Stress as a Prefix in Modern Greek

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Συνέδριο Φωνολογίας της Γηραιάς Ηπείρου 4 (OCP IV)

January 18-21, 2007, Rhodes Aquarium
Past tense forms of verbs in (Modern) Greek

- Past tense in Greek is ‘characterised’ by antepenultimate stress.
- This talk aims to give an analysis of this fact which conforms to what we already know about Greek stress in general...
- ...arguing that the phonological exponence of the functional head (Past) Tense in Greek is a floating stress marker which syntactically precedes the stem.
Motto

“Phonological theory can be tested and refined by means of fairly comprehensive analyses of a single language [...] This paper [seeks] to abide by this canon (as far as is possible within the narrow limits of a 30-minute slot) [...]”

(Bermúdez-Otero, this conference)
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  Phonology
  Morphology

Stress in the Past Tense
  Problems in the verbal domain
  Proposal

Analysis
  Morphosyntax
  Empty prefixed feet

Further issues
  Stress avoidance
  Fine details of the past tense
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The phonology of Modern Greek Stress

- It is usually assumed that Greek has syllabic (QI) trochees, at least for assigning main stress.
- Stress is mostly lexically determined...
- ...but there is one inviolable restriction: the $3\sigma$ window

You already know this, at the latest since Apoussidou, this conference)
### Stress is lexically determined

<table>
<thead>
<tr>
<th>Antepenultimate</th>
<th>Penultimate</th>
<th>Final</th>
</tr>
</thead>
<tbody>
<tr>
<td>θάλασσα</td>
<td>σταφίδα</td>
<td>αγορά</td>
</tr>
<tr>
<td>θάλασα ‘sea’</td>
<td>staφίδα</td>
<td>ayorá</td>
</tr>
<tr>
<td></td>
<td>‘raisin’</td>
<td>‘market’</td>
</tr>
</tbody>
</table>
Preantepenultimate stress is impossible

▶ There are no words such as *[sérvisoros] (cf. [servitóros] ‘waiter’)  
A few loanwords seem to have preantepenultimate stress: [kámeraman] ‘camera man’. Cf. Jurgec, Boersma & Hamann, on loanword phonology.

▶ Clitics induce stress shift when added to words with antepenultimate stress: γόνδολα ‘gondola’ → γόνδολα-μυ ‘my gondola’ (cf. staφíδa → staφíδa-μυ)

Disclaimer: I have not checked so far how cliticized gondola or staφida work in the Greek of any of the Greeks present in the audience.
### Tableau: lexical stress

<table>
<thead>
<tr>
<th></th>
<th>3σ</th>
<th>F A I T H - F t</th>
<th>T R O C H E E</th>
<th>N O N F I N</th>
</tr>
</thead>
<tbody>
<tr>
<td>i.</td>
<td>stáfiða</td>
<td>*!</td>
<td></td>
<td></td>
</tr>
<tr>
<td>ii.</td>
<td>stáfiða</td>
<td></td>
<td>*</td>
<td></td>
</tr>
<tr>
<td>iii.</td>
<td>stafíðá</td>
<td>*!</td>
<td>*</td>
<td>*</td>
</tr>
</tbody>
</table>

▶ **F A I T H - F t ≥ N O N F I N**
Tableau: default stress

<table>
<thead>
<tr>
<th>anthropós</th>
<th>3σ</th>
<th>FAITH-Ft</th>
<th>TROCHEE</th>
<th>NONFIN</th>
</tr>
</thead>
<tbody>
<tr>
<td>i. ánthropos</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ii. antrópos</td>
<td></td>
<td></td>
<td></td>
<td>*!</td>
</tr>
<tr>
<td>iii. anropós</td>
<td></td>
<td></td>
<td>*!</td>
<td>*!</td>
</tr>
</tbody>
</table>
### Tableau: no antepenultimate stress

<table>
<thead>
<tr>
<th></th>
<th>3σ</th>
<th>FAITH-Ft</th>
<th>TROCHEE</th>
<th>NONFIN</th>
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</thead>
<tbody>
<tr>
<td>i.</td>
<td>*!</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ii.</td>
<td></td>
<td>*!</td>
<td></td>
<td></td>
</tr>
<tr>
<td>iii.</td>
<td></td>
<td></td>
<td>*</td>
<td></td>
</tr>
<tr>
<td>iv.</td>
<td></td>
<td></td>
<td></td>
<td>*</td>
</tr>
</tbody>
</table>

- sérvitor+os
- (servi)toros
- ser(víto)ros
- (servi)(tóros)
- (servi)to(rós)
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The morphology of Modern Greek Stress

- With respect to the interaction between morphology and stress assignment, we follow Revithiadou (1999):
  - We assume a morpheme-based model of morphology
  - There is no stipulated lexical difference between roots and affixes
  - But morphological structures are characterised by headedness, and inflectional affixes are no heads

(cf. Apoussidou 2007, this conference)
The structure of morphemes

- We assume an Items-and-Arrangement view of morphology
- Further, we assume that there are no morphological diacritics: phonological behaviour is represented in terms of underlying phonological structure
- In particular, unpredictable stress is represented in terms of underlying stress marking (& Faithfulness)
The representation of underlying stress

- Given our assumptions, there are two options:
  - ‘a grid mark which is projected onto the stress plane as an idiosyncratic property of a vocalic peak’ (Revithiadou 2006)
    
    \[
    \begin{array}{c}
    * \\
    | \\
    sta \quad fi \quad \ddot{a}
    \end{array}
    \]

  - An underlying foot
    
    \[
    \begin{array}{c}
    Ft \\
    \downarrow \\
    sta \quad fi \quad \ddot{a}
    \end{array}
    \]
The representation of underlying stress

- If stress is represented by feet on the surface, RotB forces us to at least take the option of underlying feet seriously.
- They also have the advantage of correctly predicting locality.
- Revithiadou (2006) rejects this option because it makes it difficult to represent pre-accenting and post-accenting morphemes in a uniform way we will return to this at the end of the talk.
- For now, we will assume underlying feet.
Morén, this conference, also argued in favour of underlying prosodic structure rather than an autosegmental property for Central Swedish.

Note that in Greek it is also primary accent which is marked, so that if we would really be following Morén, we would mark an underlying PWord.
Morphemes are morphemes

- RotB also forces us to assume that stress can be present on any syllable in inputs, and also be completely absent.
- This holds for all morphemes: roots, derivational and inflectional affixes.
- Every morpheme $M$ comes in one of three flavours:
  - No marking
  - Marking on some syllable of $M$
  - Marking for stress but *not* on $M$ (preaccenting or postaccenting), represented by ... (?)
Differences between morphemes follow from structure

- If morphemes $M_1$ and $M_2$, both marked for stress, are combined, a conflict between faithfulness constraints arises.
- In Revithiadou’s (1999, 2006) proposal, the conflict is resolved by headedness: the head of $[M_1 M_2]$ decides.
- Derivational affixes are heads, inflectional affixes are not.
Derivational suffixes

- Derivational suffixes are morphological heads, and hence always win.
- E.g. the diminutive suffixes decides gender, hence counts as a head
  
  o kubáros +áki → to kubaráki
  ‘the grandfather’ (M.) Dim. (N.) ‘the grandfather’ (Dim., N.)
Inflectional suffixes

- Inflectional suffixes are not heads (do not determine the category or the gender of the noun), and hence always loose.

- **o klívan** + try → **o klívanu**
  - ‘the kiln’ (M.) GEN. ‘the kiln’ (GEN.)
Default stress

- In case neither the stem nor the suffix has any stress, we find default stress.

\[ \text{an\textgreek{throp}} + \text{os} \rightarrow \text{o an\textgreek{thropos}} \]

‘the human’ (M.) ΝΟΜ. ‘the human’ (ΝΟΜ.)
**Conflict resolution**

<table>
<thead>
<tr>
<th></th>
<th>Unmarked suffix /-os/ (NOM. SG.)</th>
<th>Preaccenting suffix /-ú/ (GEN. SG.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Unmarked root</td>
<td>default stress [ánθropos]</td>
<td>suffix decides [ánθrópu]</td>
</tr>
<tr>
<td>(/anθrop/- ‘man’)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Marked root</td>
<td>root decides [klívanos]</td>
<td>root decides [klívanu]</td>
</tr>
<tr>
<td>(/klívan/- ‘kiln’)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Marked root</td>
<td>root decides [kubáros]</td>
<td>root decides [kubáru]</td>
</tr>
<tr>
<td>(/kubár/- ‘godfather’)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Marked (postaccenting) root</td>
<td>root decides [uranós]</td>
<td>root decides [uranú]</td>
</tr>
<tr>
<td>(/uranó/- ‘sky’)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Heavy allomorphy

- An alternative approach might be to use heavy allomorphy
- As suggested yesterday in the discussion period after Apoussidou’s talk, and, in some sense, by Burzio & Tantalou (ms) as well
- These approaches still need to resolve the conflicts in a way which will eventually have to be similar (roots win over inflectional affixes)
Summary: Stress in Nouns

- both roots and affixes may (but need not) be marked for stress;
- if a root and an inflectional suffix have conflicting demands, the root wins;
- underlying stress on inflection thus only shows up if the root is unspecified;
- default stress is antepenultimate;
- stress-avoiding morphemes trigger local stress (on adjacent syllables);
- representation of preaccenting/postaccenting is mysterious.
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The problems the verbal domain pose

- What is true for the nominal domain, is not necessarily true for other domains
- There are only two classes of verbs: those which have stress on the theme vowel in the present, and those which have stress on the final vowel of the root

<table>
<thead>
<tr>
<th></th>
<th>conjugation A</th>
<th>conjugation B</th>
</tr>
</thead>
<tbody>
<tr>
<td>1S</td>
<td>aláz+o</td>
<td>aγap+á+o / aγap+ó</td>
</tr>
<tr>
<td>2S</td>
<td>aláz+i+s</td>
<td>aγap+á+s</td>
</tr>
<tr>
<td>3S</td>
<td>aláz+i</td>
<td>aγap+á / aγap-á-i</td>
</tr>
<tr>
<td>1S</td>
<td>aláz+u+me</td>
<td>aγap+á+me</td>
</tr>
<tr>
<td>2S</td>
<td>aláz+e+te</td>
<td>aγap+á+te</td>
</tr>
<tr>
<td>3S</td>
<td>aláz+u+n(e)</td>
<td>aγap+á+n(e)</td>
</tr>
</tbody>
</table>
In this talk, we concentrate on the past tense.

All past tense forms have antepenultimate stress.

<table>
<thead>
<tr>
<th>Present</th>
<th>Simple past</th>
</tr>
</thead>
<tbody>
<tr>
<td>ýráf-o</td>
<td>é-ýraf-a</td>
</tr>
<tr>
<td>ýráf-is</td>
<td>é-ýraf-es</td>
</tr>
<tr>
<td>ýráf-i</td>
<td>é-ýraf-e</td>
</tr>
<tr>
<td>ýráf-ume</td>
<td>ýráf-ame</td>
</tr>
<tr>
<td>ýráf-ete</td>
<td>ýráf-ate</td>
</tr>
<tr>
<td>ýráf-un(e)</td>
<td>ýráf-ane / é-ýraf-an</td>
</tr>
</tbody>
</table>

The system developed out of one in which there was a stressed prefix é, showing up everywhere; this system is still found in some dialects (Papazachariou, p.c.): ékana, ékanes, ékane, ékaname, ékanate, ékanan(e).
Why the past tense is problematic

- ‘Aggressive default’. The stress does not fall on any suffix, nor on the last syllable of the root, but on the antepenultimate syllable of the whole word; if both root and suffix are monosyllabic, an ‘augment’ /e/- is added to host this antepenultimate stress

- Tense is inflectional, so it should not be able to overrule any underlying stress on the roots; but it does
A difference between nouns and verbs

- We might postulate a difference in grammar between nominal and verbal morphology
- However, even if we are willing to make such a move, this difference between the two grammars should be minimal
- Furthermore, the claim is that root specifications should win over affix specifications in ‘Universal Phonology’.

(This slide has been added after the present speaker heard Bat-El, this conference. It also serves to hail the introduction of the term ‘Universal Phonology’ in Itô and Mester’s talk.)
<table>
<thead>
<tr>
<th>Proposal</th>
<th>Stress in Nouns</th>
<th>Stress in the Past Tense</th>
<th>Analysis</th>
<th>Further issues</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
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</table>

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Proposal

- The phonological exponence of the functional head Past Tense in Greek is a stress marker only, i.e. an segmentally empty foot, which occurs in a functional head preceding the stem:

```
Ft
\sigma \sigma
```

- Notice that the future Tense marker \( \vartheta \alpha \) [\( \theta \alpha \)] also precedes the verb: \( \vartheta \alpha \ \gamma\rho\alpha\varphi\omega \) ‘I will write’
What is an underlying ‘floating’ foot?

- Ontologically, it does not make a lot of sense to talk about feet without material: Feet are projections
- However, we can assume that they are projections of mora’s: it is known that mora’s can lead a ‘floating’ existence, apart from segments.

\[
\text{Ft} \\
\sigma \quad \sigma \\
\mu \quad (\mu)
\]

Iosad, this conference, presented a critical view of floating syntactic markers for Welsh. I believe, however, that his criticisms do not apply to the Greek case.
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The Greek verbal clause

See Kula, Göbbel, Hayashi, Ziková & Scheer, all at this conference (today), for relevance of syntactic structures.
After movement

NegP

Neg

| dēn

TP

T

| θa

φP

φ

| γrafı+o

AspP

Asp

| ti

VP

V

| ti

‘I will not write’
Past tense: simple past

NegP
  /\  
Neg   TP
    /\  
   T   φP
  /\   /\  
 Ft   es AspP
        /\ 
       VP  γraf
         /\ 
        V   
          /\ 
         γraf

‘You wrote’
After movement

NegP

Neg

TP

T

Ft

φ

TP

AspP

Asp

γράφει + es

φ

t_i

VP

V

t_i

‘You wrote’
Past tense: aorist

NegP

Neg

TP

T

Ft

φP

φ

e

AspP

Asp

s

VP

V

ayora

‘He bought’ (AORIST)
After movement

NegP

Neg

TP

T

Ft

φP

AspP

[ayora_s][e +s]

Asp

tj

VP

V

ti

‘He bought’ (AORIST)

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Stress in the Past Tense

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Prefixing the foot

- In order to mirror the syntactic order, we prefix the empty Ft to the word
- Let us assume that this is standardly effectuated by:
  - ALIGN-(Ft,TENSE,ω,L): There should not be a syllable between the left edge of the phonological exponence of TENSE and the left edge of the phonological word
ALIGN is not enough

Two questions arise regarding ALIGN:

1. What blocks alignment in [áγorasa]? Why do we find [ayórasa] instead?
2. Why do we need epenthesis in [ekána], since [*kána] satisfies this constraint equally well?
The first question

- The answer to the first question seems straightforward at first sight
  - Whatever constraint is responsible for the three-syllable window (say, $3\sigma$), is inviolable in Modern Greek. Hence, $3\sigma \gg \text{ALIGN}$
  - New question: why do we then have [/ayórasa], and not [ayórása] or [ayorasá]?  
  - Answer: antepenultimate stress is the default
  - $3\sigma \gg \text{FAITH-Ft} \gg \text{TROCHEE, NONFIN} \gg \text{ALIGN}$
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Συνέδριο Φωνολογίας της Γηραιάς Ηπείρου 4 (OCP IV)
The first question

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<th>ALIGN</th>
</tr>
</thead>
<tbody>
<tr>
<td>i. αγόρασα</td>
<td>*!</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ii. ἀγόρασα</td>
<td></td>
<td></td>
<td></td>
<td>*</td>
<td></td>
</tr>
<tr>
<td>iii. αɣόρása</td>
<td></td>
<td></td>
<td>*!</td>
<td>*</td>
<td></td>
</tr>
<tr>
<td>iv. αɣόρασά</td>
<td></td>
<td>*!</td>
<td>*!</td>
<td>*</td>
<td></td>
</tr>
</tbody>
</table>
The second question

- The answer to the second question is a bit more subtle: why not *[kána]?*
- The answer must be found in faithfulness:
  - FAITH-FT: The head (mora) of a foot in the input should be the head (mora) of a foot in the output.
The second question

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### Tableau: ékana

<table>
<thead>
<tr>
<th>$Ft+kan+a$</th>
<th>$3\sigma$</th>
<th>FAITH-$Ft$</th>
<th>TROCHEE</th>
<th>NONFIN</th>
<th>ALIGN</th>
</tr>
</thead>
<tbody>
<tr>
<td>i. étekana</td>
<td>*!</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ii. ékana</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>iii. kána</td>
<td></td>
<td>*!</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>iv. kaná</td>
<td></td>
<td>*!</td>
<td>*!</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Empty prefixed feet**

The table shows the analysis of stress patterns in the nouns ékana, étotekana, kána, and kaná in Modern Greek. Each row represents a different word form, with the stress patterns indicated by symbols.*
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What about stress-avoiding morphemes?

- The accent belongs to a morpheme (e.g. a ‘post-accenting’ root), but there is no association line between the accent and any vowel of the morpheme.
- We have constraints of the following type (cf. Van Oostendorp 2006):
  - **Strict Alternation (SA)**: Association lines which *could* be underlying, *must* be underlying.
Stress avoidance with feet

- Given our representation of floating feet (with underlying mora’s), this can be transferred to our approach.

  - SA: A mora $\mu$ is pronounced within morpheme/color M iff it is projected by a vowel V of morpheme/color M.

- ‘Projection’ in this formulation is taken from Turbidity Theory: it is an inalterable relationship between a segment and a feature (or mora).
## SA at work

<table>
<thead>
<tr>
<th>input</th>
<th>incorrect output</th>
<th>correct output</th>
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<tbody>
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</table>
Stress as a Prefix in Modern Greek

Stress in Nouns
  Phonology
  Morphology

Stress in the Past Tense
  Problems in the verbal domain
  Proposal

Analysis
  Morphosyntax
  Empty prefixed feet

Further issues
  Stress avoidance
  Fine details of the past tense
Fine details of the past tense

V- vs. C-final particles

- θα é-perna - θά perna, na é-perna - ná perna
- δέν é-perne - *δέν perne (*δέ perne), as é-perne - *άς perne
- I assume that the relevant difference is between consonant final and vowel final
- Epenthesis is blocked when it (necessarily) leads to hiatus
Fine details of the past tense

Prefixes

- /andi-γραfo/ ‘I copy’ → [andéγrapsa] ‘I copied’
- Notice that in these cases, the *underlying* vowel is deleted
- Expressing Past Tense is higher ranked than expressing the prefix
One potential exception

- There is one class of potential exceptions:
- /αγαπάω/ ‘I love’ → [αγαπύσα] ‘I was loving’
- In all of these cases we are dealing with ‘conjugation b’ verbs, i.e. verbs with a (stressed) theme vowel
- This stressed theme vowel can sometimes be deleted also in other cases: /αγαπάο/ ‘I love’ → [αγάρό]
- If we assume theme vowel deletion is also going on here (for reasons of hiatus avoidance), we have a case of ‘opaque antepenultimate stress’: /αγαπάνσα/
Another class of exceptions


► This is a closed class; I assume that these are irregular verbs, not formed with a separate morpheme, but by root allomorphy (cf. English go-went)
Another class of exceptions


- This is a closed class; I assume that these are irregular verbs, not formed with a separate morpheme, but by root allomorphy (cf. English *go-went*)
Conclusions

- The (past tense) verbal system of stress-morphology interaction seems different from the nominal system in Modern Greek.
- The crucial difference is that in the verbal system we have an inflectional morpheme which is an empty foot prefix.
- The prefix status is independently motivated in Greek morphosyntax.
- The representation of the prefix is like that of a stress avoiding morpheme, except that it does not have any segments.
- Such an input is predicted to exist given Richness of the Base.