as the FOC of the focus feature that is realized phonetically on *shirt*. As it is labeled now the example is an answer to the question 'What happened to him?' However smaller and smaller constituents can be the FOC, without a change of the focus exponent, each FOC can be the answer to a different question. The immediately smaller constituent as FOC, *to look out for an ex-convict with a red SHIRT,* would be the answer to 'What was he warned about?' The constituent *an ex-convict with a red SHIRT,* would be the answer to 'Who was he warned to look out for?' and so on.

(3)   *He was [warned [to look out for [an ex-convict [with [a red SHIRT]F]F] F] F] F]FOC*

F can be projected up to the highest VP node as shown in (3), according to the rules of focus projection in (1). So the pitch accenting of words can be used to indicate their information status as well as the information status of the phrases containing them. When more than one of the constituents dominated by FOC is F-marked, then the main prominence goes to the last Pitch Accent in the domain (compare this to the Nuclear Stress Rule in Chomsky, 1971; Jackendoff, 1972; Cinque, 1993; according to which the main prominence goes to the most deeply embedded constituent, which in simple sentences is the rightmost one).

However there are restrictions for focus projection which can be illustrated by changing the location of the final pitch accent and placing it on *red*. In this case, as shown in (4), no F-projection is possible. Only *red* can be a focus because there is no way for focus to project above the focus exponent according to the rules in (1).

(4)   *He was warned to look out for an ex-convict with a [RED]F shirt*

The definition of the focus of an utterance (FOC) as 'an F-marked constituent not dominated by any other F-marked constituent' (Selkirk, 1995:555) makes a distinction between plain F-marked constituents and FOC, which results in a three-way distinction among constituents: non-F marked constituents, which must be given, plain F-marked constituents, which must be new, and FOC constituents, which can be either new or given.

Summarizing Selkirk's (op. cit.) F-marking proposal[1], the algorithm for the distribution of accents in a sentence (ignoring fine details) is: Find the F-marked material by looking at the context wh-question, and accent F-marked XPs. The last accent within a prosodic phrase is the (Nuclear Pitch Accent, or) focus exponent. Leave given XPs unaccented. Non-given verbs can be left unaccented as long as their complement is accented. This is in broad terms the theory presupposed in the models presented in the remaining sections. These models build on Selkirk's theory and give fuller pictures of the structure of utterances by providing theories for the realization of the background part which was neglected in Selkirk (op. cit.). The order of presentation of these models does not follow chronological order. Instead I present them according to the number of information structural categories they assume—from more categories to fewer—to avoid unnecessary repetitions.

2.2 Three Information Structure models

In Büring's Contrastive Topic theory (1997, 1999, 2003) utterances are divided into three primary information units: *Contrastive Topic (CT), Background,* and *Focus,* as shown in (5). The melody L+H* L⁻ H% in example 5 (called the 'B-accent' in Bolinger, 1965) signals a contrastive topic. The melody H* L⁻ L% in example 5 (called the 'A-accent' in Bolinger, 1965) signals focus. Background is the given material, i.e., material that was in the context, and Focus in the answer must match the wh-expression in the question, according to the widely used Question-Answer condition.

---

[1] For criticisms of Selkirk's theory see Gussenhoven (1999), Sc hwarzschild (1999) and references in there.

(5)   Q: *What are people wearing to the concert*?
        A: [*ANN*]   [*is   wearing*]   [*a TUTU*]
           L+H* L⁻H%   [no accent]   H* L⁻L%
        --------------   ---------------------- --------------
            CT   *Background*   *Focus*

One of the most important contributions of Büring's (op. cit.) theory is the formalization of the conditions for the use and interpretation of contrastive topics: this model predicts when the presence of a contrastive topic is obligatory, optional, or impossible. We cannot go into the details of that model here. What we need to know is that the function of Contrastive Topics (CT) is to mark deviance from the question, in the sense that they answer a sub-question to the question asked. For example, a complete answer to (5) would give a list of the people-clothes pairs. In that sense (5A) is not a complete answer because it gives information about only one of the people going to the concert. The CT marking (which for English is prosodic) in (5A) indicates two things: the deviance from a complete answer and also the fact that questions about what other people are wearing are left open. Informally, CT marking and F marking provide different kinds of variables to substitute for the constituents they mark. In the case of (5) this would result in an open proposition of the form 'X is wearing x' with X ranging over different individuals and x ranging over different clothes. Question (5Q) is called Question Under Discussion, a term adopted from Roberts (1996).

A further division is made in this model, within the Focus and Contrastive Topic constituents: both can have a *focus* part (+F) and a *background* part (-F), shown in (6). Selkirk's (op. cit.) F-marking theory can account for the accent patterns in both Focus and Contrastive Topic constituents. According to rule 1 in Selkirk's Focus Projection rules in (1), non-F-marked constituents, that is, given ones, are not accented. At first glance this rule cannot account for the pitch accents found in topics (which count as part of the background); however since both topic phrases and focus phrases are further divided into a focus part and a ground part, rule 1 can be made to apply even for topics. So, the focus part and the background part within the Focus and the CT constituent correspond to accented and unaccented material respectively, as in (6).

(6)   Q: *What are people wearing to the concert*?
        A: [*The YOUNG people*]   [*are   wearing*] [*INFORMAL clothes*]
              L+H*   LH%   H*   LL%
              -------   ---------   ---------- -----------
               +F   -F   +F   -F
          ----------------------------   ---------------------- -----------------------
              CT   Background   Focus

In Steedman (1991, 2000a, 2000b) prosodic, syntactic, and information structure are isomorphic. Utterances are divided into two primary information units called *theme—* what the utterance is about, which in (7) is 'Mary prefers x (i.e. something)'—and *rheme*—what the speaker says about the theme, which in (7) is 'corduroy'. Theme and rheme are co-extensive with both prosodic and syntactic phrases. The notions of theme

and rheme can apply to non-standard syntactic constituents like *Mary prefers* ---which in his model are possible constituents--- as well as standard ones.

(7)   Q: *I know that Alice likes velvet. But what does MARY prefer*?
        A: [*MARY prefers*]$_{Theme}$ [*CORDUROY*]$_{Rheme}$.

       Intonational constituents must have coherent translations at information structure. The rheme is interpreted based on the 'focus meaning' of Rooth (1992, 1996): a set of propositions of the form 'Mary prefers x'. Steedman calls this interpretation the 'Rheme Alternative Set'. As for the theme interpretation, in his later work Steedman (op. cit.) proposes a theory very close to Büring's theory of Contrastive Topic. He terms the interpretation of themes 'Theme Alternative Set'. This is a set of Rheme Alternative Sets arrived at in the case of (7) by substituting the pitch accented *Mary* with other contextually accessible people: {{Mary prefers x}, {Lilly prefers x}, {Victor prefers x}, …}.

       Theme and rheme themselves are further divided into a *focus* part and a *background* part which correspond to the accented and unaccented material respectively. Example (8)² illustrates the division of a sentence into the theme and rheme parts and also the internal structure of each of these partitions:

(8)   Q: *What will the pop stars sing after the prime minister's speech about China?*
        A: [*The FEmale pop stars*]   [*will sing*]   [*SONGS about China*]
            L+H*   LH%   H*   LL%

          --------------- --------------------------   --------- ----------------
          Focus   *Background*   *Focus*   *Background*
          ---   --------------------------
                 Theme   *Rheme*

       Compared to the Büring (op. cit.) model, the Steedman model utilizes one less category: where the former makes an initial partition of the utterance into three parts, Contrastive Topic, Background, and Focus, the latter recognizes two categories, the Rheme which is analogous to Büring's Focus, and the Theme, which is analogous to Contrastive Topic and Background combined. In (8), the verb *is wearing* is part of the theme whereas in Büring it would be the Background. As far as the accenting properties of the verb itself are concerned, both models make the same predictions, i.e., the verb does not carry a pitch accent. However, I believe that the Steedman model makes wrong predictions about the location of the prosodic boundary: the LH% movement in (8), according to my non-native intuitions, should be at the end of the subject phrase [*the female pop stars*] not at the end of the verb *sing*. This of course is an open question subject to empirical verification.

       In the model described in Vallduví (1992) and Vallduví and Engdahl (1996) utterances are partitioned into three components: *Focus, Link*, and *Tail*, where the latter two together are called the *Ground*, shown in (9).

---

² I thank Daniel Büring for this example.

(9)

```
                        Utterance
                        /      \
                  Ground        Focus
                  /    \
              Link      Tail
```

One of Vallduví's major contributions is showing that different languages encode information categories differently. In Catalan these different components are syntactically encoded through constituent order: Link material is clitic dislocated to the left, tail material is clitic dislocated to the right, and only focus material stays within the main clause. Greek shares these characteristics with Catalan. That is, Links are dislocated to the left and Tails can be—but don't have to be—dislocated to the right. However in Greek Links also have special prosodic 'Topic' intonation, which is presumably absent from Catalan Links. In English, intonation and constituent order can signal information structure. According to Vallduví, in English Focus is marked by intonational prominence, in particular H*, Links are marked by L+H* pitch accents and optionally leftward dislocation, and Tails are typically de-accented.

For the interpretation of the different components of information structure Vallduví adopts a 'file-update' metaphor, which we will now go into. What is interesting for our purposes is that each component recognized in this model receives a different interpretation and realization, in prosody, morphology, syntax, or any combination of them, depending on the language.

Example (10) illustrates the partition according to the Vallduví model. Boundary tones aren't shown here because they are not mentioned in Vallduví.

(10)   Q: What are people wearing to the concert?
        A: [ANN   [is   wearing]] [a black   PANT   suit]
           L+H*   H*
           ---------- ------------------ --------- --------- ------
           Link   *Tail*   *?*   *Focus*   *?*
           ----------------------------- -----------------------------------
                   Ground   *Focus*

If we compare this labeling to that of the previous two models, the differences and similarities among them become clear. Vallduví's Link can be equated with Steedman's (op. cit.) Theme and Büring's (op. cit.) CT; Vallduví's Focus to Steedman's Rheme and Büring's Focus. The information structural component that is missing from Vallduví's model is the 'background' part of the Focus and Link phrases.

Table 1 is helpful in clearing up the unfortunate ambiguity of all these terms. In Vallduví's model there is no description of the internal structure of Link and Focus and no prediction about the accent distribution within them. If I understand the Vallduví' model correctly, Tail should not be equated with the background/unaccented part of Links, but with the Background proper found in the Büring system and missing from the
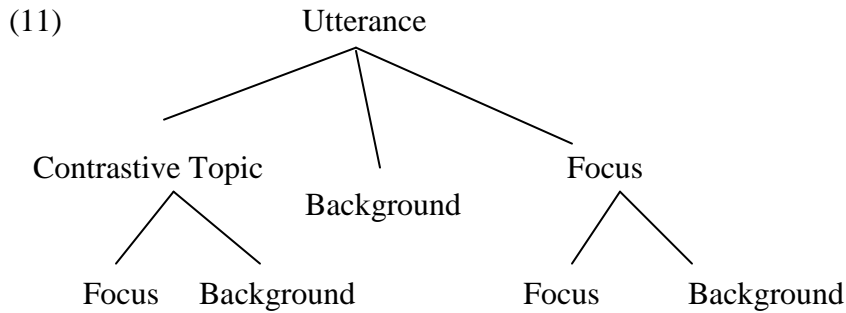
Steedman system. One reason is that, according to Vallduví, Links but not Tails can undergo leftward dislocation. Another reason is that Links and Tails receive different interpretations.
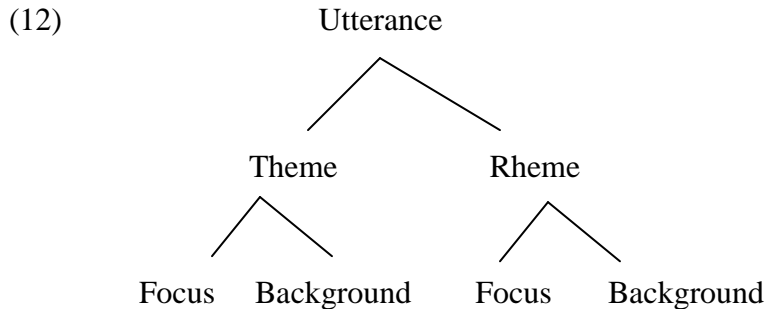
[TABLE 1]

2.3 Summary

Researchers' views about the realization and interpretation of the major categories in Information Structure are starting to converge. They agree on the opposition between focus and the rest of the utterance and furthermore they agree that the structure of this 'rest of the utterance' is rich and contributes to the interpretation of the utterance. In (11-13) I give schematic representations of the three models we examined for easy reference and comparison.

The Büring (op. cit.) model is shown in (11):

(11)
```
                        Utterance
           /                |               \
  Contrastive Topic     Background          Focus
       /    \                              /     \
   Focus   Background                  Focus    Background
```

The Steedman (op. cit.) model is shown in (12):

(12)
```
                      Utterance
                  /              \
              Theme              Rheme
             /    \             /     \
        Focus   Background   Focus   Background
```

The Vallduví (op. cit.) model is shown in (13):

(13)
```
                 Utterance
              /            \
          Ground          Focus
          /    \
       Link    Tail
```

9
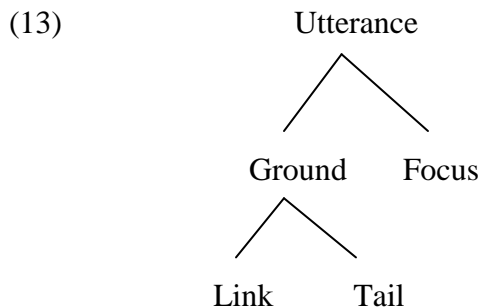
The number of information structural categories is different in each model. Further research is necessary before we can decide whether we need to make distinctions for more or fewer categories of Information Structure. Generally, the predictions of these models about the prosodic realization of utterances have not been experimentally tested and the realizations of the utterances they describe have not been instrumentally shown. How many IS categories are necessary is an empirical question, and it should be answered language by language. In section 3 I propose a model for Information Structure and the realization of its components in Greek. I give evidence for the proposed model through the comparison between affirmative and negative utterances. I also provide instrumental analysis of the utterances presented in Greek.

3. The Greek data

In the preceding section I showed that researchers have not yet reached a consensus on the internal organization of Information structure. In this study I use negatives in Greek to show how intonational structure relates to Information Structure and describe the contexts each of the different types of negative sentences is used. This is only a first step towards a more complete typology of Information Structure systems. More languages and more sentence types need to be studied. (Also see Haidou, 2000 for the connection between word order, focusing, and intonation in Greek).

The presentation of the structure of negative utterances, in section 3.2, can be better appreciated in comparison to the structure of affirmative statements, which is presented in section 3.1. The prosodic labeling of the utterances I present is based on the analysis of the prosodic and intonational structure of Greek developed in Arvaniti & Baltazani (2000, 2004) within the autosegmental/metrical framework of intonational phonology (Pierrehumbert, 1980; Ladd, 1996) and the system created for the annotation of Greek spoken corpora based on that analysis, Greek ToBI (GRToBI).

3.1 Statements

The relation between the intonation and Information Structure of statements has been studied in detail in Baltazani (2002). Here I give a brief overview of the main facts so that the discussion on negatives can be better followed.

The intonation structure of topics and foci in Greek has been studied fairly well. It has been shown that focused items are associated with a rising Nuclear Pitch Accent (NPA)—typically a L+H* pitch accent—longer duration, and post-focal de-accenting (Botinis, 1989; Baltazani & Jun, 1999; Arvaniti and Baltazani, 2000, 2004). Furthermore, these researchers have shown that topics usually form a separate prosodic phrase with a L* NPA and a H boundary. Baltazani (2002) establishes that the intonational realization of tails is de-accenting.

We now turn to the contexts in which topics, foci, and tails are used. Greek obligatorily marks all IS categories intonationally, just like English, but, unlike English, the order of IS constituents is not free—it is a non-plastic language in the sense of Vallduví: the order is Topic>Focus>Tail, thus employing both word order (like Catalan) and intonation (like English) to mark information structure.

The use of foci and tails in Greek is illustrated by the following examples. Consider the dialogues in (14) and (15). The question in (14), 'Who did Eleni praise in

the meeting?' requires an answer with narrow focus on the object *Virona*, shown with square brackets around the object. This question is followed by two answers, A1 and A2, which differ in word order, Verb-Object and Object-Verb respectively. Either of these answers can be used to answer the question. The question in (15), 'What did Eleni do in the meeting?' requires an answer with VP focus, shown with square brackets around the whole VP. This question is also followed by the same two answers, A1 and A2, but only the first one is a felicitous one, we will see why shortly.

(14) Q: *Poion   epenese   I   Eleni   sto   simvoulio*?
          who-acc praised-3s the Eleni-nom in-the meeting
          'Who did Eleni praise in the meeting?'
      A1: *Epénese*   [*to VÍRONA*]$_F$
          praised-3s   the Virona-acc
      A2: [*to VÍRONA*]$_F$ *epénese*
           the Virona-acc praised-3s
          'She praised Virona'
(15) Q: *Ti   ekane   I   Eleni   sto simvoulio*?
          what did-3s the Eleni-nom in-the meeting
          'What did Eleni do in the meeting?'
      A1: [*Epénese   to VÍRONA*]$_F$
           praised-3s the Virona-acc
      A2: #[to *VÍRONA*]$_F$ *epénese*
           the Virona-acc praised-3s
          'She praised Virona'

The prosodic realization of the A1 utterance is shown in Figure 1: the main sentence stress is a H*+L Nuclear Pitch Accent (NPA) on the object and a L*+H pre-nuclear pitch accent on the verb. The utterance in A2, on the other hand, has a different intonation structure, shown in Figure 2. The object that has moved to the beginning of the utterance is carrying the NPA. There are no accents on the verb because, like all post-nuclear material, it is de-accented.

[FIGURE 1]

[FIGURE 2]

We now turn to the felicity of these answers. Either A1 or A2 is acceptable for question (14), but A2 is infelicitous in the context of question (15). Let us see why. The object *Virona* carries the NPA and when it moves to the left, the verb, like all post-nuclear material, is unaccented. This makes no difference in (14) because the verb there is old information and does not have to carry an accent. In (15), however, the whole VP is F marked since it is new. Leftward movement of the object leaves the verb, which not given, in the tail and this results in infelicity. Informally stated, the rule is that material in the tail must be given. Note, however, that the reverse does not hold, that is, given material does not have to be in the tail, as answer (15-A1) suggests. The verb there is given and although it is not in the tail, the utterance is perfectly acceptable in the context.

11

In other words, Greek does not prosodically mark pre-nuclear given material. (In an analogous sentence in English the verb has been claimed to remain unaccented.)

Let us now turn to the use of topics, thus completing the presentation of all three Information Structure categories in statements in Greek. (16A) – (16C), differing in word order and in intonational structure, can all be answers to (16Q), 'Who ate the lettuce?'. However, these three sentences are not interchangeable—as I show in (17)—because they imply different things about their context. (16A), '*Manolis ate the lettuce*' is a straightforward answer to (16Q). (16B), *'As for the lettuce, Manolis ate it'* and (16C), *'As for eating it, Manolis ate the lettuce'* implicate that there are other relevant questions: about more foods and more actions, other than eating, respectively. These implied questions are indicated by the prosodic marking of topics, as shown in the figures below.

(16)   Q: *Ta maroulia poios ta   efage*?
              the lettuces-acc who   them ate-3s
            "Who ate the lettuce?"
         A.[*o MANOLIS*]_{Focus} [*ta efage   ta maroulia*] _{Tail}   S clitic-V O
              the Manolis   them ate the lettuces-acc
         B. [*ta maroulia*]_{Topic} [*o MANOLIS*]_{Focus} [*ta efage*] _{Tail}   O S clitic-V
              the lettuces-acc   the Manolis   them ate
         C. [*ta efage*]_{Topic} [*o MANOLIS*]_{Focus} [*ta maroulia*] _{Tail}   clitic-V S O
              them ate   the Manolis   the lettuces-acc

In all three answers in (16), the subject *o Manolis* carries a focus pitch accent (L+H*), because it corresponds to the wh-element in the question, and it is followed by post-focal de-accenting. Sentence (16A) has SVO order and everything except the subject is de-accented, forming the *tail*. Figure 3 shows the prosodic realization of this utterance.

[FIGURE 3]

In (16B) the object appears to the left of the subject and the verb is final, as shown in Figure 4. The object, *marulia*, forms the topic phrase with a L* NPA and a H⁻ boundary. The unaccented clitic-doubled verb forms the tail.

[FIGURE 4]

In (16C), the verb is the topic and the object is the tail, as shown in Figure 5.

[FIGURE 5]

The examples in (17) show a context in which two of the three word orders presented in (16) are inappropriate. (17Q), 'And who ate the veggie dishes?' is a super-question to that in (16Q) (cf. Roberts, Büring).

(17)   Q: *Ta   diafora piata   me   ta laxanika poios   ta   efage*?
               the various dishes with   the veggies who   them   ate
             'Who ate the veggie dishes?'
          A. # [*o MANOLIS*]_F   [*ta   efage ta maroulia*] _{Tail}

the Manolis-nom them ate-3s the lettuces-acc
B. [*ta maroulia*]_{Topic} [*o MANOLIS*]_F   [*ta efage*] _{Tail}
the lettuces-acc   the Manolis-nom them ate-3s
C. # [*ta efage*]_{CT} [*o MANOLIS*]_F   [*ta maroulia*] _{Tail}
them ate-3s the Manolis-nom   the lettuces-acc

(17A) is infelicitous because the object *ta marulia* is in the tail without having been mentioned in the context, i.e., new. We have established that new material cannot be in the tail in statements. The answer in (17C) is inappropriate for the same reason. (17B) is the only appropriate answer: the object *ta marulia* is topic marked and this prosodic marking indicates that the speaker is following a 'dish by dish' strategy of answering the question in (17) and her answer implies there are other relevant dishes in the discourse. Crucially, the material in the topic phrase counts as given in the discourse even though it has not been previously mentioned (cf. "accessible topics", Chafe, 1974). By topic-marking a phrase, the speaker both introduces the topic and she also retro-actively declares it part of the background by implying a question which contains that topic material. This is the difference between topics and tails: both contain given material, but tails have to contain *explicitly* given material (cf. "textually accessible" information, Prince, 1981).

We are now in a position to give an answer to the question how many Information Structure (IS) categories are necessary. The answer, shown in (18), involves two levels: The higher level of Information structure categories and the lower level of linguistic encoding of these categories. The higher level is more or less invariant across utterance types, at least for Greek, but the lower level changes, as we will see for negative utterances.

(18)

UTTERANCE (STATEMENTS)

Topic   *Focus*   *Tail*   ←——— IS constituents

PA[3] NPA   PA   NPA   de-accent   ←——— Encoding

Given   **New**   **Given**   ←——— Pragmatic Status
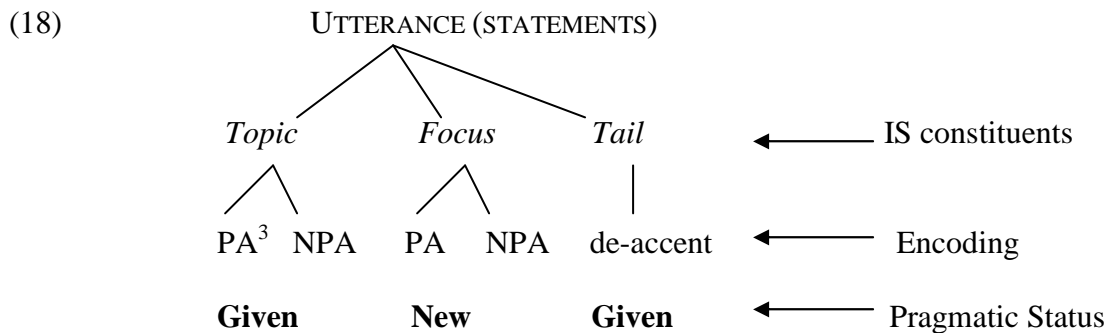
3.2 Negatives

Baltazani (2002) shows that there are two types of negative melodies in Greek. One is used when the negation is new in the discourse, the other when negation is given in the discourse. Let us start with *new negation*. Consider example (19), an all new, out of the blue negative statement. Imagine the following happens in the middle of the night:

---

[3] Both topic and focus can contain more than one pre-nuclear pitch accents, (PA). Figure (18) shows only one PA per phrase to keep the picture clean.

(19) (*Ksipna   Manoli!)   Den esthánome kalá*
       wake up-imp   Manoli-voc not feel-1s   well
       'Wake up Manoli! I'm not feeling well.'

The intonational realization of the negative utterance in (19) is shown in Figure 6. The negation, which is typically first in linear order, carries the L*+H NPA and all following material is de-accented. The boundary is a rising tone. This tune is used for out-of-the-blue negative statements, where all constituents are new, as well as for negative statements where some of the constituents are given, but where crucially the negation is new information. In both kinds, negation carries the L*+H NPA and all following material carries no accent regardless its pragmatic status as new or old.

[FIGURE 6]

Let us look at an example where negation is new information but the following material is given information. Imagine the following context: a friend and I are talking about how many people are coming to our party. My friend asks me if Eleni and Manolis are coming and I reply negatively, as in (20). The same tune as that for (19) is used here too because the negation is new information in this context. Note that in this example all the remaining words are given because they were in the question.

(20) Q: *Tha érthun   I   Eléni ki o Manólis?*
         will come-3p the Eleni and the Manolis
         'Will Eleni and Manolis come?'
     A: *Nomízo   den tha érthun   I   Eléni ki o Manólis.*
         Think-1s   not will come-3p the Eleni and the Manolis
         'I think Eleni and Manolis will not come'

Figure 7 shows the intonational realization of the utterance in (20A). The negation is carrying the L*+H NPA, and F0 falls during the following verb, remaining low until right before the final syllable. At the end there is a !H% boundary tone, which reaches only the middle level of the speaker's range. For negatives the prosodic realization of the material after the negative nucleus is the same, they are de-accented regardless of whether they are new or given information. We will return to this last point.

[FIGURE 7]

Let us now see what melody is used when negation is given in the discourse. Imagine this context: my friend and I are talking about the people coming to the party. My friend wants to know which of the people we invited are not coming. My answer is string identical to the one in example (21). However, the negation in my answer is discourse old since it is already in the context.

(21) Q: *posoi   den tha erthun   sto   party?*
         How-many not   will come-3p to-the party
         'How many people are not coming to the party?'

14

A: *Nomízo den tha érthun I Eléni ki o Manólis.*
   'I think that Eleni and Manolis will not come'

The information status of the negation affects the choice of melody used for the utterance, as shown in Figure 8: The negation is part of a separate topic phrase comprising the 'old information' negatio n + verb, with a L* NPA on the verb *erthun* and a H- phrase accent at the end of the prosodic phrase (labelled *intermediate phrase* in GRToBI). The second intermediate phrase contains the subject phrase *i Eleni ki o Manolis* with a high nucleus on the last word followed by a L boundary. The 'main sentence stress' of the utter ance is this final pitch accent. Informally put, this type of sentence does not have the feel of a negative sentence at all. The illocutionary force of a sentence is not negative, unless negation carries the main sentence stress in Greek. In their written form then, sentences like (20) and (21) are not distinguished out of context, and it is prosody alone which can disambiguate them out of context.

[FIGURE 8]

So far we have established the status of focus and topic categories in negatives, as shown schematically in (22). I would like to turn now to the problem I mentioned earlier in connection with examples 19 and 20. We saw there that with new negation, the nuclear pitch accent is invariably aligned with the negative particle *den* 'not' and everything following negation is de-accented even if it is discourse-new. Two requirements are conflicting here: on the one hand the realization of new information which is done through accents and on the other hand the prosodic requirement to de-accent all post-nuclear accents. Greek seems to value the prosodic requirement more.

(22)   NEGATIVE UTTERANCE (TENTATIVE)
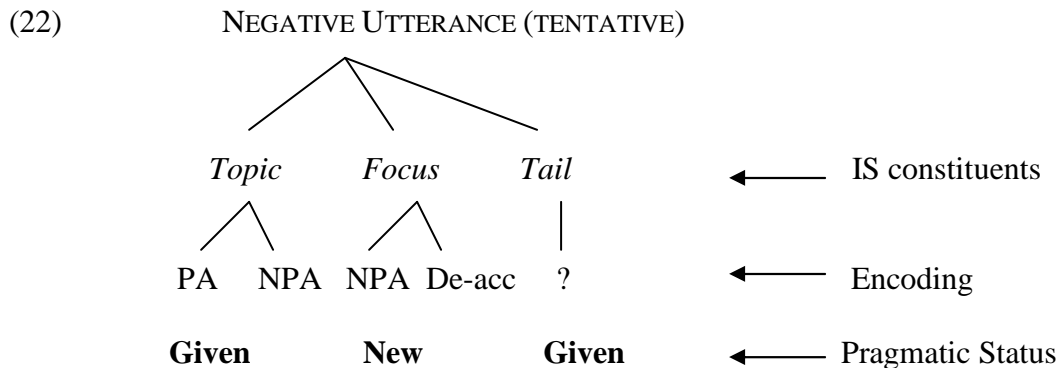
There is further complication concerning de-accenting. Recall that for statements, de-accenting uniquely encodes tails, which contain explicitly old information. For negatives de-accented material is not necessarily old. So how are tails encoded? In what follows I give evidence that will help us fill in the place marked with a question mark in (22). The way Greek uniquely encodes tails in negatives is not prosodic since intonation cannot be used in this case. Consider the following context. I meet Manolis' mother and I ask her *o Manolis tha paei sinema?* 'will Manolis go to the movies?'. If her answer is (A1), I will understand that to imply that he won't go to the cinema, but he will go somewhere else. If her answer is (A2), with the object elided, I will understand that to be

15

non-committal, just answering my question negatively, without any implicatures. In other words, the elided material encodes the discourse given material, the tail.

(23) Q. *O Manolis tha pai sinema?*
　　　　'Will Manolis go to the movies?'
　　A1. *De tha paei sinema*
　　　　not will go-3s movies
　　A2. *De tha   paei   ___*
　　　　not   will   go-3s

　　We can now fill in the missing category, the encoding of tails in negatives, as shown in (24).

(24)　　　　　　　NEGATIVE UTTERANCE (FINAL)
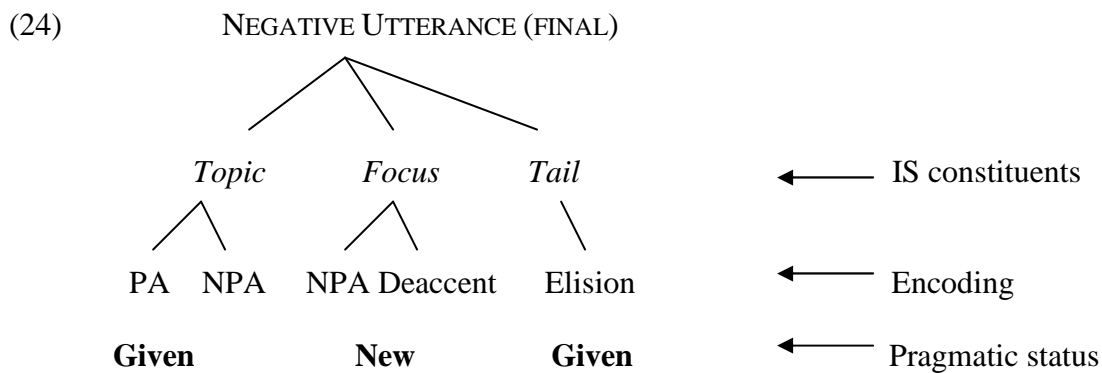
　　This chart is not entirely unproblematic, because it indicates that de-accented material under the focus part is new but, as we saw, de-accented material in negatives is not always new. A more serious problem, which remains open, is that the non-elided 'sinema' in example (23A), has a strong flavor of topic-hood in that it gives a partial answer to the question asked. Despite these problems, it is clear that more utterance types need to be investigated before we can arrive at more complete models of Information structure.

4. Conclusion
　　In this paper I showed the need to recognize three separate basic Information Structure categories in Greek: topic, focus, and tail. Much more research is necessary to determine the finer details of Information Structure of course.
　　Summarizing, we saw that in some cases these Information Structure constituents very cleanly map to prosodically distinct entities: topics form their own prosodic phrase with a specific melody, foci form a second prosodic phrase containing the main stress of an utterance and tails get typically de-accented. However I also showed types of utterances like negatives in which the encoding of information structural categories is not entirely prosodic. In these utterances focus constituents do not always get accented and de-accenting does not always show old information.
　　These results show that there is no 1-to-1 relation between prosody and Information Structure. Concentrating on the Information Structure categories of Focus and Tail, which encode new and given information respectively, we saw that they are

realized in different ways across sentence types in Greek. These results are very relevant to the larger field of prosody and its interpretation.

What I also hope has become clear is the need to examine the intonation of different sentence types cross-linguistically to establish both the number of necessary IS categories as well as the way each of the categories is encoded in the grammar.

References

Arvaniti, A. & M. Baltazani 2000. Greek ToBI: A system for the annotation of Greek speech corpora. *Proceedings of the Second International Conference on Language Resources and Evaluation* (*LREC2000*), vol. 2:555-562.

Arvaniti, A. & M. Baltazani 2004. Intonational analysis and prosodic annotation of Greek spoken corpora. In S.A. Jun (ed.) *Prosodic Typology: The Phonology of Intonation and Phrasing*, Oxford University Press.

Baltazani M. 2002. *Quantifier scope and the role of intonation in Greek.* PhD Thesis, UCLA.

Baltazani, Mary & Jun Sun-Ah 1999. Focus and topic intonation in Greek. In *Proceedings of the XIVth International Congress of Phonetic Sciences*, vol. 2:1305-1308.

Bolinger, Dwight 1965. *Forms of English: Accent, Morpheme, Order*. Edited by I.Abe & T. Kenekiyo. Cambridge, MA: Harvard University Press.

Botinis, A. 1989. *Stress and Prosodic Structure in Greek* (Lund: Lund University Press).

Büring, Daniel 1997. *The meaning of Topic and Focus – The 59th Street bridge accent.* London: Routledge.

Büring, Daniel 1999. Topic. *Focus -- Linguistic, Cognitive, and Computational Perspectives*, ed. by Bosch, Peter & Rob van der Sandt, 142-165, CUP.

Büring, Daniel 2003. On D-trees, beans, and B-accents. *Linguistics and Philosophy*.

Chafe W. 1974. Language and consciousness, *Language* 50, 111-33.

Chomsky, Noam 1971. 'Deep Structure, Surface Structure and Semantic Interpretation', in Steinberg, D. & L. Jacobovits (eds.) *Semantics, an Interdisciplinary Reader in Philosophy, Linguistics and Psychology*, Cambridge University Press, Cambridge, pp. 183-216.

Cinque, Guglielmo 1993. 'A null theory of phrase and compound stress'. *LI* 24(2):239-297.

Erteschik-Shir, N. 1986. Wh-questions and focus. *Linguistics and Philosophy* 9, 117-49

Grice, H. Paul 1975. Logic and conversation. In *Syntax and semantics*, volume 3. the academic press, New York.

Gussenhoven, Carlos 1984. *On the grammar and semantics of sentences accents.* Dordrecht: Foris.

Gussenhoven, Carlos 1999. On the Limits of Focus Projection in English. In P. Bosch and R. van der Sandt (eds.), *Focus: Linguistic, Cognitive, and Computational Perspectives*, 43–55. Cambridge UK: Cambridge University Press.

Haidou, Konstantina 2000. Word order, DP-focusing and the PF interface: the case of Modern
Greek. *SOAS Working Papers in Linguistics* 10. 161-192.

Halliday, M.A.K. 1967. 'Notes on Transitivity and Theme in English, Part II'. *Journal of Linguistics* 3:199-244.

Jackendoff, Ray 1972. *Semantic interpretation in generative grammar*. Cambridge, MA: MIT Press.

Ladd, D. Robert 1980. *The structure of intonational meaning: evidence from English.* Bloomington: Indiana University Press.

Ladd, D. Robert 1996. *Intonational Phonology.* Cambridge University Press.

Liberman, Mark and Janet Pierrehumbert, 1984. 'Intonational Invariance Under Changes in Pitch Range and Length', in M. Aronoff and R. Oehrle (eds.), *Language Sound Structure: Studies in Phonology Presented to Moris Halle by his Teacher and Students* (Cambridge, MA: The MIT Press), 157-233.

Pierrehumbert, Janet 1980. *The Phonology and Phonetics of English Intonation*. PhD dissertation. MIT (published 1987 by Indiana University Linguistics Club).

Pierrehumbert, Janet & Julia Hirschberg 1990. 'The Meaning of Intonational Contours in the Interpretation of Discourse'. In: Cohen, P. & J. Morgan & M. Pollock (eds) *Intentions in Communications*. Cambridge, MA: MIT Press. 271-311.

Prince, Ellen F. 1981. Topicalization, focus-movement, and Yiddish-movement: a pragmatic differentiation. *Proceedings of the Berkeley Linguistic Society 7*, 249–264.

Prince, Ellen F. 1986. On the syntactic marking of presupposed open propositions. *CLS (Parasession)* 22, 208-22.

Roberts, Craige 1996. Informative structure in discourse: towards an integrated formal theory of Pragmatics. *OSU working papers in Linguistics 49: Papers in Semantics*, ed. by J.H. Yoon and A. Kathol.

Rochemont, Michael 1986. *Focus in Generative Grammar*. Amsterdam/Philadelphia: John Benjamins.

Rooth, Mats 1992. A theory of focus interpretation. *Natural Language Semantics* 1:75-116.

Rooth, Mats 1996. Focus. *The Handbook of Contemporary Semantic Theory*, ed. by S. Lappin, 271-298. London: Blackwell.

Schwarzschild, Roger, 1999. GIVENness, AvoidF and other constraints on the placement of accent. *Natural Language Semantics* 7(2): 141-177.

Selkirk, Elisabeth 1984. *Phonology and Syntax: The Relation between Sound and Structure*. Cambridge, MA: MIT Press.

Selkirk, Elizabeth. 1995. Sentence prosody: Intonation, stress, and phrasing. *Handbook of Phonological theory*: 550-569.

Steedman, Mark, 1991. Structure and intonation. *Language* 67: 260-296.

Steedman, Mark, 2000a. Information structure and the Syntax-Phonology Interface. *Linguistic Inquiry* 31:649-689.

Steedman, Mark 2000b. The Syntactic Process. MIT Press.

Vallduví, Enric, 1992. *The informational component.* Garland

Vallduví, Enric and Elisabet Engdahl 1996. The linguistic realization of information packaging, *Linguistics* 34, 3(459-519).

Ward, Gregory 1988. *The semantics and pragmatics of preposing*. New York: Garland.

List of Figures and Tables

	TOPIC	BACKGROUND	FOCUS
Büring	CT ⏜ Background ⏜ Focus	Background	Focus ⏜ Background ⏜ Focus
Steedman	Theme ⏜ Background ⏜ Focus	¿Missing?	Rheme ⏜ Background ⏜ Focus
Vallduví	Link ⏜ ¿Missing? ⏜ Focus	Tail	Focus ⏜ ¿Missing? ⏜ Focus

Table 1. Correspondence of the terms used for the information structural categories in the models of Büring, Steedman, and Vallduví.
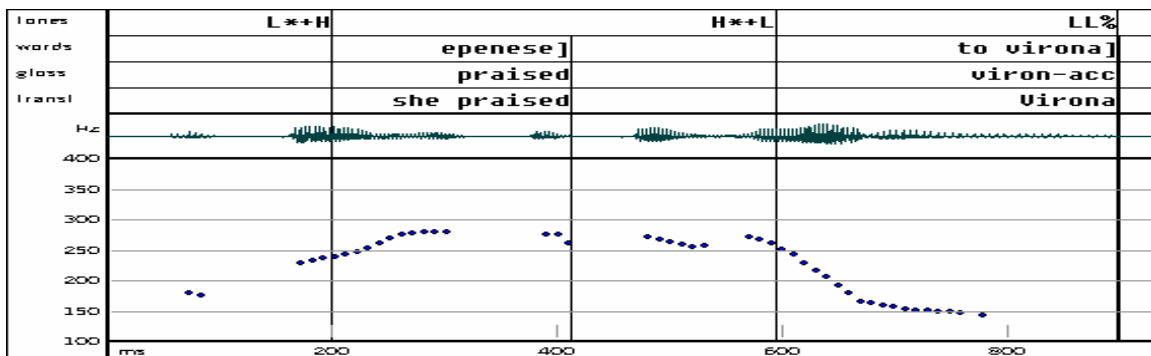

Figure 1.Verb-Object answer: *Epénese to Vírona* 'She praised Virona'
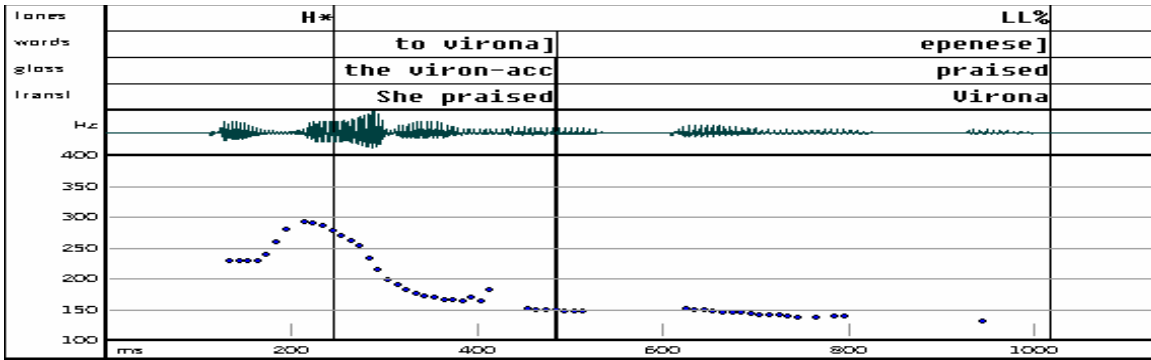
Figure 2. Object-Verb answer: *to Vírona epénese* 'She praised Virona'
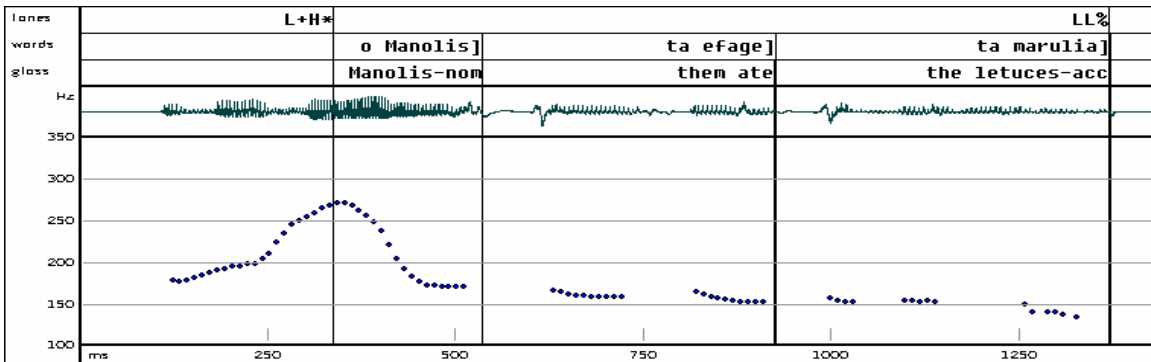
Figure 3. S clitic-V O answer of the question in 16Q.
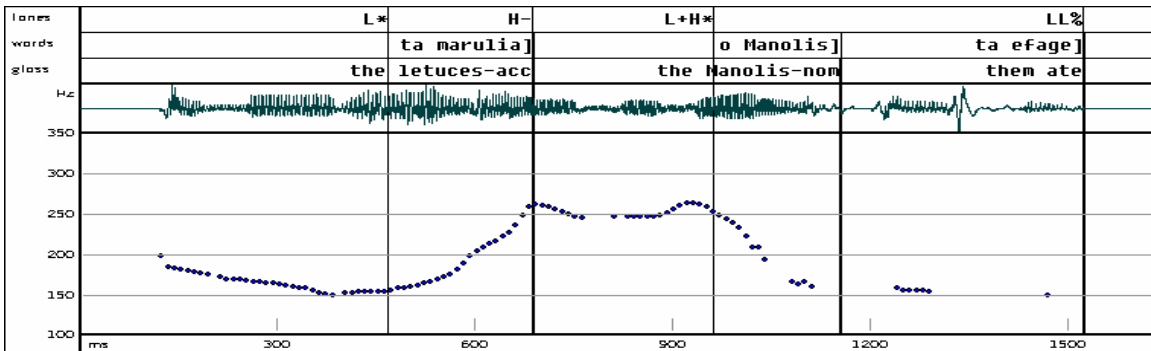
Figure 4. O S clitic-V answer of the question in 16Q.
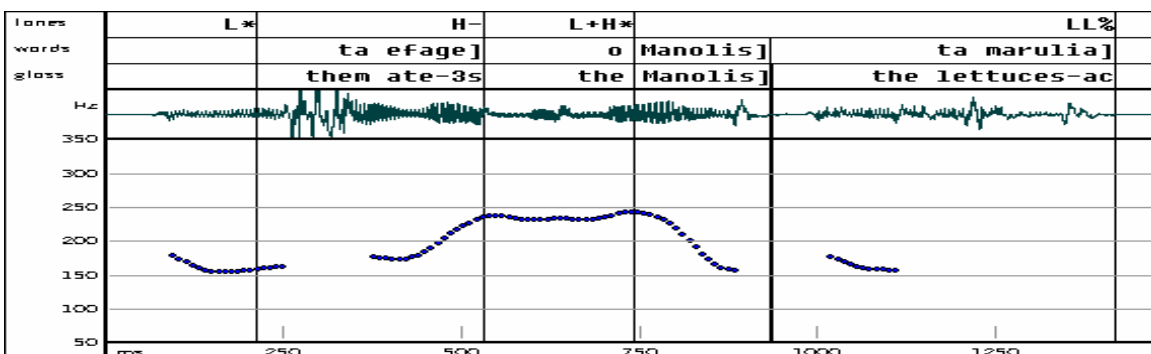
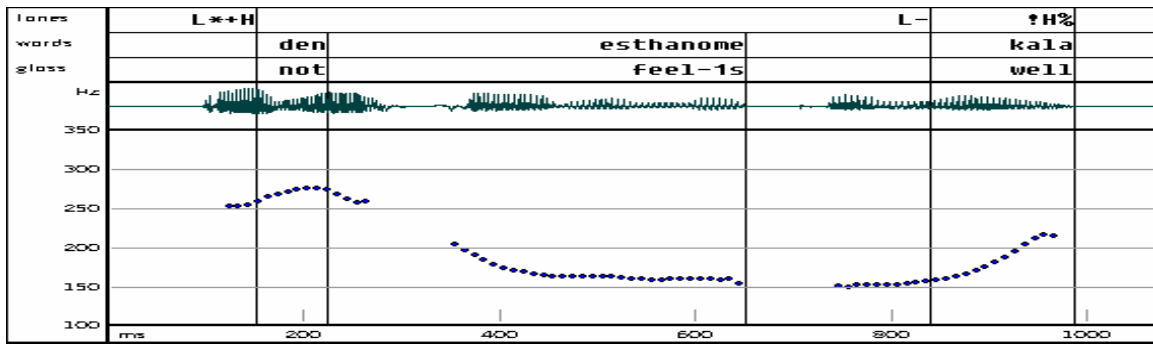Figure 5. Clitic-V S O answer of the question in 16Q.

Figure 6. Typical negative utterance in Greek in which the negation is new in the context.
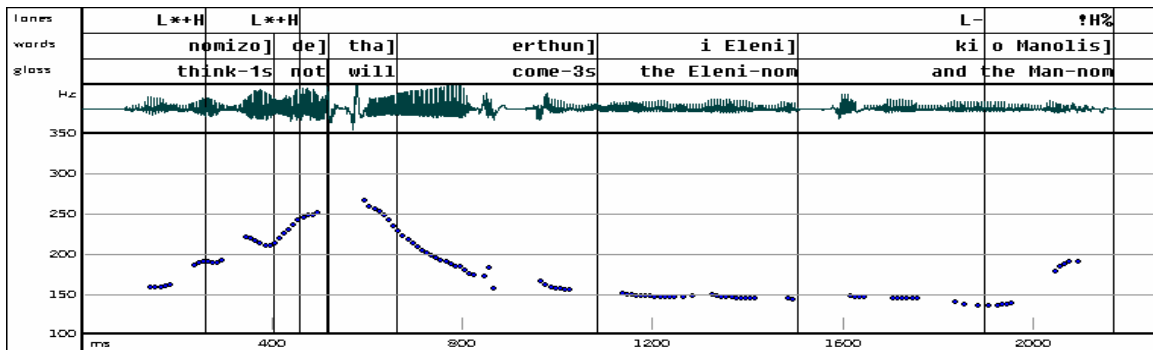

Figure 7. A negative utterance containing negation that is new in the context, followed by given material: *Nomízo den tha érthun I   Eléni ki   o Manólis* 'I think Eleni and Manolis will not come'
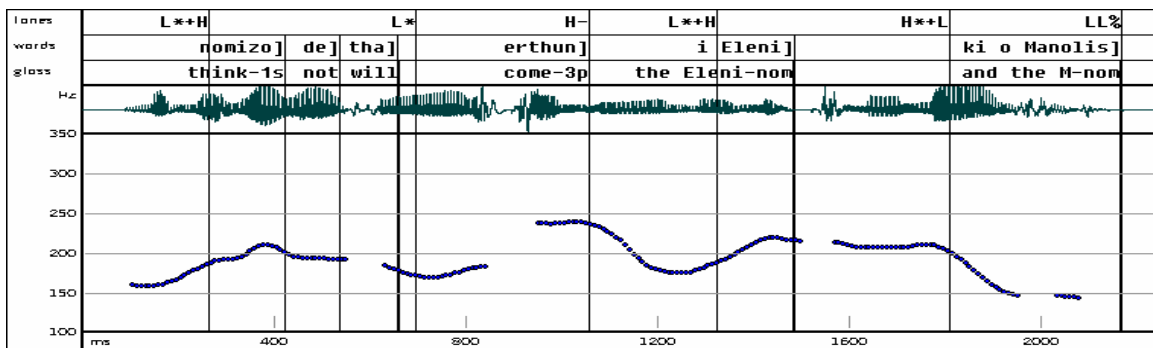

Figure 8. A negative utterance containing discourse-old negation: *Nomízo den tha érthun I Eléni ki   o Manólis* 'I think Eleni and Manolis will not come'

Short biographical note

Employment

2004 to present: Lecturer at the Department of Philology, Section of Linguistics, University of Ioannina, Greece.
2003-2004: teaching position at the Department of Philology, University of Crete, Greece.

Education

2002: PhD in Linguistics, University of California, Los Angeles (UCLA).
1998: M.A. in Linguistics, UCLA.
1996: B.A. in Linguistics, UCLA.

Research interests

Phonetics-phonology, intonation and pragmatics; the interface of phonetics with phonology; the interface of intonation with pragmatics, semantics, and syntax; Greek ToBI and the systematic analysis of the prosodic and intonational structure of Greek; application of GRToBI for speech technology.