ENGLISH INTONATIONAL PATTERNS:
an Autosegmental – Metrical Approach in Optimality Theory.

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ABSTRACT

The purpose of this article is to present a few intonational patterns of the english language. Based on the Intonational Model of Autosegmental – Metrical Theory (Ladd, 1996) in the framework of Optimality Theory (Prince&Smolensky, 1993) we intend to capture some of the constraint ranking (the grammar) of these intonational patterns.

The Intonational Phrase (IP)

The intonational phrase is part of the phonological hierarchy (Nespor&Vogel, 1986). This phonological constituent (IP) groups together the segments into syllables, the syllables into metrical feet, the metrical feet into phonological words, the phonological words into phonological phrases, the phonological phrases into intonational phrases and the intonational phrases into utterances.

Utterance	U
Intonational Phrase	IP
Phonological Phrase	Φ
Phonological Word	ω
Metrical Feet	Σ
Syllable	σ

Phonological Representation of "*Pitch*" in the Autosegmental – Metrical Theory.

The term "tone" refers to the linguistic utilization of the "fundamental frequency" (F0) or the frequencies that emanate from the glottal impulses. Theses impulses are perceived by the ear through "*pitch*" (variations of hight of the frequential sounds). The lesser the degree of opennig of the vocal tract the higher will be the value of F0.

These variations of frequencies are then translated by the Intonational Phonology (Ladd, 1996) as a sequence of discrete intonational events:

1) *Pitch accents* and

2) *Edge tones*

According to Intonational Autosegmental – Metrical Theory (Ladd 1986, Pierrehumbert 1980) these two accent types are sufficient to describe the variations of F0.

The first type of tonal event ("*pitch accent*") is associated to the nucleus of the syllables and can also be called the *"nuclear accent"*. This tone is indicated by a star symbol (*) and they can be *"monotonal"* (H*: *high tone with nuclear accent*), (L*: *low tone with nuclear accent*) when formed by one tone or *"bitones"* when formed by a sequence of two tones (H*+L: *high low bitone*), (L*+H: *low high bitone*).

The second type of tonal event ("*edge tones*") are associated to the boundaries of the prosodic constituents and they are useful as indicators of the "prosody – syntax" relationship. These tonal events are indicated by the symbol (%): (L%: *low boundary tone*), (H%: *high boundary tone*).

As an example of a intonational phrase (IP) consider the phrase below:

"She´s forgotten?"

```
Syntax:      S
             |
             Det.     VP
             |        |
             she    has forgotten  = "she´s forgotten?"
```
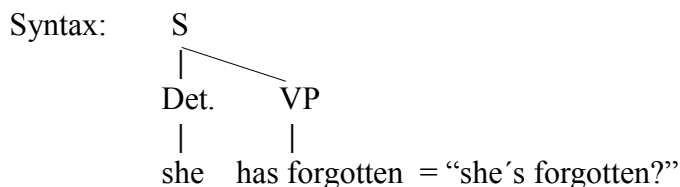
Syntax: [(she)N (has forgotten)VP]S
Phonology: [(ʃi:)ω (œs fɚ-gɑʔn̩)Φ]IP

Based on the model of metrical stress theory of Hayes (1995) we analyse the stress of this intonational phrase: (*"she´s forgotten?"*).
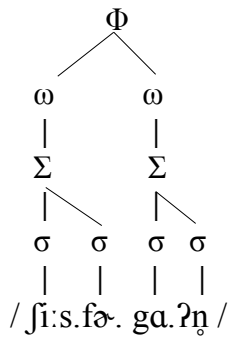
```
  ( * )    (*   . )Σ
/ ʃi:s fɚ.gɑ.ʔn̩ /
```

Notice that on the level of the metrical feet (Σ) the trochaic rythm of the phrase is not fluent. For this to happen we´ll need to consider a upper prosodic constituent or the phonological phrase.

```
 ( *    .)( *   . )Φ
 ( * )    ( *   . )Σ
/ ʃi:s fɚ.gɑ.ʔn̩ /
```

As we can see above the language rearranges the rythm by a phonological process called "ressylabification". The domain for this phonological process is the phonological phrase (Φ).

This same phonological representation above can also be shown this time based on the prosodic

model of Nespor&Vogel (1986):

```
              Φ
             / \
            /   \
           ω     ω
           |     |
           Σ     Σ
          /\    /\
         σ  σ  σ  σ
         |  |  |  |
       / ʃiːs.fɚ. gɑ.ʔn̥ /
```


    Based on the Autosegmental – Metrical Approach of Intonation (Ladd, 1996) in the framework of Optimality Theory (Prince&Smolensky, 1993) we now analyse the constraint ranking (the grammar) for this same phrase: (*"she′s forgotten?"*).

Constraints:

RESSYLAB: resylabification.

TROCHFT: trochaic metrical feet.

UPSTEP(on 2nd Σ): the syllable on the head of the second metrical feet ascends.

Input: /ʃiː hœs fɚgaʔn̥ /	**RESSYLAB**	**TROCHFT**	**UPSTEP** (on the 2nd Σ)

(*)   (* .)Σ
[ʃiːs fɚ.gɑ.ʔn̥]
  | | |
  H   H L%
	*!	*	*

(* .   * .)IP
(* .)(gɑ .)Φ
(*)   (ʔn̥)Σ
→   [ʃiːs.fɚ. | |]
   | |
   H* L H*L%			

    As we can see above the first candidate violates the constraints: RESSYLAB and TROCHFT. For the third constraint UPSTEP(on 2nd Σ) this candidate fails to ascend the intonation (interrogative phrase) on the syllable /gɑ/.

The second candidate is the "winner candidate" for passing by all the constraints without any violations.

Consider the next phrase below:

"<u>Paul</u>, called Mary".

The underlined word is the "focus". Its purpose is to emphasize a particular constituent (Hayes&Lahiri 1991), in this case, the object (O) of the phrase.

Syntax: [(Paul)N (called Mary)VP]S – grammatical order: O(focus) – Verb – Subject.

Phonology: [(pɔl)ω (kɔld mæɾiː)Φ]IP

Its natural syntatic grammatical order is:

Syntax: [(Mary)S (called)V (Paul)O]S

Based on the Intonational Model of Autosegmental – Metrical Theory (Ladd, 1996) in the framework of Optimality Theory (Prince&Smolensky, 1993) we will now analyse the metrical and intonational grammar for the same phrase above:

"<u>Paul</u>, called Mary".

[(pɔl)ω (kɔld mæɾiː)Φ]IP

Constraints:

UnaryFoot(ω): the prosodic word has an unary foot.

EXTRAM.<LeftEdge> (Φ): the left boundary of the phonological phrase is "extrametrical".

TROCHFT(Φ): Feet are trochaic on the constituent of the phonological phrase.

BREATHGROUP(N ‖ VP): there is a pause in between the noun (N) and the verbal phrase (VP).

O(focus)VS: the object (O) is the "focus" followed by the verb (V) and subject (S).

DOWNSTEP(on the Φ): the intonation starts declining on the phonological phrase.

/ pɔl kɔld mæɾi: /	UnaryFoot (ω)	EXTRAM. \<LeftEdge\> Φ	TROCHFT (Φ)	BREATH GROUP (N ‖ VP)	O(focus) VS	DOWN STEP (on the Φ)
(*) (* * .)Φ (*) (*) (* .)Σ [(pɔl)ω (kɔld mæɾi:)Φ]IP | | | | H*% H* H* L%		!*	*	*	*	*
(*) < > (* .)Φ (*) (*) (* .)Σ [(pɔl)ω ‖ (kɔld | | mæ. H*% L | ɾi:)Φ]IP H* | → L%						

Observe that the first candidate by not pausing in between the noun (N) and the verbal phrase (VP) "BREATHGROUP(N ‖ VP)" or in other words, in between the prosodic word (ω) and the phonological phrase (Φ) ends up violating the next constraint "O(focus)VS" resulting in *SVO.

The second candidate passes through all the constraints without any violations and is therefore the "winner candidate".

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