A Prosodic Projection for Role and Reference Grammar[1]

Abstract

The purpose of this chapter is to introduce a prosodic projection into the RRG inventory of grammatical representation. This is a development of previous research in O'Connor (2006). In particular the prosodic projection enables investigation of prosodic aspects of information structure (focus structure) within the RRG framework to proceed alongside existing investigation of syntactic and other means of expressing and representing information structure. The prosodic projection is based on the Autosegmental-Metrical/Tones and Break Indices (AM/ToBI) approach to the representation of intonation. The AM/ToBI representation is adapted into RRG through a redefining or prosodic structure in terms of concepts like prosodic 'template' and prosodic 'inventory', which already have a degree of familiarity within RRG through their syntactic counterparts.

1. Introduction

Role and Reference Grammar (RRG) is characterized by the representation of different components of grammatical structure via a series of projections, namely the constituent projection, the operator projection and the focus structure projection, which are supplemented by a semantic representation. These projections can be related to one another and can be associated with the semantic representation using linking rules which may be universal or language specific in character.

The purpose of the present chapter is to propose a 'prosodic projection' through which the role of prosody within grammatical structure overall can be captured, especially its relationship with 'information structure'. In particular, the prosodic projection is closely aligned with the focus structure projection – an RRG representation of aspects of information structure. This close alignment follows from the fact that the main function of prosody in terms of the production and comprehension of clauses and sentences is to express certain information structural characteristics.

The chapter is organised as follows. Section 2 contains an overview of information structure and its representation within RRG. Section 3 includes a discussion of the 'Autosegmental-Metrical/Tones and Break Indices' (AM/ToBI) framework for representing prosodic information as well as the proposal for a prosodic projection for RRG to exist alongside other RRG projections. Finally there are some concluding remarks which include commentary on how the prosodic projection might interact with other RRG components.

2. Information Structure

Previous work on information structure in RRG, such as Van Valin & LaPolla (1997) and Van Valin (1999) among many others, is based on the approach adopted by Lambrecht (1994). This approach defines information structure as a pairing of "propositions as conceptual representations of states of affairs…with lexicogrammatical structures in accordance with the mental states of interlocutors who use and interpret these structures" (1994: 5). Within such lexicogrammatical structures Lambrecht identifies the formal manifestation of information structure "in aspects of prosody, in special grammatical markers, in the form of...syntactic constituents, in the position and ordering of such constituents, and in certain choices between related lexical items" (1994: 6). The relationship between information structure and syntax can be represented in RRG by means of principles which link the constituent projection and the focus structure projection, the latter being the RRG representation of information structure. As an addition to this linking, the role of 'aspects of prosody' in the expression of information structure also requires a representation within RRG.

This section concentrates on the RRG approach to information structure in general, firstly presenting an overview of the approach described in Lambrecht (1994), and secondly outlining the RRG representation of this approach in the form of the focus structure projection. This sets the scene for the dealing with the prosodic aspects of information structure in the following section.

2.1 Topic, focus and pragmatic structure

Lambrecht (1994) sets out an approach to information structure which is based on two abstract 'pragmatic relations', topic and focus, and an associated 'pragmatic structuring' of the propositions expressed by clauses and sentences.[2] For Lambrecht (1994: 7) "information structure…is not concerned with the organization of discourse, but with the organization of the sentence within a discourse". An aspect of sentence grammar which is paid particular attention is "the function of allosentences, i.e. of multiple structures expressing the same proposition". The differences between such allosentences may be lexical, syntactic or prosodic, and they arise from the interaction between the sentence and the context of the propositions they express. Examples (2) to (5) contain sets of allosentences from English, Italian, French and Japanese which correspond to the three contexts suggested by the statement and questions in (1). These contexts respectively represent narrow focus, predicate focus and sentence focus, where 'focus' is a pragmatic relation informally corresponding to the new information expressed in a clause or sentence. The term 'focus' is more formally defined later in this subsection.

(1)   a. I heard your motorbike broke down.
        b. How is your car?
        c. What happened?

(2)   a. My CAR broke down.   English
        b. My car/It broke DOWN.
        c. My CAR broke down.

(3) a. Si è rotta la mia MACCHINA./È la mia MACCHINA che è rotta.   Italian
         REFL is broken DEF my car   /   is DEF my car   that is broken
     b. (La mia macchina) si   è ROTTA.
         DEF my car   REFL is broken
     c. Mi si   è rotta (ROTTA) la MACCHINA.
         PRN REFL is broken   DEF car

(4) a. C'est ma VOITURE qui est en panne.   French
         it.is my car   that is in breakdown
     b. Ma voiture/Elle est en PANNE.
         my car / it   is in breakdown
     c. J'ai   ma VOITURE qui est en PANNE.
         I.have my car   that is in breakdown

(5) a. KURUMA ga koshoo-shi-ta.   Japanese
         my.car   NOM break-do-PAST
     b. (Kuruma wa) KOSHOO-shi-ta.
         my.car   TOP break-do-PAST
     c. KURUMA ga   KOSHOO-shi-ta.
         my.car   NOM break-do-PAST

Although each sentence expresses the same proposition they do not have the same information structure; that is, they are distinct in terms of the 'old' and 'new' information, or presuppositions and assertion, which they express. In each of these contexts there is a contrast between the four languages in terms of their use of unmarked – i.e. 'subject'-verb – vs. marked constituent order, and of unmarked – i.e. (near) final accent – vs. marked accent placement.[3]

In the narrow focus context, i.e. focus on a represented by (1a) the English and Japanese sentences, (2a) and (5a), show marked (early) accent placement and unmarked constituent order. The first Italian equivalent in (3a), by contrast, has unmarked accent placement but marked (verb-'subject') constituent order. The bi-clausal clefted alternative in Italian and its French counterpart, (4a), on the other hand use this additional complexity to retain both unmarked constituent order as well as unmarked accent placement.

The context provided by (1b) is predicate focus, i.e. all but the 'subject' is new information. In this case the examples from all four languages exhibit both unmarked constituent order and unmarked accent placement – see (2b), (3b), and so on. In the Japanese example, (5b), a morphological strategy (use of the 'topic'-marker *wa*) is also available to indicate the non-focal material.

The third context, (1c), is sentence focus, a situation in which sentences contain only new information. Sentence focus in English, example (2c), involves the same pattern as narrow focus, namely unmarked constituent order combined with marked accent placement. The strategy exemplified for Italian in (3c) involves a marked constituent order together with unmarked accent placement. This is similar to (3a) except for the treatment of the possessive relationship between car and speaker. For French, sentence (4c), like (4a), illustrates an impetus towards maintaining both unmarked constituent order and unmarked accent placement. Similarly to the Italian examples, the exact construction used in French to express sentence focus varies from that used in the narrow focus context. Finally, example (5c) demonstrates unmarked constituent order and unmarked accent placement.[4]

In summary, examples (2) to (5) indicate a range of strategies that languages may resort to in order to express information structure. In particular, accent placement can be seen to have an important part to play.

The use of grammatical structures to express such contextual variation is formalised by Lambrecht (1994) in terms of the 'pragmatic relations', focus and topic, which are identified through the 'pragmatic structuring' of a proposition such that old information is represented as a 'pragmatic presupposition' and new information as a 'pragmatic assertion'. These terms are defined and illustrated in what follows.

Firstly, presupposition and assertion have the respective definitions given in (6) and (7), and taken from Lambrecht (1994: 52).

(6) PRAGMATIC PRESUPPOSITION: The set of propositions lexicogrammatically evoked in a sentence which the speaker assumes the hearer already knows or is ready to take for granted at the time the sentence is uttered.

(7) PRAGMATIC ASSERTION: The proposition expressed by a sentence which the hearer is expected to know or take for granted as a result of hearing the sentence uttered.

Secondly, the pragmatic relations, topic and focus, are defined as components of the propositions associated with the presupposition and assertion as in (8).

(8) a. TOPIC: A referent is interpreted as the topic of a proposition if in a given situation the proposition is construed as being about this referent, i.e. as expressing information which is relevant to and which increases the addressee's knowledge of this referent.
     b. FOCUS: The semantic component of a pragmatically structured proposition whereby the assertion differs from the presupposition.

(Lambrecht 1994: 131, 213)

Thirdly, the pragmatic relations are related to concrete grammatical structures via information structure as '[t]hat component of sentence grammar in which propositions as conceptual representations of states of affairs are paired with lexicogrammatical structures' (1994: 5). In other words, the pragmatic relations, topic and focus, which exist at the level of the proposition(s) correspond to the actual linguistic entities, topic expression and focus domain, which are in turn defined as in (9).

(9) a. TOPIC EXPRESSION: A constituent is a topic expression if the proposition expressed by the clause with which it is associated is pragmatically construed as being about the referent of this constituent.

  b. FOCUS DOMAIN: The syntactic domain in a sentence which expresses the focus component of the pragmatically structured proposition.

(Lambrecht 1994: 131, 214)

Given the definitions in (6)-(9) Lambrecht goes on to formally represents the information structure for the sets of allosentences in examples (2)-(5). The three contexts represented here correspond to three types of focus which were touched upon in the discussion earlier in this subsection. Firstly there is a distinction between narrow and broad focus, according to whether the focus domain contains a single syntactic constituent or more than one such constituent. Secondly there is a distinction within broad focus between predicate focus, in which the focus domain contains all but the topic, and sentence focus, in which the whole sentence constitutes the focus domain. Pragmatic structuring of each proposition yields a particular focus domain as illustrated in (10) to (12).

Lambrecht (1994) goes on to discuss the pragmatic structuring of such examples. These are illustrated in examples (10)-(12) respectively for the narrow focus, predicate focus and sentence focus contexts represented in (1a-c).

(10) Context: I heard your motorcycle broke down.
  Sentence: My CAR broke down.
  Presupposition: "speaker's x broke down"
  Assertion: "x = car"
  Focus: "car"
  Focus domain: NP   [narrow focus]

(11) Context: What happened to your car?
  Sentence: It/My car broke DOWN.
  Presupposition: "speaker's car is a topic for comment x"
  Assertion: "x = broke down"
  Focus: "broke down"
  Focus domain: VP (or verb + remaining post verbal core constituents in RRG terms)   [predicate focus]

(12) Context: —
  Sentence: My CAR broke down.
  Presupposition: —
  Assertion: "speaker's car broke down"
  Focus: "speaker's car broke down"
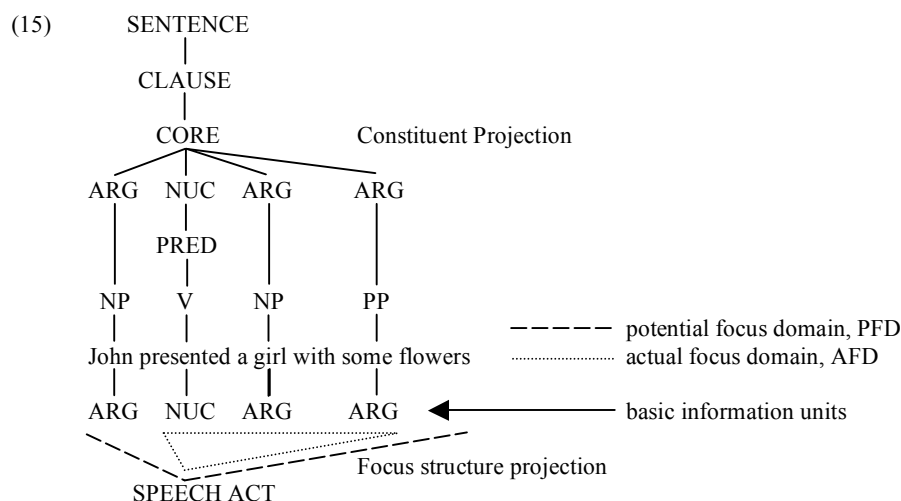 Focus domain: S   [sentence focus]

This pragmatic structuring of propositions and its relationship to the clauses and sentences through which it is expressed is translated into RRG in terms of the focus structure projection as detailed in the next subsection.
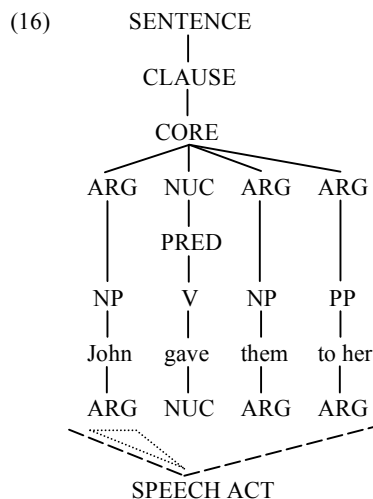
2.2 *The focus structure projection*

Within the focus structure projection of RRG, it is the focus domain that is represented. This is achieved by means of demarcating a potential focus domain, the PFD – e.g. for English this is the whole clause; for other languages there may be restrictions as to which part of the clause may potentially constitute the focus. Furthermore, there is an additional demarcation of where the actual focus domain, AFD, occurs with respect to the PFD. It is the AFD which corresponds to the 'focus domain' which results from the pragmatic structuring in (10) to (12). This is illustrated in (15) and (16) below for the predicate focus and narrow focus contexts in examples (13) and (14), taken from Van Valin & LaPolla (1997: 215, 216).

(13) John presented a girl with some flowers.

(14) John gave them to her.

(15)

```
        SENTENCE
           |
        CLAUSE
           |
        CORE            Constituent Projection
     /    |    \     \
  ARG  NUC  ARG   ARG
        |
       PRED
        |
  NP    V    NP    PP
  |     |    |     |                  — — — — —   potential focus domain, PFD
John presented a girl with some flowers  ............  actual focus domain, AFD
  |     |    |     |
 ARG  NUC  ARG   ARG  ◄———————  basic information units
                     Focus structure projection
       SPEECH ACT
```

(16)   SENTENCE
            |
         CLAUSE
            |
          CORE
    ┌───────┼───────┐
   ARG   NUC   ARG   ARG
          |
         PRED
          |
   NP   V   NP   PP
   | | | |
  John gave them to her
   | | | |
  ARG   NUC   ARG   ARG
    └───────┬───────┘
       SPEECH ACT

These examples show a correspondence between the constituent projection and the focus structure projection reflecting syntactic expression of information structure.   By analogy, given that information structure is also expressed by prosodic means, a correspondence must also exist between the focus structure projection and prosody. Section 3 concentrates on how this prosodic expression of information structure might be incorporated into the RRG view of grammar.
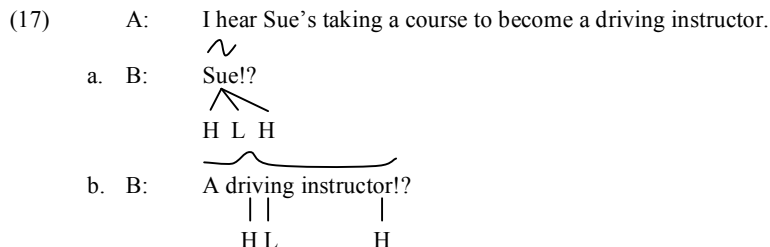

3. The Prosodic Projection

This section is concerned principally with the role of prosody, especially intonation, in the expression of information structure and with the representation of this role in terms of a prosodic projection. As the discussion of examples (2) to (5) suggests, intonation plays an important role in the interpretation of grammatical structures. Although the prosodic projection proposed below is developed on the basis of English, the general principles are suggested to be applicable to languages that may use different aspects of prosody, or may use the same aspects differently to English, in terms of expressing information structure. The section proceeds as follows: firstly the Autosegmental-Metrical/Tones and Break Indices (AM/ToBI) approach to intonation (Pierrehumbert 1980, Ladd 1996 and contributions to Jun 2005) is discussed; secondly, on the basis of the AM/ToBI framework a prosodic projection is proposed.

3.1 The AM/ToBI framework

The AM/ToBI framework is based on the concept of representing different types of information as separate, parallel but interrelated dimensions or tiers. The work of Pierrehumbert (1980), from which the ToBI system of transcribing intonation has been developed, was itself based upon the 'autosegmental' representation of tone in African languages in work such as Goldsmith (1976), among others. Although this approach developed originally to describe the intonation of English, work is well underway in extending it to a number of other languages – cf. contributions to Jun (2005).

An autosegmental phonological representation is one in which different properties of words such as tones, phonemes or syllables are represented as segments on separate tiers. Pierrehumbert (1980) adopts these features into her analysis of English intonation allowing an intonational contour to be decomposed into a sequence of H(igh) and L(ow) tones – a sample ToBI transcription is included in the appendix. This decomposition is shown schematically in example (17) in which the same contour is associated with utterances of different lengths spoken in the same context, which in this case is a strongly challenging or contradicting echo question.

(17)   A: I hear Sue's taking a course to become a driving instructor.
                          ∿
   a.   B: Sue!?
                         ⌃⌄
                       H L H
                     ⌣_____⌣
   b.   B: A driving instructor!?
                     | | |
                    H L   H

(adapted from Ladd 1996: 44)

This contour appears as a continuous pitch movement on B's utterance of the monosyllable, *Sue*, in (17a), but as a sequence of two separate pitch events when associated with the longer text, *driving instructor*, in (17b). The first part of the sequence consists of a pitch rise on the initial syllable of *driving* together with the fall associated with the immediately following syllable. The second part is a rise at the end of *instructor*. The level sections of the contour – that preceding the first rise and that between the fall and the second rise – are merely transitions which lead up to these localised pitch events. In the case of (17b) the two events occur on a single syllable so there is no 'space' for transitions. Ladd (1996: 45) sums this up as follows:

…[T]he AM [Autosegmental-Metrical] theory…draw[s] an explicit distinction between *events* and *transitions*. It recognises that some parts of contours are linguistically important, and others are merely what happen between the important parts. Furthermore, it assumes that the important parts are localised 'events', not long stretches of contour.

It is such 'linguistically important' parts of intonation contours that play a role in terms of the information structure of an utterance, a role which, as proposed below, can be mediated within RRG by means of a prosodic projection.
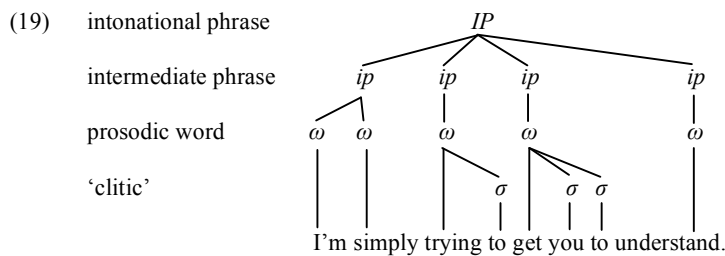
There are two types of pitch event in example (17). One type is associated with prominent syllables and is exemplified by the rise and fall beginning on the first syllable of *driving*. Events of this type are referred to within the AM/ToBI approach as 'pitch accent', a term which Ladd (1996: 45-46) defines as:

…a local feature of a pitch contour – usually but not invariably a *pitch change*, and often involving a local maximum or minimum – which signals that the syllable with which it is associated is *prominent* in the utterance.

'Prominence' here has two related interpretations. Firstly, a word may have a prominent role in terms of the information structure of an utterance. Secondly, such a role may be indicated in terms of the prominent phonetic characteristics of the word's stressed syllable.[5]

An intonational contour does not consist of pitch accents alone, however. In addition there are two types of boundary tone which are associated with the right edges of two types of prosodic constituent. These constituents, the intermediate and intonational phrases, form part of the hierarchical metrical structure of an utterance which is illustrated in (19) below for example (18).[6]

(18)   I'm simply trying to get you to understand.

(19)   intonational phrase   *IP*

        intermediate phrase   *ip*   *ip*   *ip*   *ip*

        prosodic word   ω   ω   ω   ω   ω

        'clitic'   σ   σ σ

   I'm simply trying to get you to understand.

The right edge of an intonational phrase, *IP*, carries an 'intonation phrase boundary tone' – in English either L% or H% – while the right edge of an intermediate phrase, *ip*, is marked with an 'intermediate phrase boundary tone' – for example L⁻ or H⁻.[7] The latter are often alternatively referred to as 'phrase accents'.

The ToBI framework as currently applied to (mainstream) American English (MAE_ToBI), described in Beckman et al. (2005), is summarised in table 1.

Table 1: the tones of (mainstream) American English

Pitch Accents	Intermediate Phrase Boundary Tones	Intonational Phrase Boundary Tones
L*	L-	L%
H* (!H*)	H- (!H-)	H%
L+H* (L+!H*)		%H
L*+H (L*+!H)		
H+!H*		

An intonation contour can thus be analysed as consisting of a relatively small number of discrete pitch events associated with particular syllables and prosodic boundaries. In the ToBI notation the nuclei of syllables which bear pitch accents are aligned with 'starred' tones, either L* or H*.[8] The association of pitch accents and boundary tones is demonstrated in example (20).

(20)   L* H⁻   L*   H⁻H%
             | | | | |
        [[Marianna]ip [made the marmalade]ip]IP?
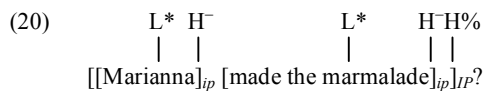
Furthermore, the same sentence uttered in different circumstances can vary with respect to both the type and number of pitch accents that it contains. This variation is illustrated in example (21) in which the impressionistic contours are based on the description in Beckman & Ayers (1997: 10) of several different productions of the sentence *Marianna made the marmalade*.

(21)   a.
                    Marianna made the marmalade.
                         H*   L⁻L%
        b.
                    Marianna made the marmalade.
                         H*   H*   L⁻L%

c.

Marianna made the marmalade.
  L+H*   L⁻L%

d.

Marianna made the marmalade.
  L+H*   !H*   L⁻L%

e.

Marianna made the marmalade.
    L*   H⁻H%

f.

Marianna made the marmalade.
    L*   L*   H⁻H%
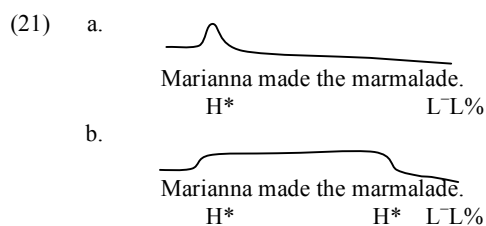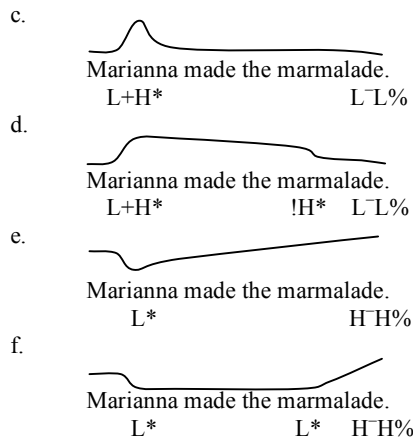
Although there are different forms of pitch accent, as (21) demonstrates, in the description of the prosodic projection later in this section it is only the placement of pitch accents, rather than their exact form, that is of direct concern. Other important aspects of the AM/ToBI framework to be utilised in the prosodic projection are the distinction drawn between pitch events and transitions from one such event to another; and the consequent characterisation of intonational contours in terms of a small number of tonal targets.

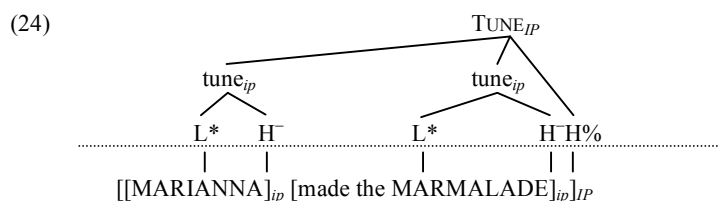3.2 *The prosodic projection and prosodic templates*

On the one hand, the proposed prosodic projection is based on the aforementioned AM/ToBI description of the intonational phenomena of English. On the other hand, representation within the prosodic projection is not intended to be restricted only to languages with intonation comparable to that of English, and is hence to be viewed as compatible both with intonational phenomena cross-linguistically, and with those other aspects of prosody in general which languages may adopt for information structure purposes. Accordingly, the following factor is considered to be at work in the background to this discussion – in matters of tune-text association (that is, the association of tones with respect to the prominent syllables in a sentence or clause) the prosodic structures of languages are divergent. Consequently, the prosodic projection is couched in terms that are intended to be specific enough to accurately reflect English intonation as it has been described in the AM/ToBI framework, while remaining general enough to leave open the incorporation of the differences that have been attested among the prosodic systems of the world's languages. At this stage, the extension of this work to other languages and/or prosodic systems is a matter for future research.[9]
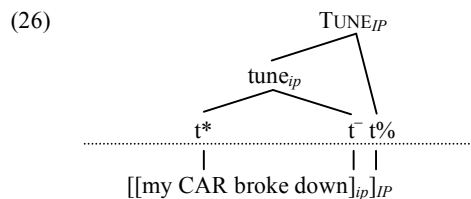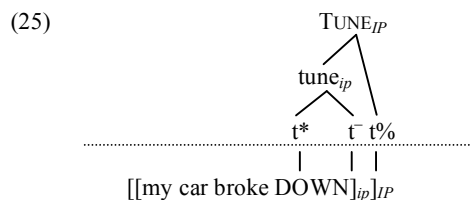
   This subsection develops the prosodic projection as an adaptation in RRG terms of AM/ToBI principles for the representation of the intonation of English. These principles are expressed in terms of generalised prosodic templates as in example (22) for an intonational phrase tune, TUNE_{IP}, and example (23) for an intermediate phrase tune, tune_{ip}.[10] The prosodic templates are intended on one hand to be analogous to 'syntactic templates', and on the other as equivalent to the LFG-style 'tune-structure rules' proposed in O'Connor 2006).

(22)
$$\text{TUNE}_{IP}$$

tune_{ip} (tune_{ip}) … … $t\%$

(23)
$$\text{tune}_{ip}$$

$t*$ $(t*)$ …   … t^-
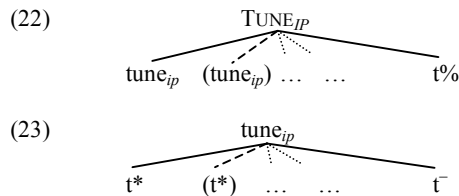
The prosodic categories, TUNE_{IP} and tune_{ip}, denote the stretches of the intonational contour respectively contained within the intonational phrase (*IP*) and intermediate phrase (*ip*), while $t*$, t^- and $t\%$ in turn represent unspecified pitch accents, phrase accents and *IP* boundary tones. The 'intonational phrase tune template', or '*IP*-tune template', in (22) therefore states that an intonational contour consists of an *IP* boundary tone, $t\%$, which marks its right edge, along with at least one 'intermediate phrase tune', or '*ip*-tune'. The latter constituent is constructed, according to the template in (23), from a minimum of one pitch accent, $t*$, together with a phrase accent, t^-, associated with its right edge. The use of 't' in these contexts denotes an unspecified tone which, in specific contours, can be instantiated by a simplex tone, e.g. L% or H in the case of $t\%$; or by a more complex sequence of tone targets, e.g. L*+H, L+H* or other bitonal pitch accent in the case of $t*$.

   The prosodic projection has two components which are illustrated in example (24) which is a representation of example (20) above: (i) a string of tones and its hierarchical organisation according to the prosodic templates detailed in (22) and (23) – i.e. everything above the dashed line in (24); and (ii) a labeled bracketing which represents the metrical structure of the utterance, or its division into prosodic constituents or phrases.

(24)
$$\text{TUNE}_{IP}$$

tune_{ip} tune_{ip}

L*   H⁻   L*   H⁻H%

[[MARIANNA]$_{ip}$ [made the MARMALADE]$_{ip}$]$_{IP}$

(25)

TUNE_IP
  tune_ip
    t*   t⁻ t%
    | | |
[[my car broke DOWN]_ip]_IP

(26)

TUNE_IP
  tune_ip
    t*   t⁻ t%
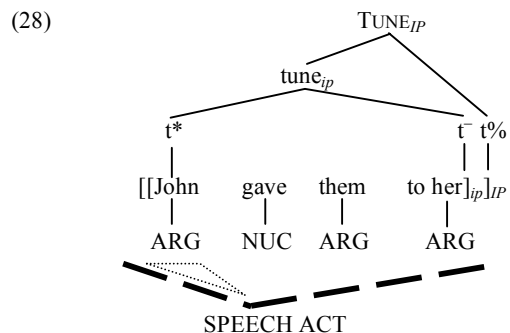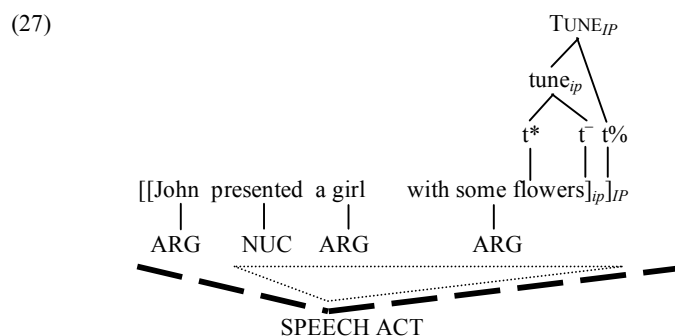 | | |
[[my CAR broke down]_ip]_IP

The prosodic projections in (25) and (26) indicate the application of the prosodic templates to the pair of allosentences corresponding respectively to example (2b), i.e. predicate focus, and examples (2a, c), i.e. narrow focus and sentence focus. Here the actual values of the tones are unspecified unlike example (24) which is based on a true transcription – see appendix. While a likely tonal sequence is H*L⁻L% in both cases, it is the different tune-text association in (25) that distinguishes predicate focus from the other two contexts. In addition, the fact that in this case narrow focus and sentence focus cannot be distinguished prosodically is captured by (26).

4. **The relationship between the prosodic projection and the focus structure projection**

The prosodic projection can be collapsed together with the focus structure projection to form a single representation giving an impression of how focus structure and prosody interact. This is illustrated in examples (27) and (28) below for examples (13) and (14), repeated for convenience, which contain predicate focus and narrow focus constructions respectively.

(13)   John presented a girl with some flowers.

(14)   John gave them to her.

(27)

TUNE_IP
  tune_ip
    t*   t⁻ t%
    | | |
[[John presented a girl   with some flowers]_ip]_IP
  | | | |
 ARG   NUC   ARG   ARG
                    SPEECH ACT

(28)

TUNE_IP
  tune_ip
    t*   t⁻ t%
    | | |
[[John   gave   them   to her]_ip]_IP
  | | | |
 ARG   NUC   ARG   ARG
              SPEECH ACT

Informally it is possible to state some linking principles. For instance the prosodic focus, as marked by the sentence accent – i.e. the rightmost pitch accent within the intonational phrase – is associated with an element of the actual focus domain within the focus structure projection. Following from this, is the fact that any accented element outside of the AFD cannot be focused but may instead be considered as a topic expression which for independent reasons has been accented or otherwise prosodically marked.[11]

The relationship between the prosodic projection and the focus structure projection also provides a basis for investigation into language-specific principles concerned with linking different types of focus structure with particular types of prosodic expression. For instance, on the basis of the examples in (29), a first approximation of a principle for accent placement in English predicate focus might be stated as in (30).

(29)　　　A:　What happened to your car?
　　a.　B:　It broke DOWN.
　　b.　B:　It broke down on the MOTORWAY.
　　c.　B:　It got hit by a LORRY.
　　d.　B:　Someone stole the WHEELS.

(30)　ACCENT PLACEMENT IN ENGLISH PREDICATE FOCUS (first approximation): The rightmost element in the AFD carries the sentence accent.

Using the prosodic projection, further investigation would reveal the extent to which this statement of unmarked accent placement can be applied to a range of predicate focus contexts.

　　Broadening such work even further will permit the investigation of and the representation of such issues as are discussed above with regard to examples (2) to (5) vis à vis their unmarked vs. marked constituent order and accent placement, thereby furthering understanding of the intersections between syntax, prosody and information structure.

5. Conclusion

The prosodic projection which has been introduced here is based on an already established phonological framework (AM/ToBI) for the representation of intonation. AM/ToBI allows superficially complex intonational structures to be stated in terms of a relatively small inventory of constituent parts. By adapting this type of representation, intonation has been cast in terms such as 'prosodic template' and 'prosodic inventory' that are reminiscent of syntactic constituent structure. As such the prosodic projection easily allows prosodic information to be accommodated alongside other aspects of grammar within the wider RRG framework. In particular, the three-way relationship between prosodic, syntactic and information structure is a potentially rich area for further investigation. This is not only the case for English and languages with similar prosodic inventories. In addition, the format of prosodic templates is sufficiently adaptable to permit cross-linguistic differences among prosodic inventories to be incorporated into the prosodic projection.

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Appendix – example ToBI transcription

The ToBI transcription system factors out three types of information on to separate tiers. In addition to an orthographic tier there are tone (*To-*) and break index (*-BI*) tiers, with the latter incorporating the metrical structure of the utterance into the overall autosegmental representation. In a full ToBI transcription break indices 3 and 4 coincide respectively with phrase accents and *IP* boundary tones. Since an intonational phrase boundary also coincides with the right edge of an intermediate phrase, this boundary is therefore marked by a sequence consisting of a phrase accent followed by an *IP* boundary tone. This is the case at the right edge of the example below. Break indices 1 and 0, by contrast, are not aligned with specific tonal targets. The latter index corresponds to boundaries between full words and reduced function words. Break index 1, on the other hand, marks the boundary between adjacent phonologically independent words which don't otherwise occur at the boundaries between the larger prosodic units, *ip* and *IP*. Finally, break index 2 is reserved for two types of mismatch – either a) when a phrase accent or *IP* boundary tone occurs where an

ip/*IP* boundary is not expected; or b) where such a boundary is detected in the absence of the usual associated phrase accent or *IP* boundary tone. These are illustrated for the utterance used in examples (20) and (24) which are repeated below for convenience.[12]

(20)
```
        L* H⁻          L*    H⁻H%
        |  |           |     | |
[[Marianna]ip [made the marmalade]ip]IP?
```

(24)
```
                        TUNEIP
              _____/\_____
             /                     \
         tuneip                  tuneip\
          /\                      /\    \
       L*   H⁻               L*       H⁻H%
        |    |                |        | |
[[MARIANNA]ip [made the MARMALADE]ip]IP
```
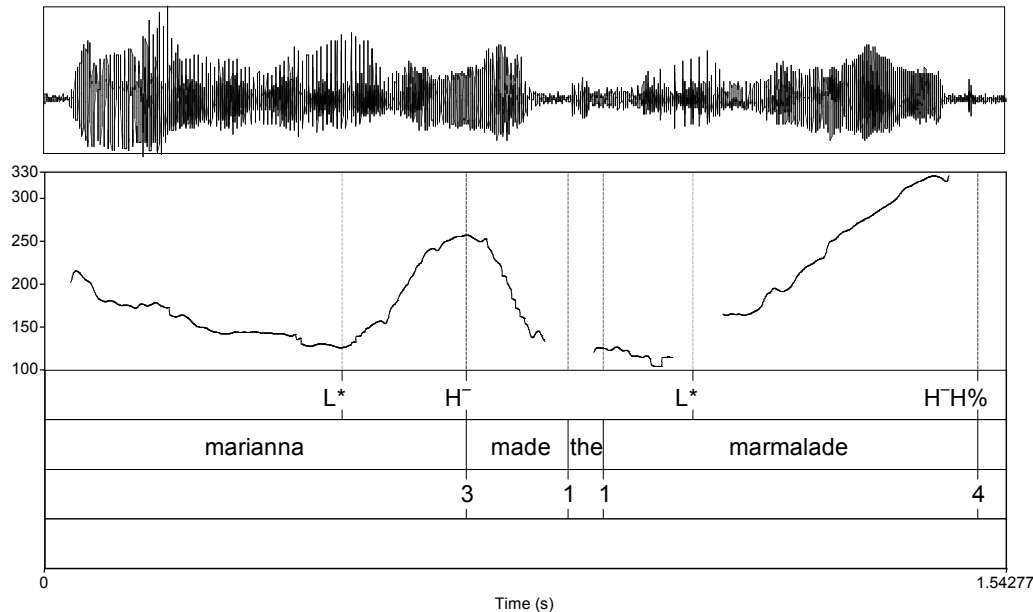

Figure 1: ToBI representation for example (20)/(24)

[2] The term 'information structure' dates back to Halliday (1967), and indeed Lambrecht (1994) draws on Halliday's work as well as that by the Prague School of linguistics (e.g. Daneš 1966), Jackendoff (1972), Chafe (1976, 1987), Prince (1981), Levinson (1983) and Gussenhoven (1984) among others.

[3] See Lambrecht (1994: 15-18) for justification of these assumptions regarding markedness of syntactic structure and accent placement.

[4] The accent placement in (5c) is considered unmarked despite the presence of an additional accent early in the sentence. When there is more than one accent present in an intonational phrase (the prosodic constituent corresponding to the whole sentence in this example – see section 3 for more details) it is usual practice to consider the rightmost accent as the sentence accent.

[5] Stress and prominence are not the same thing. Stress is a phonological ability or potential to bear prominence, while prominence itself is a real physical or phonetic characteristic realised on some stressed syllables. Hence, not all stressed syllables are phonetically prominent, as is the case with the second syllable of *instructor* in example (17b) which carries no pitch accent, unlike the first syllable of *driving*.

[6] Metrical structure is represented within the ToBI framework on the separate 'break indices' tier. In particular, the relative strength of juncture between different words is indicated by means of numerical indices. See appendix for an example ToBI transcription. In addition, the sentence in example (18) is spoken with a degree of emphasis reflected in its division into four intermediate phrases. A recording and transcription of this utterance are available at http://www.ling.ohio-state.edu/~tobi/ame_tobi/ as 'understand.wav' and 'understand.TextGrid' respectively.

[7] An additional *IP* boundary tone is listed in table 1 – namely %H. This is referred to by Beckman et al. (2005) as 'marginal, [occurring] at the beginnings of some intonational phrases after [a] pause'.

[8] These starred tones may be preceded by a leading tone or followed by a trailing tone which are as much a part of the pitch accent as the starred tone itself. Hence pitch accents may be tonally simplex or complex.

[9] O'Connor (2006), which investigates intonation and information structure within the framework of Lexical-Functional Grammar, also includes research on aspects of Serbo-Croatian prosody.

[10] In proposing structures of the type given in (22) and (23) I have drawn on the work of Ladd (1996) who has developed an Autosegmental-Metrical approach to the abstract representation of intonational contours based on X' theory. Some aspects of this have been adopted into these prosodic templates. However, Ladd's representations take the form of a binary branching structure while prosodic templates have a 'flatter' structure.

[11] One such independent reason may lie in an aspect of information structure dealt with in Lambrecht (1994) but which has not been touched upon in this chapter, namely the 'pragmatic state' that a speaker assumes a referent to have in the mind of the addressee. A referent may be presumed to be 'identifiable' or 'unidentifiable':

> [A]n identifiable referent is one for which a shared representation already exists in the speaker's and the hearer's mind at the time of utterance, while an unidentifiable referent is one for which a representation exists only in the speaker's mind. (Lambrecht 1994: 77-78)

Identifiable referents are further classified according to one of three 'activation states':

> An ACTIVE [referent] is one 'that is currently lit up…in a person's focus of consciousness at a particular moment.' An ACCESSIBLE/SEMI-ACTIVE [referent] is one 'that is in a person's peripheral consciousness…of which a person has a background awareness, but one that is not

being directly focused on.' An INACTIVE [referent] is one 'that is currently in a person's long-term memory, neither focally nor peripherally active.' (Lambrecht 1994: 93-94, following Chafe 1987)

A topic expression, therefore, may by marked by means of intonation if the speaker assumes its referent to be, for example, 'unidentifiable' or 'inactive' in the mind of the speaker.

[12] A recording is available from: http://www.ling.ohio-state.edu/~tobi/ame_tobi/ as 'made4.wav'/'made4.TextGrid'.