PROSODIC PHRASING AND FOCUS IN GREEK DECLARATIVES

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Abstract

Σε αυτό το άρθρο υποστηρίζεται ότι προσωδιακοί περιορισμοί μεγέθους όπως η διττότητα έχουν καθοριστικό ρόλο στο σχηματισμό των φωνολογικών φράσεων (ΦΦ) στην Ελληνική. Πιο συγκεκριμένα, αναφέρεται ότι οι ΦΦ σχηματίζονται είτε σε αλληλεπίδραση με τη συντακτική δομή είτε με βάση πληροφορία προσωδιακού τύπου. Ειδικότερα στη δεύτερη περίπτωση, οι ΦΦ διέπονται από τις αρχές της διττότητας και της ισόποσης κατανομής του φωνολογικού βάρους και, λόγω της ευρρυθμίας τους, προτιμώνται στατιστικά. Επιπλέον, οι ίδιες αρχές φαίνεται να καθορίζουν και τη φρασοποίηση του προ-εστιακού μέρους μιας πρότασης. Είναι γνωστό ότι ένα στενά εστιασμένο συστατικό αποτελεί μια αυτόνομη προσωδιακά φράση προκαλώντας με αυτόν τον τρόπο αποφρασοποίηση του υλικού που έπεται. Προτείνεται όμως ότι παράλληλα προκαλεί και επαναφρασοποίηση του υλικού που προηγείται. Σε αυτήν την περίπτωση υποστηρίζεται ότι η ΦΦ ακολουθεί αμιγώς προσωδιακούς περιορισμούς στο σχηματισμό της κι όχι περιορισμούς αλληλεπίδρασης σύνταξης-φωνολογίας.

Keywords

phonological phrase, branchingness, end-based theory, focus, wellformedness, wrap, alignment

1. Introduction

In this paper we examine the impact of focus on phrasing and, especially, the prosodic re-organization it inflicts to pre-focal *given* information. More precisely, we argue that in Greek focus exploits both prominence and constituency for its prosodic encoding. In the former case, post-focal material is de-accented (Baltazani 2002b) and, subsequently, de-phrased. In the latter case, on the other hand, a phonological boundary is placed at the left edge of the focused constituent and, as consequence, preceding background material is forced to rephrase (Revithiadou 2003). The central issue here is the dynamics of focus-driven rephrasing and, in particular, the interaction of information structure with the constraints that control phonological phrasing in Greek.

It has been claimed that both syntax-phonology interface and prosodic wellformedness constraints are actively involved in Greek phrasing. More specifically, Revithiadou (2003) shows that there is variation in phrasing due to the parallel existence of two phrasing grammars: the end-based grammar (EBG) and the wellformedness-based grammar (WBG). The former proceeds by looking at syntactic structure and accordingly matching prosodic edges to syntactic edges (cf. Selkirk, 1978, 1981a *et seq.*; Truckenbrodt, 1995, 1999) whereas the latter proceeds by paying attention to prosodic structure alone and, subsequently, grouping pairs of prosodic words into the same phonological phrase. In particular, WBG aims at enhancing the eurhythmicity of the utterance by organizing prosodic constituency on the basis of length, weight balancing and branchingness. However, often this is performed at the expense of

pursuing an isomorphic mapping between morphosyntactic and prosodic constituents which, in contrast, is what the EBG usually strives for. Moreover, the WBG has been found to be quantitatively prevalent and characteristic of both slow and faster speech rates. This set of facts naturally raises a question with respect to how pre-focal material is prosodically organized.

This question is undertaken in the present paper. More specifically, based on the results of an experimental study, we show that pre-focal material phrases according to the dictates of the WBG. This finding is consistent with the statistically prevalent phrasing patterns of declarative sentences and, actually, confirms the prominent role of the WBG in phrasing. More importantly, this range of parallels leads to some interesting conclusions about the architectural organization of the grammatical modules in Greek.

The remaining of this paper is organized as follows: Section 2 discusses the basic phrasing patterns of declarative sentences. Section 3 examines the impact of information structure on phrasing and, in specific, the prosodic organization of pre-focal material. Finally, section 4 concludes this paper.

2. P-Phrasing in declarative sentences

2.1 The end-based pattern

In Optimality Theory (Prince & Smolensky, 1993), the rules that match syntactic edges to prosodic ones take the form of the alignment constraints in (1) (Selkirk, 1995 based on McCarthy & Prince, 1993). In addition, Truckenbrodt (1995, 1999) builds a convincing argument for the necessity of including WRAP-XP in the family of interface constraints.[1]

(1) *interface constraints*

a Align-XP,L: Align (XP, L; PPh, L)
For each XP, there is a PPh, such that the left edge of XP coincides with the left edge of PPh.

b Align-XP,R: Align (XP, R; PPh, R)
For each XP, there is a PPh, such that the right edge of XP coincides with the right edge of PPh.

c WRAP-XP: Each XP is contained in a phonological phrase.

Revithiadou (2003) reports that the end-based phrasing algorithm for Greek is {Right, XP} which roughly reads as "the right edge of a maximal projection projects a right phonological phrase boundary." The proposed analysis is based on the examination of a corpus of 204 declarative sentences (elicited from four native speakers of a southern variety of Greek).[2] However, before moving on to examining the phrasing patterns of declarative sentences, it is wise to review the sandhi rules that apply within the domain of the *phonological phrase* (henceforth p-phrase).

In the variety of Greek studied here, the sandhi rules that provide cues for p-phrase breaks are given in (2) and (3). The rules in (3), namely high vowel deletion and non-high vowel fusion, are claimed to be gradient as opposed to the rules in (2) which are categorical. For instance, / i/ becomes a glide [j] across p-phrases but it deletes across prosodic word boundaries (cf. Baltazani, 2002a). Similarly, sequences of non-high vowels belonging to the same p-phrase tend to fuse provided they are unstressed; otherwise, the rule is blocked.

(2) *categorical rules (based on Pelekanou & Arvaniti 2002)*

a *s-voicing*

$s \rightarrow z$ / [… ___ C …]φ

$$\begin{bmatrix}+\text{cont}\\+\text{voi}\end{bmatrix} \text{ or } \begin{bmatrix}-\text{cont}\\+\text{nas}\end{bmatrix}$$

example: /meγálos máγos/ → [meγálo**z**máγos]φ ‘great magician’

b *nasal-stop assimilation*

$n \rightarrow [\alpha \text{ p.a.}]$ / [… ____ $\begin{bmatrix}-\text{cont}\\ \alpha \text{ p.a.}\end{bmatrix}$ …]φ

[-cont] → [+voi] / [… [+nas] ___ …]φ

example: /éxun palépsi/ → [éxu***mb***alépsi] ‘(they) have wrestled’

c *C-degemination*

$C_i \rightarrow \varnothing$ / [… […___]ω [C_i…]ω]φ

V-degemination

$V_i \rightarrow \varnothing$ / [… […___]ω [V_i…]ω]φ

example: /mázeves savúra/ → [mázeve∅ ***s***avúra] ‘(you) were piling up clutter’

/káni italiká/ → [kán∅ ***i***taliká] ‘(s/ he) learns Italian’

(3) *non-categorical rules*

a *i-deletion*

$V_{[+high]} \rightarrow \varnothing$ / [… […___]ω [$V_{[-high]}$ …]ω]φ

b *i-semivolization across p-phrases*

$i \rightarrow j$/ … […___]φ [$V_{[-high]}$…]φ

example: /ofíli apantísis/ → [ofíl∅ ***a***pandísis/ ‘(s/ he) owes answers’

/i íkosi oðipóri arpázun…/ → [íikos∅ ***o***ðipór***j***]φ [arpázun…]φ

‘twenty travelers seize…’

c *non-high V fusion*

[… [… V]ω [V…]ω]φ → V

$$\begin{bmatrix}\alpha F\end{bmatrix} \quad \begin{bmatrix}\beta F\end{bmatrix} \qquad \begin{bmatrix}\alpha F\end{bmatrix}$$

-hi -hi βF

example: /éðosa eksetásis/ → [éðosæksetásis] ‘(I) participated in exams’

Some representative sentences with their respective phrasings are provided in (4). More specifically, in (4a), the blocking of V-degemination between the NP-subject *i élena* and the verb *anakálipse* is an indication that a p-phrase boundary intervenes between the two constituents. In contrast, the application of the same rule between the verb and its complement *ekriktiká* verifies that the two constituents belong to the same p-phrase. Similarly, in (4b) the enforcement of *i*-deletion is an indication that the verb and the NP-complement belong to the same p-phrase, whereas *i*-semivocalization in the same example provides a cue for the presence of a p-boundary between the NP-subject and the verb.

(4) $[_{NP}$Det N$]$ $[_{IP}$ V $[_{VP}$ t_V $[_{NP}$ Det N$]]$

a /i élena anakálipse ekriktiká/ → [jélena]φ [**a**nakálips∅ ***e***kriktiká]φ
the Elena.NOM.sg discover.3sg.PAST ‘Elena discovered explosives’
explosives.ACC.pl

b /i ártemi ofili eksiγísis/ → [jártem**j**]φ [ofil∅ ***e****ksiγ*ísis]φ
the Artemi.NOM.sg owe.3sg.PRES ‘Artemi owes explanations’
explanation.ACC.pl

All syntactic analyses of Greek (Philippaki–Warburton, 1987, 1989; Horrocks, 1994; Alexiadou & Anagnostopoulou, 1998; Alexiadou, 1999) argue that the verb raises to the head of IP leaving behind a silent copy t_V (Chomsky, 1995). Given the *Lexical Category Condition* (Truckenbrodt, 1999: 226),[3] neither the IP nor the projection of an empty head can project a p-boundary. As expected, therefore, the verb phrases together with its complement in (5), a prediction that is verified by the application of V-degemination in this environment, *ðín∅ isxí*. Furthermore, the blocking of s-voicing between the NP-subject *to fós* and the verb *ðíni* in the same sentence hints at the presence of a p-phrase boundary at the right edge of the NP-subject.

(5) $[_{NP}$Det N$]$ $[_{IP}$ V $[_{VP}$ t_V $[_{NP}$ Det N $[_{PP}$ P NP$]]$

/to fós ðíni isxí sti mixaní/ → [to fó**s**]φ [ðín∅ ***i***sxí]φ [sti mixaní]φ
the light.NOM.sg give.3sg.PRES ‘the light gives power to the engine’
power.ACC.sg to-the engine.ACC.sg

An immediate consequence of V-raising to the head of IP is that it is impossible to detect the effects of WRAP-XP within the VP. A comparison of the sentence in (5) with the one in (6) is telling: the sentence with two complements (5) and the sentence with a complement and an adjunct (6) phrase alike.

(6) [NPDet N] [IP V [VP tV [NP Det N] [PP P NP]]]

/o pános stélni efxés me kártes/→ [o pános]φ [stéln∅ *e*fxés]φ [**m**e the Panos.NOM.sg send.3sg.PRES kártes]φ

wish.ACC.pl with card.ACC.pl 'Panos sends greetings with cards'

The effects of WRAP-XP are revealed only in constructions with multiple complements to the head of an NP such as the ones in (7). In (7a), both the NP in genitive *tis ártemis* and the PP *sta erotímata* are complements to the NP *tis apantísis*. This structure minimally contrasts with (7b) where the PP *sto sirtári* is an adjunct. Interestingly, the PP-adjunct phrases by itself whereas the PP-complement incorporates with the other constituents of the NP into one p-phrase. This difference can only be explained if WRAP-XP is effective in the grammar.

(7) *complex NPs*

a [NPDet N] [IP V [VP tV [NP Det NP_{GEN} PP P NP]]]]

/i maría psáxni tis apantísis tis ártemis sta erotímata/ → [i maría]φ [psáxni tis apandísis tis ártemi∅ *s*t*æ*rotímata]φ

the Maria.NOM.sg look for.3sg.PRES the answer.ACC.pl the Artemi.GEN.sg to-the question.ACC.pl 'Maria looks for Artemi's answers to questions'

b [NPDet N] [IP V [VP tV [NP Det NP_{GEN} [PP P NP]]]]]

/i maría psáxni tis apantísis tis ártemis sto sirtári/ → [i maría]φ [psáxni tis apandísis tis ártemis]φ [**s**to sirtári]φ

the Mary.NOM.sg look for.3sg.PRES answers in the the answer.ACC.pl the Artemi.GEN.sg in-the drawer.ACC.sg 'Mary looks for Artemi's drawer'

In OT, a constraint can promote certain candidate outputs as optimal only when it occupies a higher rank than a constraint that drives the selection towards a different direction. Thus, WRAP-XP must dominate ALIGN-XP,R in order to select candidate (8a) over candidate (8b) as the winner in the following tableau:

(8) WRAP-XP >> ALIGN-XP,R >> ALIGN-XP,L

	[N NP_1 PP]$_{NP2}$	WRAP-XP	ALIGN-XP,R
a	☞ [N NP_1 PP]φ		$*_{NP1}$
b	[N NP_1]φ [PP]φ	$*_{NP2}$!	

Tableau (9) spells out the details of the competition that leads to the surfacing of the phrasing patterns displayed in (4).

(9)

	NP_1 [IPV[VP tV NP_2]	WRAP-XP	ALIGN-XP,R	ALIGN-XP,L
a	☞ [NP_1]φ [V NP_2]φ			$*_{NP2}$

b	$[NP_1\ V]\varphi\ [NP_2]\varphi$		$*_{NP1}$!	

2.2 The role of size constraints in phrasing

In the previous section, we have shown that the end-based phrasing finds empirical justification because it can accurately predict p-phrase breaks. The problem, however, is that only 30% of the compiled material phrases according to the end-based model. Strikingly, 48% of the p-phrase patterns found in our corpus displays different phrasing behavior.[4] In (10) below, the outputs of the end-based model are given in the ′-sentences whereas its quantitatively preferred alternative is given in the ′′-sentences.

(10) *variation in phrasing*

a /to fós ðíni isxí sti mixaní/

a′ [to fó**s**]φ [ðín∅ ***i***sxí]φ [sti mixaní]φ

a′′ [to fó***z*** ðín**i**]φ [**i**sxí sti mixaní]φ

‘the light gives power to the engine’

b /to fós tis avγís ðíni isxí sti mixaní/

b′ [to fós tis avγí**s**]φ [ðín∅ ***i***sxí]φ [sti mixaní]φ

b′′ [to fós tis avγí**s**]φ [ðín∅ ***i***sxí sti mixaní]φ

‘the light of the dusk gives power to the engine’

c /i éksi apantísis miás péktrias stis ðóðeka erotísis tu parusiastí/

c′ ??[jéks∅ ***a***pandísi***z*** ***m***jás péktrja∅ ***s***tiz ðóðek***æ***rotísis tu parusjastí]φ

c′′ [jéks∅ ***a***pandísi**s**]φ [**m**jás péktrja∅ ***s***ti***z*** ***ð***óðeka] [**e**rotísis tu parusjastí]φ

‘the six answers of a player(fem) to the twelve questions of the TV-spokesman’

The phrasing displayed by the ′′-sentences is particularly significant in the present context. First, pairs of prosodic words are grouped together into larger p-constituents. In (10a′′), for instance, s-voicing applies between the NP-subject and the verb whereas *i*-degemination is blocked between the verb and its NP-complement. In other words, sandhi rules reveal that the former pair of constituents is prosodically more coherent than the latter. This phrasing contrasts with the end-based pattern in (10a′).

Second, augmentation of the sentence in (10a) by one word has dramatic effects on the organization of its phrasal constituency as shown in (10b). More precisely, a five-word-long sentence like (10b′′) is phrased as 2ω 3ω and not as *2ω 2ω 1ω or *2ω 1ω 2ω. This implies that the head p-phrase[5] is structurally more complex, i.e. heavier, than the other p-phrases. In general, there seems to be a lower and an upper limit in the size of p-phrases. This is why end-based phrasings such as (10c′) are under-represented in the corpus.

The existence of multiple phrasing options for a given syntactic string has long been acknowledged in the literature (Nespor & Vogel, 1986; Ghini, 1993). More recently, studies on

phrasing in Romance languages (Prieto, 1997; Elordieta *et al*, 2003; Sandalo & Truckenbrodt, 2001) underlined the relevance of notions such as branchingness and length for phrasing. Ghini in his 1993 analysis of phrasing in Italian shows that if syntactic branchingness is re-analyzed as phonological branchingness, the mapping algorithm meets with stronger empirical support. In the same spirit, Selkirk (2000) underlines the importance of constraints on the minimum and maximum size of prosodic constituents as the driving force for eurhythmic phrasing patterns. She therefore proposes the following constraint set:

(11) *binarity constraints*

a BIN^{min}: a p-phrase must consist of at least two prosodic words.

b BIN^{max}: a p-phrase must consist of at most two prosodic words.

Given the existence of prosodic size constraints in the Grammar the alternative ′′-phrasings can now receive a straightforward interpretation. BIN^{min} clusters together pairs of prosodic words even when they belong to different XPs. This can only be achieved with a hierarchy that ranks BIN^{min} over WRAP-XP and ALIGN-XP,R.

We assert from the above that two different constraint hierarchies are responsible for constructing the phrasal constituency of a given syntactic string in Greek. Tableau 1 below illustrates the effects of the hierarchy that top-ranks prosodic wellformedness constraints whereas tableau 2 demonstrates the effects of the reverse ranking. Sentence (10a) serves as an input to both tableaux.

(12) *prosodic wellformedness vs. interface patterns*

T1	/**t**o fós̲ ðín̲i i̲sxí sti mixaní/	BIN^{min}	WRAP-XP	ALIGN-XP, R
a	☞ [to fó**z** ðín**i**]$_{\varphi_1}$ [**i**sxí sti mixaní]$_{\varphi_2}$			**
b	[to fó**s**]$_{\varphi_1}$ [ðín∅ ***i***sxí]$_{\varphi_2}$ [sti mixaní]$_{\varphi_3}$	*!φ_1		

T2	/to fós̲ ðín̲i i̲sxí sti mixaní/	WRAP-XP	ALIGN-XP, R	BIN^{min}
a	☞ [to fó**s**]$_{\varphi_1}$ [ðín∅ ***i***sxí]$_{\varphi_2}$ [sti mixaní]$_{\varphi_3}$			*φ_1
b	[to fó**z** ðín**i**]$_{\varphi_1}$ [**i**sxí sti mixaní]$_{\varphi_2}$		*!*	

Furthermore, the minimum binarity restriction for head p-phrases is ensured by a ranking that places the prosodic domination constraints, namely EXH and NONREC, as well as HEAVYHEADφ over BIN^{max}, the constraint that enforces strict binarity. HEAVYHEADφ, stated in (13), imposes a wellformedness requirement on the size of the head p-phrase of an utterance.[6]

(13) HEAVYHEADφ

A head p-phrase must be heavy, i.e. minimally binary: $\varphi_{Head} \geq 2\omega$

Only this domination order can achieve a ternary prosodic structure for the head-phrase of every sentence with an odd number of prosodic words. For example, a string consisting of five prosodic words, / ω ω ω ω ω/ , can be phrased in one of the following ways:

(14) *phrasings of a five-word-long sentence*

a [ωω]$_{\varphi_1}$ [[ωω]$_{\varphi_2}$ ω]$_{\varphi_3}$

b [ωω]$_{\varphi_1}$ [ωω]$_{\varphi_2}$ ω$_{\varphi_3}$

c [ωω]$_{\varphi_1}$ [ωω]$_{\varphi_2}$ [ω]$_{\varphi_3}$

d [ωω]$_{\varphi_1}$ [ω]$_{\varphi_2}$ [ωω]$_{\varphi_3}$

e [ωω]$_{\varphi_1}$ [ωωω]$_{\varphi_2}$

Let us assess each phrasing in (14) on the basis of the constraints at hand. The recursive p-phrase in (14a) fails to satisfy NONREC and, similarly, the one in (14b) violates EXH. Furthermore, phrasing (14c) defies the minimal size demands of HEAVYHEADφ and (14d) is also excluded because φ_2 scores a fatal violation of BIN^{min}. This leaves us with (14e) as the output with the optimal prosodic organization for the string in question. Suffice to say that ternary head-phrases arise only if HEAVYHEADφ, BIN^{min} >> BIN^{max}. The total constraint ranking that leads to its selection as the optimal candidate is provided in (15).

(15) *wellformedness-based phrasing*

EXH, NONREC >> HEAVYHEADφ, BIN^{min} >> BIN^{max} >> WRAP-XP >> ALIGN-XP,R

To sum up, a phrasing mechanism that assigns primary role to prosodic wellformedness naturally stands in a rivalry relationship with the end-based mapping that requires a hand-in-hand co-operation between phonology and syntax. In OT, both phrasing options take the form of the constraint hierarchies in (16) where each hierarchy represents a different phrasing grammar.[7]

(16) *phrasing patterns in Greek*

a end-based grammar (EBG)

{WRAP-XP >> ALIGN-XP,R} >> {HEAVYHEADφ, BIN^{min} >> BIN^{max}}

b wellformedness-based grammar (WBG)

{HEAVYHEADφ, BIN^{min} >> BIN^{max}} >> {WRAP-XP >> ALIGN-XP,R}

In the next section we investigate the impact of information structure on phrasing. More specifically, we explore the prosodic cues by which narrow/ contrastive focus is signaled and the phrasing decisions it imposes to *given* material in a sentence.

3. Information structure-effects on phrasing

Baltazani (2002a,b) showed that there is an asymmetry in the prosodic marking of *given* information depending on its relative position to focus. To be precise, *given* information is de-accented post-focally but preserves its pitch accents pre-focally. Furthering this claim, Revithiadou (2003) argues that narrow/ contrastive focus inserts a left p-boundary at the left of the focused constituent. Moreover, we propose here that the presence of a p-boundary also triggers leftward rephrasing of the string. This finding arises from the examination of 95 sentences rendered with narrow/contrastive focus. Five native speakers of a southern variety of Greek were asked to read dialogues of the following format: [8]

(17) *dialogues*

Q1: to fós ðíni isxí î óθisi sti mixaní? 'does the light give power or thrust to the engine?'

A1: to fós ðíni ISXÍ stin mixaní 'the light gives POWER to the engine, not thrust'

Q2: tí ðíni to fós sti mixaní? 'what does the light give to the engine?'

A2: to fós ðíni ISXÍ stin mixaní 'the light gives POWER to the engine'

The sentences were recorded in a quiet room and digitized (wav files, sample rate 22,050Hz, sample size 16-bit). F0 tracks were analyzed using PRAAT (developed by Boersma & Weenink, University of Amsterdam).

In (18), we compare the phrasings of a few representative sentences rendered with narrow/contrastive focus on a particular constituent with the phrasings of the same sentences rendered with nuclear stress rule. The ′-sentences represent the output of the EBG whereas the ′′-sentences represent the output of the WBG.

(18) *focus and rephrasing*

/ o féðon paríngile ANGÍSTRIA/

a [o féðo***n*** ***b***aríŋgile]φ [AŋGÍSTRJA]φ

a′ [o féðo**n**]φ [**p**aríŋgil***æ***ŋgístrja]

a′′ [o féðo***mb***aríŋgil***æ***ŋgístrja]φ

'Phaedon ordered HOOKS/hooks'

/to fós ðíNI isxí sti mixaní/

b [to fó**s**]φ [ðíN***I*** ∅sxí sti mixaní]φ

b′ [to fó**s**]φ [ðín∅ ***i***sxí]φ [sti mixaní]φ

b′′ [to fó***z*** ***ð***in**i**]φ [**i**sxí sti mixaní]φ

'the light GIVES/ gives power to the engine'

/o pános γráfi ikositéseris SONÁTES/

c [o pánoz ɣráf∅ ikositéseris]φ [SONÁTES]φ

c′ [o pános]φ [ɣráf∅ ikositéseri sonátes]φ

c′′ [o pánoz ɣráfi]φ [ikositéseri sonátes]φ

'Panos writes/ composes twenty-four SONATAS/sonatas'

/o mános parínglie ENÉA úza/

d [o mános parínglie]φ [ENÉA úza]φ

d′ [o mános]φ [parínglie∅ néa úza]φ

d′′ [o mános parínglie]φ[enéa úza]φ

'Manos ordered NINE/ nine (glasses of) uzo'

A few comments are in order. In (18a), focus on *aŋgístrja* blocks non-high vowel fusion which, nevertheless, applies between the verb and the NP-object as correctly predicted by both the EBG (18a′) and the WBG (18a′′). Similarly, focus blocks s-voicing in (18b), C-degemination in (18c) and V-degemination in (18d). We conclude, therefore, that focus changes the dynamics of phrasing in a sentence.

Selkirk (1996, 1997 *et seq.*) proposes a model of information structure-phonology interface which supplies the grammar with the Align(Info, PCat) family of constraints. Constraints of this family, such as ALIGN-FOCUS,L in (19), ensure the mapping of some edge of a focus constituent with some edge of a prosodic unit. Furthermore, high-ranking ALIGN-FOCUS,L guarantees that the demands of Information Structure will be imposed on the phrasal structure of a given sentence.

(19) ALIGN-FOCUS,L

Align the left edge of a Focus constituent in information structure with the left edge of a p-phrase in the prosodic structure.

Another issue that calls for special attention is the phrasing of pre-focal material. The sentences in (18c-d) clearly show that the NP-subject and the verb are grouped together into one p-phrase according to the dictations of prosodic branchingness. This entails that when information structure-phonology interface constraints impose certain requirements on the prosodic constituency of a sentence, the matching of syntactic boundaries with prosodic boundaries seems to be totally ignored.

The ranking in (20) formalizes the described system of relations. ALIGN-FOCUS,L dominates HEAVYHEADφ because unary p-phrases are allowed only under focus prominence. The results of the proposed ranking are demonstrated in the following tableaux:

(20) ALIGN-FOCUS,L >> HEAVYHEADφ, BIN^{min} >> WRAP-XP >> ALIGN-XP,R

T1	/o féðon parínglie AŋGÍSTRIA$_{FOC}$/	ALIGN-FOCUS,L	HEAVYHEADφ	BIN^{min}	WRAP-XP	ALIGN-XP,R
a	☞ [NP$_1$ V]φ [**NP**$_2$]φ		*	*$_{NP2}$		*$_{NP1}$

b	[NP$_1$] [V]φ [**NP**$_2$]φ		*	*$_{NP2}$*$_V$!		
c	[NP$_1$] [V **NP**$_2$]φ	*!		*$_{NP1}$		
d	[NP$_1$ V **NP**$_2$]φ	*!				*$_{NP1}$

T2	/o pános γráfi ikositéseris SONÁTES$_{FOC}$/	ALIGN-FOCUS,L	HEAVY HEADφ	BIN^{min}	ALIGN-XP,R
a	[NP$_1$]φ [V Num]φ [**NP**$_2$]φ		*	*$_{NP2}$*!$_{NP1}$	
b	☞ [NP$_1$ V Num]φ [**NP**$_2$]φ		*	*$_{NP2}$	*$_{NP1}$
c	[NP$_1$]φ [V Num **NP**$_2$]φ	*!		*$_{NP1}$	
d	[NP$_1$ V Num **NP**$_2$]φ	*!			

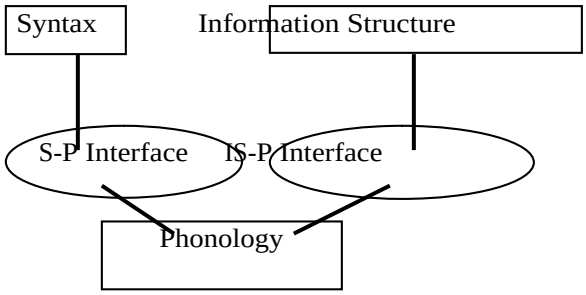
In T1, candidate-a is the winner because it is the only form that satisfies the focus alignment constraint and, at the same time, complies with binarity. For the same reason, candidate-b is chosen as the optimal output in T2.

4. Conclusions

In this paper we claim that there is variation in phrasing: p-phrases are built either hand-in-hand with syntactic structure (EBG) or in accordance with purely prosodic principles (WBG). Interestingly, the statistically preferred pattern is the one that challenges syntactic-edge alignment and wrapping requirements by not displaying isomorphy between the syntactic and prosodic structure. In this case, prosodic wellformedness principles such as prosodic branchingness and weight balancing are in control of building up phrasal constituency.

Furthermore, narrow/ contrastive focus in Greek is encoded by means of prosodic constituency and prominence. This means that focus signals the beginning of the most prominent p-phrase of the utterance. As expected, focus has dramatic effects on the phrasing of other material in a sentence. Indeed, post-focal material is reported to de-accent and possibly de-phrase. On the other hand, pre-focal material is subject to rephrasing according to the dictates of the WBG. This finding is consistent with the results of the analysis of declarative sentences which show a strong preference for WBG outputs. We conclude, therefore, that in Greek the relation between grammatical modules is not arbitrary: information structure-phonology interface constraints dominate phonological constraints which, in turn, outrank syntax-phonology interface constraints. The diagram in (21) portrays the modular organization of the grammar and the ranking reflects the described system of affairs between the relevant components.

(21)



ranking: IS-P ℂ >> P ℂ >> S-P ℂ

The marked preference for a hierarchy in which phonological constraints mediate between blocks of interface constraints (i.e. information structure-phonology and syntax-phonology) raises many questions about the architecture of the Grammar in general that are definitely worth exploring in the future. Moreover, future research should also investigate the role of prosodic principles in phrasing and the ways in which they could be integrated in the analyses of spoken sentences.

NOTES

[1] Next to constraints controlling edge-alignment there are also the *prosodic domination constraints*, which, taken together, compose the Strict Layer Hypothesis (Selkirk, 1981b; Nespor & Vogel, 1986). These constraints state certain requirements about the hierarchical relations holding between prosodic units, which refer to headedness, rank of category, exhaustivity of parsing and prohibition of recursive structures.

[2] Cf. Revithiadou 2003 for the details of the experimental study.

[3] Constraints relating syntactic and prosodic categories apply to lexical syntactic elements (L^0) and their projections (L^{max}) but not to functional elements (F^0) and their projections (F^{max}), nor to empty elements and their projections.

[4] The remaining 22% demonstrates non-systematic variation in phrasing.

[5] In Greek, default prominence is rightmost within the p-phrase and rightmost within the intonational phrase (i-phrase). This entails that the following constraints are top-ranked:

(i) RIGHTMOST-φ: The head prosodic word is rightmost in the p-phrase.

(ii) RIGHTMOST-IP: The head p-phrase is rightmost in the i-phrase.

(based on EDGEMOST, Prince & Smolensky, 1993; Prince, 1983)

[6] It is well-established that phonological heads show the maximum complexity allowed by grammar. If there is an asymmetry, it will always be the head that is more complex than the dependent (cf. Dresher & Van der Hulst, 1998). For instance, heads of feet are often heavier (i.e. bi-moraic) than their dependents. Italian has also been reported to require head p-phrases to minimally comply with branchingness (Guasti & Nespor, 1999).

[7] For the technical details of how exactly a specific phrasing grammar matches to specific performance situations (e.g. slow/fast speech rates) see Revithiadou 2003.

[8] Three of the participants also took part in the experiment that lead to the compilation of the corpus described in section 2.1 from which the ′-sentences and ″-sentences in (18) are drawn.

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