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The morphology of PAST in Greek

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1. Introduction

TOPIC: The morphology of PAST

- The morphophonological status of the augment e- as an exponent of the PAST
- Its distribution with respect to other exponents of the PAST

CLAIMS:

- The antepenultimate (APU) stress pattern is not an exponent of the PAST, but the surface manifestation of a segmentally empty prefix with lexically-encoded accentual properties (à la van Oostendorp 2007b)
- This prefix stands in an allomorphic relation with respect to a set of other exponents of the PAST

In previous analyses of Greek verb morphology (Warburton 1970; Babiniotis 1972; Ralli 1988, etc.), the exact details of the division of labor between phonology and morphology in the realization of the PAST have not been worked out thoroughly.

In this paper, based on the investigation of certain complexities that have been either ignored or treated in parsimony, we seek to identify the exact function of each manifestation of the past morpheme and the proper conditioning that regulates its distribution.

Organization of the talk:

- 2. Setting the stage: The morphological structure of the Greek verb
- 3. Past as an empty prefix
- 4. The derivation of past forms

5. Conclusions

2. Setting the stage: The morphological structure of the Greek verb

Non-imperative verb forms in Greek are organized on the basis of the manifestation of two major grammatical categories, namely aspect and tense, in the following system (Mackridge 1985; Holton et al. 1997; Ralli 1988, among others):

- Aspect: ±perfective
- Tense ±past

(1) The basic verb forms illustrated by the 1st conjugation verb *iðrío* 'to establish, found'¹

a. Active			
Aspect	Tense		
	Past	Non Past	
Perfective	íðrisa	iðríso	
Imperfective	1ðria	iðrío	

PAST has many exponents Augment e- is a

manifestation of a segmentally empty prefix

Our analysis combines phonology with insights from the morphosyntax of the PAST

¹ Our claims in this paper are illustrated by using examples from verbs of the first conjugation. Second conjugation verbs employ similar morphology, so, naturally, our analysis extends to them as well.

b. Passive				
Aspect	Tense			
	Past	Non Past		
Perfective	iðríθika	iðriθó		
Imperfective	iðriómuna	iðríome		

Tense is mainly expressed in the ending, which also encodes subject-agreement and, when relevant, passive voice.

(4)	The change of orcer met conjugation				
	Set 1	Set 2	Set 3	Set 4	
	-past	+past	-past	+past	
			+passive	+passive	
1sg	-0	-а	-ome	-omuna	
2sg	-is	-es	-ese	-osuna	
3sg	-i	-е	-ete	-otane	
1PL	-ume	-ame	-omaste	-omastan	
2PL	-ete	-ate	-osaste / -este	-osastan	
3PL	-un(e)	-an(e)	-onde	-ondan / -ondusan	

(2) The endings of Greek first conjugation

The full paradigm of the past forms for a disyllabic verb root is as follows:

(3)

	-perfective	+perfective	-perfective	+perfective	
	+past	+past	+past	+past	
	-passive	-passive	+passive	+passive	
1sg	íðri-a	íðris-a	iðri-ómuna	iðríθik-a	
2sg	íðri-es	íðris-es	iðri-ósuna	iðríθik-es	
3sg	íðri-e	íðris-e	iðri-ótane	iðríθik-e	
1PL	iðrí-ame	iðrís-ame	iðri-ómastan	iðriθík-ame	
2PL	iðrí-ate	iðrís-ate	iðri-ósastan	iðriθík-ate	
3PL	íðri-an ~	íðris-an ~	iðrí-ondan ~	iðríθik-an ∼	
	iðrí-ane	iðrís-ane	iðri-óndusan	iðriθík-ane	

The full paradigm of the past forms for a monosyllabic verb root is as follows:

(4)				
	-perfective	+perfective	-perfective	+perfective
	+past	+past	+past	+past
	-passive	-passive	+passive	+passive
1sg	é-γraf-a	é-γraps-a	γraf-ómuna	γráftik-a
2sg	é-yraf-es	é-vraps-es	γraf-ósuna	γráftik-es
3sg	é-yraf-e	é-vraps-e	γraf-ótane	γráftik-e
1PL	γráf-ame	γráps-ame	γraf-ómastan	γraftík-ame
2PL	γráf-ate	γráps-ate	γraf-ósastan	γraftík-ate
3PL	é-γraf-an ~	é-γraps-an ~	vráf-ondan ∼	γráftik-an ~
	γráf-ane	γráps-ane	γraf-óndusan	γraftík-ane

Comments:

- The shared property of the forms in (3) and (4) is APU stress.
- Monosyllabic roots develop the vowel e to support the APU stress, which is traditionally referred to as the 'augment'.

Previous analyses treat APU stress as an exponent of PAST. Such approaches do not provide a phonological analysis for the relation between APU stress and the morphology of Greek. Moreover, they fail to account for a handful of cases which constitute an exception of the generalized APU stress pattern:

(5) p e in o 'to take' $\rightarrow e - p e in - a$ (past, imperfective) **but** p i r - a / e - p i r - a (past, perfective) beino 'to enter' $\rightarrow e - b e n - a$ (past, imperfective) **but** b i k - a / e - b i k - a (past, perfective)

	-perfective, +past		+perfective, +past		
1sg	é-pern-a	é-ben-a	pír-a (*é-pir-a)	bík-a (*é-bik-a)	
2sg	é-pern-es	é-ben-es	pír-es (*é-pir-es)	bík-es (*é-bik-es)	
3sg	é-pern-e	é-ben-e	pír-e (*é-pir-e)	bík-e (*é-bik-e)	
1pl	pérn-ame	bén-ame	pír-ame	bík-ame	
2PL	pérn-ate	bén-ate	pír-ate	bík-ate	
3pl	3PL é-pern-an ~ é-ben-an ~		pir-an (*e-pir-an) ~	bík-an (*é-bik-an) ~	
	pérn-ane bén-ane		pír-ane	bík-ane	

(6) The full paradigm of the -passive past forms of *pérno* and *béno*

Comments:

- The forms with the developed stressed *e* are ungrammatical (**e*-*pir-a*, **e*-*bik-a*, etc.).
- It seems that the special suppletive stem in *pira* and the formative *-ik* in *bika* carry out the same function as the stressed *e-* and, hence, are in complementary distribution with it.

E Proposal

- The augment is a segmentally empty prefix with lexically encoded stress.
- Tense is fused with agreement, so that they form a single terminal node in the morphological structure of the verb.
- The fused tense-agreement node is subject to fission when it is specified as [+past]
- Fission results in multiple exponence.

- One exponent is the ending which encodes both tense and subject-agreement.
- The second exponent is an empty prefix, which is realized under certain conditions as a stressed front mid vowel é (the default vowel for Greek).
- This empty prefix is the default way to encode the [+past] tense node, when (a) it is not filled in with some other [+past] tense formative, such as -*ik*, and (b) it is not satisfied by suppletion.

 \rightarrow Our proposal has the advantage of providing a unifying analysis for all cross paradigmatic instances of the past.

3. PAST as an empty prefix

This section investigates APU stress as manifestation of the PAST. Based on van Oostendorp's (2007b) analysis of the Greek verb stress pattern, we argue that one of the several exponents of PAST is a segmentally empty prefix which carries lexically-encoded accentual properties. Under certain conditions, the empty vocalic slot of the prefix materializes, e.g., *e*-*yrap-s-a*, giving on the surface the impression that the augment and the APU stress constitute part of a discontinuous morpheme, i.e. *e*- ... -a/-es/-e, etc. We provide ample evidence from contemporary Greek dialects as well as from Ancient Greek in support of the proposed analysis.

3.1. Basic elements of van Oostendorp's (2007b) analysis

Starting point:

• APU stress is usually not a property of affixal morphology but the default stress pattern for Greek (Malikouti-Drachman & Drachman 1989, among others). Previous analyses are not explicit about the relation of the APU stress and the affixal morphology of Greek.

• Greek stress is sensitive to morphological structure in the sense that (a) morphemes may – although need not – have lexically-imprinted local and non-local accents (i.e. pre-/post-stressing morphemes), (b) there is an asymmetry among various types of morphemes in determining stress: derivational affix > root > inflection affix.

• APU stress is usually the default stress pattern but it may also arise from underlying metrical structure. For van Oostendorp, this structure is a trochaic foot (F):

(7)	<i>lexically encoded feet</i> F	
	Ν	
	μ _α μ _α σ _α σ _α	where α is any morpheme, σ a syllable of morpheme α , and μ a mora projected from σ of morpheme α .

☑ Aim: To propose an analysis for the Greek past tense that is in line with standard assumptions about the morphology-phonology interaction in Greek and, at the same time, takes into account certain morphosyntactic properties of the structure in question.

Proposal:

• The phonological exponence of the past tense is a segmentally empty foot, which occurs in a functional head preceding ϕP (=AgrP).



(9) PAST as a segmentally empty underlying foot

F

\land	"The F should contain at least one mora in the head position
μ _α (μ _α) σ _α σ _α	because 'mere' feet or 'mere' syllables have no ontological status: such constituents (AR: feet) are projections of lower-order material, and cannot exist without them." (van Oostendorp 2007b: 12)

- The particle θa is a future tense marker. Since θa is a proclitic, the segmentally empty foot must be a proclitic too \rightarrow tense is realized outside the boundaries of the morphological word of the verb
- Tense markers are not affixes in Greek but rather free-standing heads procliticizing to the root.

∽ <u>Reporting on some problems</u>:

- It is broadly accepted that θa is an epistemic modal marker and not a pure tense marker (Tsangalidis 1999; Roussou 2000; Philippaki-Warburton & Spyropoulos 2006). Crucially, θa is not in complementary distribution with past tense morphology, which indicates that these two elements occupy different positions in the morphosyntactic structure of the verb. Cf. $\theta a \in yrafe$'s/he would be writing, $\theta a \in kane$'s/he would be doing', etc.).
- If the past tense foot is a proclitic, then it constitutes the only instance of a(n inherently accented) proclitic which can obligatorily claim stress prominence from the verb. In contrast, object clitics never claim stress from their verbal host, e.g. to kano / *tokano 'I do it', to zo / *tozo 'I experience it', as kano / as kano 'Iet me do', etc.

Important elements of van Oostendorp's analysis:

 Whatever the explanation may be for the past tense stress pattern, it should comply with the overall structure and design of the Greek stress system and, in particular, with the mode in which morphology-phonology interact.

- PAST is encoded as a segmentally empty prosodic unit, i.e. Foot.
- This exponent must occur at the left edge of the verb root.

☑ Our assumptions:

- PAST is encoded as a segmentally empty prefix which carries an inherent accent (not a foot).
- This accent must be **projected and locally pronounced**. To satisfy this requirement, an 'epenthetic' vowel (traditionally known as the *augment*) is inserted.
- Only under one condition the accent fails to be realized locally: the violation of the 3σ window!

3.2. Local and non-local realizations of the PAST accent

☑ We argue that the past exponent

- a. is a prefix (This is in conformity with both historical and dialectal evidence, as shown in Section 3.3.)
- b. lacks a segmental content; it is a segmentally empty mora which is lexically associated with an accent:

(10) PAST as an accented, segmentally empty prefix

 $\begin{array}{l} {}^{*_{\alpha}} \\ \uparrow \\ \mu_{\alpha} \\ \uparrow \\ \uparrow \\ \Box_{\alpha} \end{array}$ where α is the PAST morpheme

The empty vocalic peak **projects** a mora and an accent. That is, any vocalic element that will be inserted to fill in the empty slot will have to carry an accent.

A few words about the representational model
Colored Turbidity (Revithiadou 2007): It is a two-dimensional representational model which

a. encodes morphological affiliation
b. draws a distinction between lexical association and the locus of pronunciation of an accent.

It is inspired by Goldrick's (1998, 2000) *Turbidity Theory,* and van Oostendorp's (2006, 2007a) *Colored Containment Theory.*

 Turbidity Theory (TT) (Goldrick 1998, 2000): Two relations hold between a vowel and, in general, any autosegmental feature sponsored by it:

- (11) a. *projection* (up-arrow ↗): an abstract, structural relationship holding between the vowel and the autosegmental unit.
 - b. *pronunciation* (down-arrow ↘): an output relation that holds between the autosegmental unit and the vowel and describes the output realization of structure.

• **Colored-Containment Theory (CC)** (van Oostendorp 2006, 2007a): The different morphological affiliation of phonological elements is visualized in terms of 'colors' (indicated through indexation in the text). CC allows the morphological affiliation of phonological elements to be 'visible' in the surface structure.

The empty prefix needs to materialize. For this reason, the vowel *e* (i.e. the epenthetic vowel for Greek) is inserted:

(12) *_α ↑ μ_α ↑ e_α-γrap-s-a

DEP-V must be dominated by some other constraint. Q: Which is this constraint?

(13) RECIPROCITY: If Y projects to X, then X must pronounce Y (Goldrick 2000: 3).

Ranking: RECIPROCITY » DEP-V

In order for the accent to be projected by and pronounced on the same vowel, the empty slot must be filled with vocalic material. The result is a **local accent** on the *augment e*:

(15)

*	FAITH(acc)	RECIPROCITY	Dep-V
□-γrap-s-a			
つ a. * _α			*
↑↓			
e _α -γrap _β -s _γ -a _{α+δ}			
b. * _α		*!	
1 ≥			
□ _α -γrap _β -s _v -a _{α+δ}			

Although the default case is for projection and pronunciation to match, several forces (i.e. structural harmony constraints) may operate in a language system causing these association lines to drift apart. In this case, a turbid relation holds between the accent and its sponsor.

Q: Which constraint may yield turbid patterns in Greek?

A: One of the constraints that systematically causes mismatch between projection and pronunciation is the 3σ -window (see Revithiadou 2007 for more instances of such mismatches). Keep in mind that in Standard Greek, this constraint is inviolable, e.g. ðjavázume/*ðjávazume 'we read'.

((16)	<i>ði</i> a∕vasa	'I read-PAST
1	,	<i>ofaraoa</i>	11000017101

poss	sible outputs		3σ-window
	* α		*!
	<u>↑↓</u>		
a.	e _α -ðjava _β -s _γ -a _{α+ō}	*éðjavasa	
	* α		\checkmark
	1 ≥		
b.	□ _α -ðjava _β -s _γ -a _{α+ō}	ðjávasa	

⊠ 3σ » RECIPROCITY » DEP-V

(47)

(17)				
*	FAITH(acc)	3σ	RECIPROCITY	DEP-V
□ _α -ðjava _β -s _γ -a _{α+ō}				
a. * _α		*!		*
<u>↑</u> ↓				
e _α -ðjava _β -s _γ -a _{α+δ}				
<i>éðjavasa</i>				
			*	
1 ≥				
□ _α -ðjava _β -s _γ -a _{α+ō}				
ðjávasa				
C . [*] _α			*	*!
<u>↑</u> >				
e _α -ðjava _β -s _γ -a _{α+õ}				
eðjávasa				
d. * _α	*!			
↑				
e _α -ðjava _β -s _γ -a _{α+õ}				
ðjávasa ²				

Summary:

- APU stress in the Past Tense paradigm is **NOT** the default. .
- The phonological exponent of the PAST is a segmentally empty accented prefix.

.....

- Vocalic content is inserted so that the accent is locally realized (matched
- Vocalic content is inserted so that the accent is locally realized (m projection-pronunciation).
 Vowel insertion is blocked when surfacing of the (accented) vowel t violation of the 3σ window. Vowel insertion is blocked when surfacing of the (accented) vowel triggers

² With monosyllabic roots, the predicted candidate output would have been the ungrammatical *_Vrápsa.

▷ Welcome result of this analysis: APU stress in the past tense paradigm does not require an exceptional treatment. It can be analyzed (a) on the basis of standard assumptions about Greek stress, especially those that pertain to the morphology-phonology interface (see, for instance, Revithiadou 1999) and (b) by employing the same analytical apparatus used for the accentuation of other word classes (see Revithiadou 2007).

Only two extra assumptions need to be made:

- a. PAST is a prefix
- b. PAST is an empty morpheme

In the following section, we provide evidence for (a) the prefixal status of the 'augment' and (b) its development into an empty morph.

3.3. The status of the PAST augment in Ancient Greek and the Greek dialects

• The prefixal status of the augment is witnessed in Ancient Greek, as shown in (18):

(18) Ancient	Greek
--------------	-------

	-perfective	-perfective	
	+past	+past	
	-passive	-passive	
1sg	é-grap ^h -a	e-élpidz-a	- (
2sg	é-grap ^h -as	e-élpidz-as	ра
3sg	é-grap ^h -e(n)	e-élpidz-e(n)	■ 3 an
1PL	é-grap ^h -amen	e-élpidz-amen	
2PL	é-grap ^h -ate	e-élpidz-ate	
3pl	é-grap ^h -an	e-élpidz-an	

e appears throughout the paradigm

 3µ permitting, it is assigned an accent

Glosses: *egrap*^h*a* 'I was writing', *eelpidza* 'I was hoping for'

Comments:

• The augment *e* is prefixed to the verb root.

• It is filled either with the vocalic material from the neighboring verb root (19a) or with the default vowel *e* (19b):

(19)	a.	⊡-elpidz-a ⊾↑↓ μ	\rightarrow	e-élpidz-a	\rightarrow	eelpidza
	b.	⊡-grapʰ-a ⊾ ↓ µ	\rightarrow	€-grapʰ-a	\rightarrow	<i>égrap</i> ʰa

• It can carry an accent (19b), unless the 3-mora limitation rule is violated (19a).

Contemporary Greek dialects display a great deal of diversity:

(20) Ofitika Pontic (OP)

	+perfective	-perfective
	+past	+past
	-passive	-passive
1sg	é-stil-a	é-ku-a
2sg	é-sti∡-es	é-ku-es
3sg	é-sti∡-e	é-ku-e
1PL	é-stil-ame	é-ku-ame
2pl	é-sti∡-ete	é-ku-ete
3pl	ésti∡-aրe	éku-ane

• *e* appears throughout the paradigm

- it is always stressed
- no 3σ-window

Glosses: estila 'I sent', ekua 'I was hearing'

	+perfective	
	+past	 e appears throughout the
	-passive	paradigm
100	á ran a a	it is always stressed
ISG	e-yrap-s-a	= no 2 a window
1PI é-vran-s-ámi		
		 development of rhythmic stress

(21) Macedonia (Papadopoulos 1926: 87; Malikouti-Drachman & Drachman 1992)

Glosses: *e_yrapsa* 'I was writing'

Comments:

- The augment *e* is obligatorily prefixed to the verb root.
- Since default stress is edgemost, the augment is always stressed.

(22) Southern Italy Greek – Apoulia (Karanastasis 1997: 83)

	-perfective +past -passive	
1sg	é-graf-a	 e appears throughout the paradigm
2sg	é-graf-e(s)	1 5
3sg	é-graf-e	 it is stressed only in SG (monosyllabic suffixes)
1PL	e-gráf-amo	■ 3σ-window
2PL	e-gráf-ato	
3pl	e-gráf-ane	

Glosses: egrafa 'I was writing'

Comment: The augment *e* is prefixed to the verb root and surfaces in all forms of the paradigm regardless of whether it is stressed or not.

(23) Kos (Pyli)

<u> </u>			
	-perfective	+perfective	
	+past	+past	
	-passive	-passive	
	example a	example b	
1sg	é-sfiŋg-a	e-jír-is-a	•
2sg	é-sfiŋdȝ-es	e-jír-is-es	•
3sg	é-sfiŋdȝ-e	e-jír-is-e	•
1pl	e-sfiŋg-ame	jir-ís-ame ~ jir-ís-amé-ne ³	
2pl	e-sfiŋdȝ-ete	jir-ís-ete	
3pl	e-sfiŋg-asi	jir-1s-asi	
	∼ e-sfiŋg-ane	∼jir-îs-asî-ne	

• e appears mainly in the SG

- it is NOT stressed
- no 3σ-window

development of rhythmic stress

Glosses: esfinga 'I was squeezing', ejirisa 'I returned'

Comments:

• The augment *e* is prefixed obligatorily to monosyllabic verb roots (23a) but only optionally (or under certain conditions pertaining to word size) to polysyllabic ones (23b).

\rightarrow variation between e ~ \varnothing

• Such variation evidences the gradual loss of the vocalic content of the PAST prefix.

Sonclusions:

• The past was a segmentally empty prefix in Ancient Greek, which was filled either with vocalic material from the base (= verb root) or with a default vowel *e*.

• In several contemporary Greek dialects (e.g. Apoulia, OP, Macedonian), it survives as an obligatory increment of the verb form in the past tense, but unlike Ancient Greek, it is usually manifested with the vowel *e*-

• In certain of these dialects (e.g. OP, Macedonian), the augment is stressed in all forms of the paradigm.

• Finally, there are dialects (e.g. Kos) in which the prefix e- alternates with \emptyset , depending on stress and, most likely, on word size restrictions.

In all dialects, as well as in AG, the augment has a prefixal status. In some dialects, it was always realized, regardless of stress, whereas in others it surfaces obligatorily under stress and optionally elsewhere.

4. The derivation of past forms

This section illustrates how our analysis accounts for the derivation of the different kinds of past forms. We assume an *Item and Arrangement* approach to morphology, as recently developed by the framework of *Distributed Morphology* (DM) (Halle & Marantz 1993; Halle 1997; see also the overviews in Harley & Noyer 2003 and Embick & Noyer 2007). However,

³ The elements *ne* are epenthetic and are inserted usually in phrase final position.

the spirit of our analysis can be easily formulated by other approaches to morphology that assume an affix-based derivation of forms.

Basic theoretical assumptions:

- Morphology works on a set of terminal nodes which represent the relevant grammatical categories to be encoded.
- These terminal nodes are organized in a hierarchical structure. Depending on the approach about the relation between syntax and morphology:
 - this structure derives from the organization of the relevant functional categories in the syntactic component and it is the result of the mapping of the syntactic structure onto the morphological one at the syntax-morphology interface after Spell-Out (DM architecture according to which the Morphological Structure (MS) follows syntax).
 - this structure is morphology specific and it is reflected on the organization of the relevant functional categories in the syntactic component (strict lexicalism: morphology precedes the syntactic component)⁴
- The terminal nodes are filled in by the formatives that carry the relevant information. This operation is subject to the *Subset Principle*. Insertion of the relevant formative discharges (i.e. satisfies or erases) the feature specification of the node.
- (24) The Subset Principle (Halle 1997: 128)

The phonological exponent of a Vocabulary Item is inserted into a position if the item matches all or a subset of the features specified in that position. Insertion does not take place if the Vocabulary Item contains features not present in the morpheme. Where several Vocabulary Items meet the conditions for insertion, the item matching the greatest number of features specified in the terminal morpheme must be chosen.

- A terminal node may be also or additionally realized by means of a readjustment rule that affects the stem or the base to which it is affixed. Readjustment rules are lexically specified properties carried by the root/stem and imposed on the relevant terminal node.⁵
- For the purposes of this paper we will remain neutral with respect to formal accounts of grammatically conditioned allomorphy.⁶
- The terminal nodes are subject to operations of the MS, such as *fusion*, *fission* and *impoverishment* (Halle & Marantz 1993; Halle 1997).
- Fusion is an operation that unites two (or more) terminal nodes to one, as shown in (25).

⁴ We will not take a position in favor of any of the previous two approaches. For the purposes of this paper we will simply assume that syntactic evidence is relevant and sometimes crucial for identifying the organization of the terminal nodes in morphology.

⁵ The existence and function of readjustment rules is related to suppletion. The derivation and the formal representation of suppletion constitute big theoretical issues which will not be addressed in this paper.

⁶ There are many issues pertaining to the processes and the conditions underlying grammatically conditioned allomorphy (see Halle 1990; Halle & Marantz 1993; Carstairs-McCarthy 1987, 2001, 2003; Bobaljik 2000; Adger et al. 2003), which we will not address here. We will simply assume that satisfaction of a terminal node discharges its features so that they may not condition the insertion of formatives under the next terminal nodes.



- Fission is an operation that allows for a terminal node to have multiple exponents. More specifically, under normal circumstances a terminal node is expressed only once, no matter whether the formative inserted under it expresses only a subset of its features. When fission applies, other formatives may be also inserted under such a terminal node, until all of its features have been discharged:
- (26) a. Non fission $X[\alpha, \beta, \gamma]$ \downarrow $x[\alpha, \beta]$ b. Fission $X[\alpha, \beta, \gamma] \rightarrow X[\alpha, \beta] [\gamma]$ \downarrow | $x[\alpha, \beta]$ $x[\alpha, \beta] z[\gamma]$

4.1. The morphological structure of Greek verbs

Assuption: The morphological structure of Greek verbs derives from the hierarchical organization of the functional categories involved in the clause structure (Philippaki-Warburton 1990, 1998; Rivero 1990, 1994; Philippaki-Warburton & Spyropoulos 1999; Alexiadou & Anagnostopoulou 2001; Galani 2005)⁷:

(27) verb root-VOICE-ASPECT-TENSE-AGREEMENT-MOOD

Mood is only relevant for imperative verb forms. Thus, non-imperative verb forms, with which we are dealing in this paper, have the following morphological structure:

(28) verb root-VOICE-ASPECT-TENSE-AGREEMENT

There is ample evidence that agreement does not exist as an independent functional projection in Greek clause structure (Spyropoulos 1999): agreement is a relational category with no semantic content and agreement features are parasitic to the functional category of Tense. This means that in MS Tense and Agreement form a fused terminal node. Structure (28) is therefore revised as (29):

(29) verb root-VOICE-ASPECT-[TENSE-AGREEMENT]

Other fusion operations may also apply to the terminal nodes of structure (29) in certain occasions and create fused nodes. We will not discuss these situations here, since they are not directly relevant for the realization of past tense.

⁷ See also Warburton (1970, 1973) from the viewpoint of morphology. For similar Item-and-Arrangement approaches to the morphological structure of Greek see Hamp (1961), Koutsoudas (1962) and Babiniotis (1972). See also Joseph & Smirniotopoulos (1993) and Ralli (1998, 1999, 2005) for arguments against the Item-and-Arrangement approach to Greek verb morphology.

▷ **Proposal**: The fused T-Agr terminal node is subject to fission, which means that all of its features must be satisfied by some formative.

4.2. The derivation of the active past forms

The full paradigm of these forms for both monosyllabic and disyllabic verb roots is exemplified by (30):

	-perfective, +past, -passive		+perfective, +past, -passive	
	disyllabic	monosyllabic	disyllabic	monosyllabic
1sg	íðri-a	é-γraf-a	íðris-a	é-γraps-a
2sg	íðri-es	é-γraf-es	íðris-es	é-γraps-es
3sg	íðri-e	é-γraf-e	íðris-e	é-vraps-e
1PL	iðrí-ame	γráf-ame	iðrís-ame	vráps-ame
2PL	iðri-ate	γráf-ate	iðrís-ate	γráps-ate
3PL	íðri-an ~	é-γraf-an ~	íðris-an ~	é-γraps-an ~
	iðrí-ane	γráf-ane	iðrís-ane	γráps-ane

(30) *iðri-o* 'to found', *yraf-o* 'to write'

The perfective specification of the aspect node is satisfied by the insertion of the formative -*s*, which is specified as [+perfective]. Since there is no formative in the system specified as [-perfective], insertion of the default null formative - \emptyset satisfies the [-perfective] specification of aspect in imperfective forms:

(31) a. é-γrap-s-a ~ é-γraf-Ø-a
b. íðri-s-a ~ íðri-Ø-a

The fused T-Agr terminal node is specified as [+past, α agreement⁸].

☑ The exponents of [+past] are:

- The empty prefix described in section 2
- The ending Set 2

■ <u>The distinction between primary and secondary exponence</u> (Carstairs 1987; Noyer 1997): The feature specification of a formative may contain primary and secondary information. By the insertion of such a formative under a terminal node, only those features of the terminal node that are primarily encoded are discharged

- [+past] is the only and primary specification of the empty prefix.
- The [+past] specification of the ending set 2 is not the primary, but the secondary. The primary specification of the ending is its agreement specification. Notice that this set also carries no specification for voice.

 $^{^{8}}$ Since we are not interested in agreement and the features it involves, we will use a general specification [α agreement] where relevant.

(32) The feature specification of past tense formatives
 □- ⇔ [+past]

Set 2 \Leftrightarrow [α agreement, (+past)⁹]

Filling in the T-Agr node

- Insertion of an ending belonging to the set 2 discharges the specification for agreement, but crucially not that of [+past].
- Since the terminal node is marked for fission, the empty prefix is employed in order to discharge this property of the terminal node, yielding the by now well-known APU stress pattern.

4.3. The derivation of [+passive, +perfective, +past] forms

E First remarks:

- These forms involve the insertion of a formative -θik
- They exhibit APU stress pattern
- They take the Set 2 endings which carry no specification for voice

	+perfective, +past, +passive		
	disyllabic	monosyllabic	
1sg	iðrí-θik-a	γráf-tik-a	
2sg	iðrí-θik-es	γráf-tik-es	
3sg	iðrí-θik-e	γráf-tik-e	
1PL	iðri- 0 ík-ame	γraf-tík-ame	
2PL	iðri-θík-ate	γraf-tík-ate	
3pl	iðrí-θik-an ~	γráf-tik-an ~	
	iðri- 0 ík-ane	γraf-tík-ane	

(33) *iðrí-o* 'to found', yraf-o 'to write'

I Tentative analysis:

- -θik is a formative specified as [+passive, +perfective] and satisfies the relevant specifications of the aspect and voice terminal nodes (Babiniotis 1972; Ralli 2005).
- Paste tense is realized in the same way as in active forms described above, i.e. the fused tense-agreement node is marked for fission and it is realized by the insertion of Set 2 endings and the empty prefix.

E <u>Problem</u>: -θik is not a unit

Were -θik a unit, nothing would have prevented its use in [+passive, +perfective, -past] forms. Crucially, in these forms only the -θ part appears, as shown in (34):

⁹ Secondary specification is denoted by being included in brackets.

(34)

(•••)			
	+perfective, -past, +passive		
	disyllabic	monosyllabic	
1sg	iðri-θ-ó	γraf-t-ó	
2sg	iðri-θ-ís	vraf-t-ís	
3sg	iðri-θ-í	vraf-t-í	
1PL	iðri-θ-úme	γraf-t-úme	
2pl	iðri-θ-íte	γraf-t-íte	
3pl	iðri-θ-ún(e)	vraf-t-ún(e)	

- -*ik* appears alone in [+passive, +perfective, +past] forms in which the [+passive, +perfective] specification has been satisfied by means of a readjustment rule that has affected the stem resulting in suppletion. Thus, the verb *strefo* 'turn' has a special stem *straf* which is used only in [+passive, +perfective] forms:
- (35) The stem alternation *stref-* ~ *straf-* of the verb *stref-o* 'to twist'

a. Active		
Aspect	Tense	
	Past	Non Past
Perfective	é-strep-s-a	strép-s-o
Imperfective	é-stref-a	stréf-o

b.	Passive
N.	1 400110

Aspect	Tense	
	Past	Non Past
Perfective	stráf-ik-a	straf-ó
Imperfective	stref-ómuna	stréf-ome

-ik also appears in the [-passive, +perfective, +past] forms of three verbs, namely b-ik-a (beno 'to enter'), vy-ik-a (vyeno 'to exit'), vr-ik-a (vrisko 'to find'). Significantly, these forms do not respect the APU stress pattern and, as anticipated under the current analysis, are not augmented either. Notice also that -ik does not appear in the corresponding [-passive, +perfective, -past] forms, i.e. b-o, vy-o, vr-o.

(36)	The perfective active	forms of <i>beno</i> 'te	o enter', <i>v_Yeno</i>	'to exit', vrísko 'to find'
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	be	éno	vyé	no	vr	ísko
	+perfective	+perfective	+perfective	+perfective	+perfective	+perfective
	+past	-past	+past	-past	+past	-past
1sg	b-ík-a	b-ó	vγ-ík-a	٧ɣ-Ó	vr-ík-a	vr-ó
2sg	b-ík-es	b-ís	vγ-ík-es	vy-ís	vr-ík-es	vr-ís
3sg	b-ík-e	b-í	v _¥ -ík-e	vy-í	vr-ík-e	vr-í
1PL	b-ík-ame	b-úme	v _V -ík-ame	v _V -úme	vr-ík-ame	vr-úme

2PL	b-ík-ate	b-íte	v _¥ -ík-ate	v _V -íte	vr-ík-ate	vr-íte
3pl	b-ík-an(e)	b-ún(e)	v _¥ -ik-an(e)	vɣ-ún(e)	vr-ík-an(e)	vr-ún(e)

➢ Conclusion:

- -θik consists of two formatives, namely -θ and -ik
- -θ encodes passive voice and perfective aspect. <u>Evidence</u>:
 - it appears only in [+passive, +perfective] forms
 - it is in complementary distribution with readjustment rules/suppletion triggered by these specifications (example (35))
- -ik is a past tense exponent selected by perfective aspect.¹⁰ Evidence:
 - it only appears in those perfective forms that are specified as [+past]
 - o it can appear to both active and passive perfective past forms

Proposal:

- -θ is a formative specified as [+passive, (+perfective)]
- -ik is a formative specified as [+past, (+perfective)]
- -*ik* is therefore in competition with the empty prefix. Since the latter is only specified for [+past], insertion of -*ik* always wins over in perfective forms in which the perfective specification of the aspect node has not been discharged.

E The derivation:

- Insertion of -θ satisfies the voice and aspect terminal nodes, but crucially it does not discharge the [+perfective] specification, since this feature is secondarily expressed by this formative.
- In the fused T-Agr node, fission applies and insertion of the Set 2 endings satisfies the agreement features but not the [+past] specification.
- Two formatives compete for insertion so that the [+past] feature be satisfied:

(37) □- ⇔ [+past] -ík ⇔ [+past (+perfective)]

-ik wins over because it is more specified, given the [+perfective] specification of the aspect node.¹¹

¹⁰ The previous analyses that separate $-\theta ik$ into $-\theta$ and -ik do not treat -ik as a past tense exponent but rather as either a perfective or a passive perfective exponent (Hamp 1961; Koutsoudas 1962; Babiniotis 1972; Warburton 1973; Rivero 1990), with the exception of Galani (2005) who suggests that -ik is primarily specified for [+passive, +perfective] and secondarily as [+past].

¹¹ The exact way in which the [+perfective] specification of the aspect terminal node affects the T-Agr node is not very clear. It may be taken to indicate that these forms involve generalized fusion so that the perfective aspect may condition the insertion of the *-ik* formative, because it belongs to the same node with tense. We leave the issue open to further research.

 The APU stress pattern derives from default stress (which is of course constrained by the 3σ-window).

4.4. The derivation of irregular [-passive, +perfective, +past] forms

Two different cases:

- verb forms that involve the formative -*ik* (see (36) above)
- verb forms that involve suppletion, i.e. pira (pérno 'to take'), piya (piyéno 'to go')

In the derivation of bika, vyika and vrika:

These three verbs involve different stems for perfective and imperfective forms:

- (38) a. b- [+perfective] ~ bén- [-perfective]
 - b. v_{V} [+perfective] ~ v_{V} én- [-perfective]
 - c. vr- [+perfective] ~ vrisk- [-perfective]

➢ Remarks:

- It can be argued that the root of these verbs is the stem used for the perfective forms and that the characteristic *-en* and *-isk* segments are [-perfective] formatives which manifest the imperfective aspect node.
- These three verbs are similar to a class of verbs, named here *N verbs*, that make no use of the [+perfective] formative -s. N verbs have a lexical specification that excludes the -s formative from their inventory and encode the [+perfective] information of the aspect node by means of (a) insertion of the default null formative or (b) readjustment rules that result in suppletion or (c) both. Crucially, they do so in a complete way, so that the feature specification of the aspect node is discharged and hence cannot condition the insertion of the past formative. In this case, the empty prefix is inserted instead yielding *e* insertion and the anticipated APU stress.

☑ Filling in the T-Agr node:

- The three verbs in question differ from N verbs in that somehow the perfective specification of the aspect node is not discharged and is able to condition the insertion of the past formative.¹²
- -ik is inserted instead of the empty prefix because of its [+perfective] specification → no APU stress pattern and no augment.

It the derivation of *pira* and *piya*:

These verbs involve two different stems for the perfective forms, one for [+past] and another for [-past]:

¹² One possible way to formulate this asymmetry is to assume that inward-sensitive grammatically conditioned allomorphy involves fusion of the relevant nodes. Thus, in the forms where the perfective aspect node conditions the insertion of the past formative fusion between the aspect and the T-Agr node has taken place. See also note 11.

	be	éno	vyé	no
	+perfective	+perfective	+perfective	+perfective
	+past	-past	+past	-past
1sg	pír-a	pár-o	píγ-a	pá-o
2sg	pír-es	pár-is	píγ-es	pá-s
3sg	pír-e	pár-i	píγ-e	pá-j
1PL	pír-ame	pár-ume	píγ-ame	pá-me
2PL	pír-ate	pár-ete	píγ-ate	pá-te
3pl	pír-an(e)	pár-un(e)	píγ-an(e)	pá-n(e)

|--|

Suppletion in these forms is relevant not only to perfective aspect, but also to past tense. This means that the [+past] specification of the tense node is satisfied by a special readjustment rule, together with the [+perfective] specification of the aspect node.



Readjustment rules/suppletion are lexically determined and thus block the insertion of either *-ik* or the empty prefix. The only formative inserted under the T-Agr node is the Set 2 endings that realize primarily the agreement features and secondarily the [+past] specification.



5. Conclusions

We showed that:

- The APU stress pattern is not a morphological exponent of past tense.
- It derives from a segmentally empty prefix with lexically-encoded stress properties.
- This empty prefix is a past tense exponent.
- The formative $-\theta ik$ consists of two parts.

• The *-ik* part is not a (passive) perfective aspect exponent, but rather a past tense exponent with a secondary perfective aspect specification.

We proposed an analysis according to which:

- The morphological structure of Greek verb involves a fused tense and agreement node as a result of the syntactic status of agreement.
- This fused node is subject to fission when it is specified as [+past], which results in multiple exponence.
- The empty prefix is the default exponent for the [+past] specification of the tense terminal node.
- -*ik* is also a past tense exponent specified as [+past, (+perfective)], which competes with the empty prefix for insertion under the tense node and wins over when the [+perfective] specification of the aspect node has not been discharged.
- Insertion of the empty prefix (and -ik) is also excluded when the relevant node has been satisfied by a lexically defined readjustment rule (suppletion).

The benefits of our analysis:

- It reveals the nature and the conditions underlying the distribution of the APU stress pattern and the augment.
- It explains the APU stress pattern and the augment by means of independently needed assumptions regarding the phonological manifestation of the morphological structure.
- It accounts for the 'irregular' instances of past tense manifestation by means of a unified analysis with the regular ones.

Extensions/ Issues to explore:

- The morphophonological manifestation of the aspect node and its effects on the manifestation of tense.
- A thorough and principled formal account for the grammatically conditioned allomorphy and the suppletion in the manifestation of the morphological structure of Greek verb.

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