

# Subject chains in Greek and PF processing

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In this paper, we challenge the left-dislocation analysis of preverbal subjects in Greek on the basis of interpretative, syntactic and prosodic evidence. We propose that the derivation of subjects in Greek involves a movement operation which targets an EPP Spec,TP position. This movement operation creates a sequence of copies, the pronunciation and interpretation of which hinges on certain PF and LF requirements. Crucially, the linearization of the sequence of copies on the basis of independently existent PF principles derives the surface distribution of Greek subjects and accounts for its possible patterns of variation.

## 1. Introduction

This paper proposes an analysis for the derivation of subjects in Greek, which explains their distribution as a result of the processing of the syntactic output by the Phonological Component after Spell-Out. We first show that the left-dislocation analysis to preverbal Greek subjects<sup>1</sup> does not cover the whole range of empirical facts, since there exist preverbal subjects which exhibit properties incompatible with a (left-)dislocation status. To account for these subjects, we put forward the hypothesis that their syntactic derivation involves a movement operation which targets an EPP Spec,TP position. The major challenge for such a hypothesis is to account for the various patterns of subject distribution which have been observed and documented for Greek. The analysis proposed here builds on a copy approach to movement, as developed by Bošković (2001) and Bobaljik (2002), which states that the syntactic output of movement is the sequence of copies at the positions involved, and that the linearization of this chain, i.e. the choice upon which copy is pronounced and interpreted, is a matter of the interfaces and subject to their operations and conditions.

The remainder of this paper is organized as follows: In section 2, we review a number of arguments from interpretation, extraction and prosodification which substantiate our claim that preverbal subjects in Greek are not necessarily left-dislocated elements. In section 3, we lay out the specifics of

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<sup>1</sup> The left-dislocation approach to preverbal subjects has been the predominant analysis in the literature of Greek syntax since Philippaki-Warbuton's (1987) paper. See also Alexiadou and Anagnostopoulou (1998) and Spyropoulos and Philippaki-Warbuton (2002) for some theoretical formulations and elaborations of the original idea.

the copy approach to the derivation of Greek subjects. In sections 4 and 5, we implement our proposal to subjunctive and indicative clauses respectively, and we show how the core distribution of subjects is derived by the enforcement of PF constraints. In section 6, we conclude the paper.

## 2. Challenging the left-dislocation approach to Greek subjects

The left-dislocation analysis states that preverbal subjects in Greek do not occupy the EPP Spec,TP position and that they are left-dislocated elements doubled by a null-subject element. Thus, preverbal subjects are assumed to have the same syntactic status as preverbal clitic left-dislocated objects. There is a great amount of truth in the left-dislocation analysis, namely (a) in certain constructions an overt subject may not surface at the Spec,TP position and (b) some Greek preverbal subjects have topic readings and exhibit properties of left-dislocated elements. However, we claim that this is not always the case. More specifically, we provide evidence that there are significant asymmetries between preverbal subjects and clitic left-dislocated objects, and, moreover, that preverbal subjects in certain occasions show properties that are inherently different from those characterizing a left-dislocated element.

### 2.1. Preverbal subjects are not necessarily topics

A clear indication against the left-dislocation analysis is that preverbal subjects do not always have a topic reading. Both SVO and VSO orders are felicitous answers to questions requiring an all new information answer:

- (1) Q:    τί           έγινε?           /τί            néa?  
           what-ACC happen-PAST.3SG/what-NOM new-PL.NOM  
           ‘What happened?/What’s up?’
- A1.  ο  jánis        fίlise        ti  maría  
           the John-NOM kiss-PAST.3SG the Mary-ACC
- A2.  fίlise        ο  jánis        ti  maría  
           kiss-PAST.3SG the John-NOM the Mary-ACC  
           ‘John kissed Mary’

Interestingly, SVO is the optimal and most frequent answer in such cases (Laskaratou 1998; Keller and Alexopoulou 2001). The non-topic availability of preverbal subjects has not received the appropriate attention so far, because the vast majority of previous syntactic analyses took no notice of the distinction between transitive (SVO) and intransitive<sup>2</sup> (SV) constructions. To explain, whereas S in SVO is readily rendered as a non-topic, this is not the case with SV constructions. In the latter, the alternative VS order is a more preferred answer

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<sup>2</sup> The term ‘intransitive’ is used pretheoretically here in order to describe unergative and unaccusative constructions in general, including passives, ergatives, middles, etc.

in an ‘all new information’ context,<sup>3</sup> which suggests that S in SV constructions is the marked alternative. Thus, putting together preverbal subjects in both SVO and SV orders hides the non-topic reading of S in the SVO order.

Given that SVO orders do not necessarily involve a topic subject, the motivation for the left-dislocation approach loses ground. This is reinforced by the existence of constructions with *Free Choice Items* (FCIs) as preverbal subjects. Giannakidou (2001) has convincingly shown that FCIs are inherently incompatible with a topic reading due to their intensional semantics, but still are fine preverbal subjects.

- (2) opiaðípote γάτα kiniγáí pondíkia  
 whichever cat-NOM hunt-3SG mice-ACC  
 ‘Any cat hunts mice’ (Giannakidou 2001: 679)

Furthermore, Roussou and Tsimpli (2006) claim that the interpretation of preverbal subjects in certain constructions is incompatible with a left-dislocation status. They examine stative (3a), middle (3b) and generic (3c) verb constructions, in which the subject must be preverbal with the intended reading and with neutral intonation:

- (3) a. i maría kséri (#i maría) tin apándisi  
 the Mary-NOM know-3SG (the Mary-NOM) the answer-ACC  
 ‘Mary knows the answer’
- b. ta liná plénonde éfkola (#ta liná)  
 the linen-PL.NOM wash-3PL easily (the linen-PL.NOM)  
 ‘Linen wash easily’
- c. i fálenes íne (#i fálenes) θilastiká  
 the whale-PL.NOM are (the whale-PL.NOM) mammal-PL.NOM  
 ‘Whales are mammals’ (Roussou and Tsimpli 2006: 340–1)

This behavior can be straightforwardly explained by the special interpretative properties of these constructions, which obligatorily associate the subject with the T functional projection. This is more prominent in constructions in which the preverbal subject has a generic reading (3b-c). This reading in Greek subjects is closely associated with the tense specification of T as [-past, -perfective]. Roussou and Tsimpli (2006) argue that this association reveals a checking relation established between the preverbal subject and the T head, which cannot be established if the preverbal subject is a left-dislocated element.

Moreover, Roussou and Tsimpli (2006) put into question Alexiadou and Anagnostopoulou’s (1998) argument regarding the scopal preferences of constructions with an indefinite preverbal subject:

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<sup>3</sup> This is confirmed by the results of a questionnaire research we carried out, according to which the VS order was preferred to the SV order by 58.6% as an answer in an ‘all new information’ context. In contrast, in transitive clauses the SVO order was the preferred choice by 76.5%.

- (4) énas astinomikós sinélave káthe listí  
 a policeman-NOM catch-PAST.3SG every thief-ACC  
 ‘A policeman caught every thief’  
 $\exists > \forall$  but  $*\forall > \exists$

Alexiadou and Anagnostopoulou (1998) claim that the indefinite subject can only take wide scope over the universal quantifier object and that the unavailability of the narrow scope reading indicates the (left-)dislocated status of the preverbal subject. Roussou and Tsimpli (2006) counter-argue that the narrow scope reading of the indefinite subject is possible under certain pragmatic contexts. More importantly, they go on, this reading seems to be facilitated by the imperfective aspect. We concur with Roussou and Tsimpli’s (2006) observations and take example (6) to have both readings available.

- (5) énas ipuryós episkéftike káthe póli tis eládas  
 a minister-NOM visit-PERF-PAST.3SG every city-ACC the Greece-GEN  
 ‘A minister (has) visited every city of Greece’  
 $\exists > \forall$  only ( $*\forall > \exists$ )
- (6) énas ipuryós episkeftótan káthe póli tis eládas  
 a minister-NOM visit-IMPERF-PAST.3SG every city-ACC the Greece-GEN  
 ‘A minister was visiting every city of Greece’  
 $\exists > \forall$  and  $\forall > \exists$

It is, therefore, clear that preverbal existential quantifier subjects may take narrow scope and, naturally, in such occasions they cannot be left-dislocated elements. All these different pieces of evidence, put together, provide a robust interpretative argument against the dislocation analysis of preverbal Greek subjects.

## 2.2. Preverbal subjects are not islands

Greek subjects permit extraction out of them even when they are preverbal:

- (7) [pjanú maθití]<sub>i</sub> mu ípes óti [<sub>DP-subj</sub> i mitéra t<sub>i</sub>]  
 which student-GEN me tell-PAST.2SG that the mother-NOM  
 xtípise to ðiefθindí?  
 hit-PAST.3SG the headmaster-ACC  
 ‘\*Of which student did you tell me that the mother hit the headmaster?’

In this respect, preverbal subjects crucially differ from left-dislocated elements. As evident from clitic left-dislocated objects, left-dislocated elements do not allow extraction from within, as a result of their status as derivational islands (Nunes and Uriagereka 2000; Stepanov 2001).

- (8) \*pjanú<sub>i</sub> mu ípes óti [<sub>DP</sub> to axláði t<sub>i</sub>] to éfayes?  
 who-GEN me tell-PAST.2SG that the pear-ACC it eat-PAST.3SG  
 ‘Whose pear did you tell me that you have eaten?’

If preverbal subjects were indeed left-dislocated, then we would expect them to constitute derivational islands and extraction out of them to be rigidly banned. Thus, the availability of such an extraction constitutes a strong argument against the left-dislocation analysis of preverbal Greek subjects.

### 2.3. Preverbal subjects do not prosodify as left-dislocated elements

Revithiadou and Spyropoulos (2005, to appear) have shown that clitic-doubled objects form prosodic islands in the sense that not only are they wrapped into their own p-phrase, but also resist prosodic restructuring. On the contrary, preverbal subjects may form independent p-phrases, but, crucially, they are also subject to rephrasing. Here we review some of their arguments.

Two prosodic phrasing algorithms are effective in Greek: (a) an *end-based algorithm* (EA), which dictates the mapping of the edges of syntactic constituents with prosodic ones (Selkirk 1995, et seq.; Truckenbrodt 1995, et seq.), and (b) a *binarity-based algorithm* (BA), which operates on the basis of the prosodic size of constituents.<sup>4</sup> Crucially, such an algorithm, which is driven by the need to construct p-phrases of prosodically ideal (i.e. binary) size, often triggers radical rephrasing, i.e. prosodic restructuring.

- (9) /i éksi apóriés miás péktrias sta erotímata/  
 the six query-PL.NOM a-GEN player-FEM.GEN to-the question-PL.ACC  
 ‘The six queries of a player to the questions’

- a. ?[jéksØ apóriéz mñas péktrjaØ sta erotímata]φ EA  
 b. [jéksØ apóriés]φ [mñas péktrjaØ sta erotímata]φ BA

There are several sandhi rules in Greek that operate within the p-phrase domain. For the purposes of the discussion here, we will focus on the following two:

- (10) a. *s-voicing before voiced fricatives and sonorants*  
 /éxis majirépsi/ → [éçiz majirépsi] ‘You have cooked’  
 b. *VV/CC -degemination*  
 /éxo orámata/ → [éxØ orámata] ‘I have visions’

In (9), the application of the two phrasing algorithms yields two different phrasing patterns. The end-based algorithm strives to wrap the whole DP into a unique but a rather lengthy p-phrase (9a). This phrasing, however, seems to be less favored compared to the one in (9b), which is formed on the basis of grouping pairs of words into binary p-phrases.

Strikingly, the binarity-driven rephrasing is not enforced in clitic left-dislocated object constructions. The examples in (11) and (12), which render the

<sup>4</sup> The following prosodic size constraints, called collectively here *prosodic binarity* constraints, constitute the backbone of the binarity-based algorithm:

- (i) *prosodic binarity* (based on Selkirk 2000):  
 a. BIN<sup>min</sup>: A p-phrase must consist of at least two PrWs.  
 b. BIN<sup>max</sup>: A p-phrase must consist of at most two PrWs.

orders *DP-object clV DP-subject* and *DP-object DP-subject clV*, respectively, clearly show that the relevant sandhi rules are blocked between the clitic-doubled DP-object and the following constituent. More specifically, the example in (11) illustrates that clitic left-dislocated objects are wrapped into their own p-phrase because *s*-voicing does not apply between the DP-object and the following clitic. The sentence in (12) reinforces this assumption, since here the blocking of vowel degemination between the clitic-doubled DP-object and the DP-subject confirms their failure to restructure in the appropriate environment.

- (11) a. *tis próves,*            *mas tis klíni*            *o pános*  
the rehearsal-PL.ACC us    them arrange-3PL the Panos-NOM  
‘As for the rehearsals, Panos arranges them for us/you-PL’
- b. [tis próves]φ [mas tis klíni o pános]φ
- (12) a. *ton aléko,*            *o bambás ton misi*  
the Aleko-ACC the dad-NOM him hate-PRES.3SG  
‘As for Alex, dad hates him’
- b. [ton aléko]φ [o bambás ton misi]φ

Revithiadou and Spyropoulos (2005, to appear) account for the formation of independent p-phrases and the lack of restructuring as a direct consequence of the status of left-dislocated objects as derivational islands. Clitic left-dislocated objects constitute non-cyclic elements in the sense that they are assembled in a different derivational workspace and they merge with the rest of the structure at a later point of the derivation, after an application of Spell-Out has driven them to the interfaces (Lebeaux 1988; Uriagereka 1999; Nunes and Uriagereka 2000; Stepanov 2001). This is also indicated by their radical syntactic islandhood, i.e. such elements severely block extraction from within:

- (13) a. \**pjanú<sub>i</sub> mu ípes*            *óti* [<sub>DP</sub> *to axláði t<sub>i</sub>*] *to éfayes?*  
whose me say-PAST.2SG that    the pear-ACC it eat-PAST.3SG
- b. *pjanú<sub>i</sub> mu ípes*            *óti éfayes*            [<sub>DP</sub> *to axláði t<sub>i</sub>*]?  
whose me say-PAST.2SG that eat-PAST.3SG    the pear-ACC  
‘Whose pear did you tell me that you have eaten?’

Based on the evidence presented above, we had concluded that the syntactic islandhood of clitic-doubled DP-objects is matched by prosodic islandhood as well. This finding has an important consequence for the status of Greek preverbal subjects: if subjects in SVO orders were left-dislocated elements doubled by a null-subject, one would expect a similar prosodic behavior with clitic left-dislocated objects due to their structural similarity. However, this expectation is not borne out, since preverbal subjects can rephrase:

(14) to fós            ḏíni        isxí            sti        mixaní  
 the light-NOM give-3SG power-ACC to-the engine-ACC  
 ‘The light gives power to the engine’

- a. [to fós] $\phi_1$  [ḏín $\emptyset$  isxí] $\phi_2$  [sti mixaní] $\phi_3$     EA  
 b. [to fóz ḏíni] $\phi_1$  [isxí sti mixaní] $\phi_2$             BA

In the phrases constructed by the end-based algorithm (14a), *s*-voicing is blocked across  $\phi_1$  and  $\phi_2$  and vowel degemination is enforced within  $\phi_2$ . The exact opposite situation, however, is observed in (14b) suggesting that an alternative, binarity-driven, phrasing is also available.

To sum up, the evidence discussed above shows that preverbal subjects and clitic left-dislocated objects do not behave the same at the syntax-phonology interface. We take this to constitute a solid argument that preverbal subjects are not necessarily left-dislocated elements.

### 3. Greek subjects: A copy approach

The evidence presented above shows that preverbal subjects may exhibit properties which are not compatible with a left-dislocation status. Crucially, such properties are revealed in the unmarked indicative transitive constructions rendered with neutral intonation in ‘all new’ information contexts. Especially, the evidence discussed by Roussou and Tsimpli (2006) suggests that preverbal subjects must belong to the functional domain of T and establish some kind of syntactic relation (feature checking) with it. On the basis of this, we claim that preverbal subjects in discourse neutral SVO constructions reside at the Spec,TP position.<sup>5</sup> This proposal leads to a more general approach to Greek subjects, according to which their syntax is associated with the projection of an EPP specifier. The major challenge for such an approach is to provide a principled account for a number of issues regarding the positions in which an overt subject may surface. More specifically, subjects (a) may be either preverbal or postverbal in transitive constructions (SVO ~ VSO, with SVO being the preferred option by far), (b) are preferred to be postverbal in intransitive constructions, and (c) are obligatorily postverbal in subjunctive clauses.<sup>6</sup> We propose that this variation in the distribution of overt subjects in Greek is not a matter of syntax, but rather the result of the linearization of the subject chain in the PF component after Spell-Out.

Based on Chomsky’s proposals about the formulation of movement in the Minimalist Program in terms of copies, Bošković (2001) and Bobaljik (2002) develop a particular approach to movement which maximizes the role of interfaces in evaluating the output of the syntactic derivation. According to this

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<sup>5</sup> Such a proposal leaves space for preverbal subjects to also be able to occupy focus or topic positions in the relevant occasions. However, in such cases preverbal subjects seem to belong to the CP-layer, as Roussou (2000) and Roussou and Tsimpli (2006) have extensively argued for. We do not discuss here the details of the syntactic derivation of these subjects.

<sup>6</sup> Note that VOS orders are always rendered with focus either on the S or the O or the [VO] and hence their derivation falls outside the scope of this study (see Georgiafenitis and Sfakianaki 2004).

approach, movement is a syntactic process which operates before Spell-Out and creates a sequence of copies of the moving element at the relevant positions. Crucially, syntax itself does not decide on which copy should delete; this is a matter of the linearization of the copy sequence at the interfaces. In other words, the PF and LF components decide on which copy will be pronounced or interpreted on the basis of their own principles and constraints.<sup>7</sup> As far as the PF component is concerned, the default case is that linearization of chains favors pronunciation of the highest copy. This effect is captured by the constraint PRONOUNCE HIGHEST (PH) originally proposed by Franks (2000):

- (15) PRONOUNCE HIGHEST (PH)  
Lower identical copies are silent.

PH is a form of a *positional faithfulness* constraint (Beckman 1997), since it promotes the pronunciation of the head of a chain. Its effects can be seen only when it is high-ranking. The non-positional correlate of PH is PRONOUNCE, which indiscriminately advocates the pronunciation of every copy available in the syntactic string.

- (16) PRONOUNCE  
A copy must be pronounced.

Given these two constraints in a system, in a two-copy chain, the highest copy will survive. Needless to say, the set of PF constraints is not exhausted by the ones mentioned above. There are several PF constraints intimately involved in the selection of the optimal copy; some of them are morphophonological whereas others are purely prosodic. Interestingly, the interaction of these constraints, as encoded in a language-specific constraint hierarchy, provides a promising and powerful analysis for the linearization of chains and the surface distribution of the moving element.

Implementing these theoretical assumptions to the derivation of Greek subjects, we propose that subjects move from their theta-position in the  $\nu$ P to an EPP Spec,TP position creating a sequence of copies, one in the Spec,TP and another in the relevant theta position.<sup>8</sup> After Spell-Out, linearization of the chain at the PF interface promotes the pronunciation of one of the two copies. More specifically, PF requirements (adjacency conditions, prosodic wellformedness principles, stress assignment, and so on) alone will decide on which copy qualifies as a well-formed PF-structure and hence will be pronounced as the *optimal* output, and which does not and, consequently, it will be silenced. For instance, given a ranking in which PH is ranked high enough to guarantee that its effect will not be blunted by another PF constraint, the highest copy will be pronounced. Interestingly, exactly this ranking is responsible for the emergence

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<sup>7</sup> For the purposes of this paper, PF conditions are formulated in an optimality theoretic framework (Prince and Smolensky 1993; McCarthy & Prince 1993). See also Pesetsky (1997, et seq.) for an OT-based approach to word order variation.

<sup>8</sup> We leave aside the issue of what may constitute the driving force for such a movement (case checking, agreement valuation, satisfaction of EPP, etc.; see Chomsky 2000; Bobaljik 2002; Bošković to appear, among others).

of the SVO order. In what follows, we examine subjunctive and indicative clauses in Greek and demonstrate how such an interface approach to copy selection, which exploits in full the power of PF constraints, provides a promising and straightforward analysis for the distribution of Greek subjects.

#### 4. Subjunctive clauses

Subjunctive in Greek involves the verb form plus the proclitic subjunctive particle *na*, which occupies the head of a Mood functional category (Philippaki-Warburton 1998, among others). Overt subjects in subjunctive clauses are always postverbal when rendered with neutral intonation. They may appear before the *na*+verb complex, but in this case they are obligatorily rendered with a focus (17) or a topic (18) intonational pattern:

- (17) a. TO PÚLMAN na fíyi  
 the bus-NOM SUBJ leave-3SG  
 ‘THE BUS should go’
- b. O NÍKOS na ríksi to dísko  
 the Nikos-NOM SUBJ throw-3SG the server-ACC  
 ‘NICK should throw the server’
- (18) a. to púlman || na fíyi  
 the bus-NOM SUBJ leave-3SG  
 ‘As for the bus, it should go’
- b. o níkos || na ríksi to dísko  
 the Nikos-NOM SUBJ throw-3SG the server-ACC  
 ‘Nick should throw the server’

Such a distribution is straightforwardly explained by our analysis. Let us consider the derivation of the subjunctive clause in (19-20):

- (19) na (\*o jánis) féri o jánis to vivlío  
 SUBJ the John-NOM bring-3SG the John-NOM the book-ACC  
 ‘John should/may bring the book’

- (20) [<sub>MP</sub> [<sub>M</sub> na] [<sub>TP</sub> ~~o jánis~~ [<sub>T</sub> ferí] [<sub>VP</sub> o jánis ~~ferí~~ to vivlío]]]

Subject movement targets the EPP Spec,TP position. In this position, the copy structurally intervenes between the particle *na* and the verb form. Philippaki-Warburton and Spyropoulos (1999) extensively argue that *na* and the verb form are subject to some kind of postsyntactic merger (Marantz 1988), which results in the procliticization of *na* to the verb form. This kind of merger does not involve any checking relation between the two elements, because the verb form carries no mood morphology and the mood features of the M head are satisfied by merging the particle *na*. Thus, it cannot be interpreted as lowering or postsyntactic affixation. Rather, it seems to constitute an instance of postsyntactic

merger that operates on string-adjacent elements. For such a merger, pronunciation of the higher copy in Spec,TP position would thus have catastrophic results. Given that pronunciation of the higher copy creates an ill-formed morphophonological object in PF, some other constraint must enforce the pronunciation of the lowest copy. We argue that this constraint is STRICT ADJACENCY, stated in (21):

- (21) STRICT ADJACENCY (SA)  
Elements liable to postsyntactic merger must be strictly adjacent.

An ungrammatical output such as *\*na o jánis féri to vivlío* is exactly what SA is designed to rule out, through high-rank. We infer from this that SA must outrank PH. The tableau in (22) illustrates the competition between the crucial candidates. Candidate (22a) incurs a fatal violation of SA. This leaves candidate (22b), which realizes the lowest copy, as the winner. Note that each candidate scores a single violation of PRONOUNCE, since one copy always deletes, regardless of its position.

(22)

na o jánis féri o jánis ...	SA	PH	PRONOUNCE
a. na o jánis féri <del>o jánis</del> ...	*!		*
b. na <del>o jánis</del> féri o jánis ...		*	*

## 5. Indicative clauses

### 5.1. Transitive clauses

Both SVO and VSO orders are possible in rendering an all new information transitive sentence, but SVO is strongly preferred. This variation suggests that the requirement to pronounce the highest copy is somewhat relaxed in Greek, since otherwise a lower copy would never had the chance to surface. In order to fully-understand the described pattern of variation, let us take a closer look at the syntactic derivation of a typical transitive sentence.

- (23) (o jánis) éfere (o jánis) to vivlío  
the John-NOM bring-PAST.3SG the John-NOM the book-ACC  
'John brought the book'

- (24) [<sub>CP</sub> [<sub>TP</sub> o jánis [<sub>T</sub> éfere] [<sub>VP</sub> o jánis ~~éfere~~ [<sub>VP</sub> ~~éfere~~ to vivlío]]]]  
a. [o jánis] éfere [~~o jánis~~] to vivlío preferred  
b. [~~o jánis~~] éfere [o jánis] to vivlío less preferred

In the *vP*-phase, the two arguments merge with the verb and Spell-Out applies sending its complement domain, i.e. the VP, to the interfaces for processing. At the next phase level up, two movement operations take place: The verb moves to the T head and the DP *o jánis* moves to the Spec,TP position in order to satisfy EPP. Spell-Out of the CP-phase will send its complement domain, i.e. the TP, which now includes a copy of the DP *o jánis* and a copy of the verb, to the

interfaces. Leaving aside verb movement, for which we assume that the high copy is always the one promoted at the interfaces, interfaces will have to linearize the output of the movement of the DP *o jánis* which consists of two copies. Let us now see how PF processes this output in Greek.

Recent proposals, including the present one, assume that during Spell-Out higher order prosodic structure, i.e. p-phrasing, is assigned.<sup>9</sup> Leaving aside the technical differences among the various analyses, the core idea is that the spell-out domain of a phase forms a p-phrase constituent. More specifically, we propose that the p-phrasing algorithm will operate to prosodify the string in the usual end-based fashion, that is, by scanning the edges of syntactic phrases and appropriately mapping them into p-phrase boundaries by means of an ALIGNMENT(XP, Right, p-phrase, Right) constraint (McCarthy and Prince 1993). We concur with Kratzer and Selkirk (2007) that both p-phrasing and sentential stress are determined at root-spell out, i.e. after the whole derivation is completed. But even then, only a partial phonological representation is constructed, which can still be manipulated by core PF constraints (i.e. binarity and heaviness-oriented constraints). Having said this and assuming for the sake of argument that both copies are equally pronounceable (or not), we predict two possible p-phrasings for the input string *o jánis éfere o jánis*:

- (25) *p-phrasing in CP-Phase*  
 a. [o jánis]φ éfere ~~o jánis~~  
 b. ~~o jánis~~ [éfere o jánis]φ

In terms of wellformedness, the phrasing in (25b), which promotes the VS order, fares much better than the one in (25a), which gives rise to the SV order, because the V is included into the p-phrase, i.e. the string is exhaustively parsed. On the contrary, the p-phrasing in (25a) results in a prosodically unparsed, i.e. stray, verb which will have to prosodically incorporate either into the p-phrase of the subject or into the p-phrase of the object in a latter application of the p-phrasing algorithm. To account for the non-optimal phrasal shape of (25a), we bring into play the archetypical constraint NOSTRAY ('Morphosyntactic material should be prosodically parsed') which strives towards achieving *Exhaustivity*. Significantly, a parsimonious parsing such as ~~o jánis~~ [éfere o jánis]φ where the V is immediately prosodified after Spell-Out satisfies NOSTRAY, unlike the alternative p-phrasing [o jánis]φ éfere ~~o jánis~~.

To conclude, in Greek NOSTRAY may outrank the constraint that favors the pronunciation of the head of the chain, namely PH. When this happens, the VSO order emerges. The opposite order is responsible for the emergence of the SVO order. It is important to emphasize that the exact conditions under which SVO and VSO orders emerge may also hinge to a great extent on the other competing forces in the system. Let us not forget the significant role that prosodic size constraints (e.g. binarity of p-phrases) play in Greek. Often the added effects of these constraints conspire towards appointing one output as the optimal one (see also Spyropoulos and Revithiadou 2007).

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<sup>9</sup> See Kahnemuyipour (2004), Adger (2006), Kratzer and Selkirk (2007), among others.

Regardless of which p-phrasing and, consequently, word order is chosen, the p-phrased string will have to be assigned sentence stress. In Greek, the sentence stress rule assigns prominence to the element which is rightmost within the p-phrase (RIGHTMOST- $\phi$ ) and rightmost within the intonational phrase (RIGHTMOST-IP). For both the SVO/VSO orders, the most rightmost element will be the object. In the following section, we show that the same set of PF constraints yield somewhat different results for intransitive clauses, which is exactly what we expect under the copy approach to movement.

## 5.2. Intransitive clauses

In intransitive constructions the VS order seems to be preferred (see fn. 3). Let us examine the derivation of a typical intransitive construction:

- (26)  $\acute{\iota}\rho\theta\alpha\acute{\nu}$                        $ta$   $pe\delta i\acute{\alpha}$   
       come-PAST.3SG the child-PL.NOM  
       ‘The children came’

We assume that intransitive predicates head a Spec-less  $vP$ . Chomsky (2000) suggests that such a  $vP$  does not constitute a strong phase and, therefore, it is not subject to Spell-Out. However, Legate (2003) and Kratzer and Selkirk (2007) provide substantial evidence from the interfaces that intransitive  $vPs$  are subject to Spell-Out. We adhere to this hypothesis, i.e. we assume that intransitive  $vPs$  in Greek are phases and that Spell-Out sends their material to PF for prosodic processing. Consequently, the example in (26) involves a two-phase derivation, with the DP  $ta\ pe\delta i\acute{\alpha}$  moving to the Spec,TP position. The resulting chain consists of a preverbal copy at the Spec,TP and a postverbal copy inside the  $vP$ .

- (27)  $[_{CP} [_{TP} ta\ pe\delta i\acute{\alpha} [_{T} \acute{\iota}\rho\theta\alpha\acute{\nu}]] [_{VP} \acute{\iota}\rho\theta\alpha\acute{\nu} [_{VP} \acute{\iota}\rho\theta\alpha\acute{\nu} ta\ pe\delta i\acute{\alpha}]]]]$

Following the same steps as those taken in the analysis of transitive constructions, the Spell-Out of the  $vP$ -phase will send the DP  $ta\ pe\delta i\acute{\alpha}$  to PF for prosodification. Then, the right edge of the DP will be right-aligned with the right edge of a p-phrase,  $[ta\ pe\delta i\acute{\alpha}]\phi$ . Accordingly, the output of the CP-phase  $ta\ pe\delta i\acute{\alpha}\ \acute{\iota}\rho\theta\alpha\acute{\nu}$  will be Spelled-Out and will be appropriately parsed at the PF into a prosodic unit:  $[ta\ pe\delta i\acute{\alpha}]\phi\ \acute{\iota}\rho\theta\alpha\acute{\nu}$ . Note, however, that the verb remains once again stray and will have to await a later application of the p-phrasing algorithm. Interestingly, regardless of which copy will be phonetically realized, we end up in both cases with a less parsimonious p-phrasing since the verb is left unparsed:

- (28) a.         $[ta\ pe\delta i\acute{\alpha}]\phi\ \acute{\iota}\rho\theta\alpha\acute{\nu}$                       *higher copy is pronounced*  
       b.         $\acute{\iota}\rho\theta\alpha\acute{\nu}\ [ta\ pe\delta i\acute{\alpha}]\phi$                       *lower copy is pronounced*

An important question that arises at this point is how the preference for VS orders in intransitives arises. To put it differently, what hampers down the effects of PH? We believe that the source of explanation lies on the dynamics of the rightmost sentence stress rule. Unlike transitive constructions, in which sentence stress falls always on the object, in intransitives the element which hosts stress prominence changes depending on which copy is pronounced. Thus,

in (28a) sentence stress will have to await the prosodification of the stray V and hence the second round of p-phrasing. After that, the V will be assigned sentence stress, as shown in (29a). If the lower copy is selected (29b), however, sentence stress can be assigned right away, i.e. in the first application of the p-phrasing algorithm. Thus, phrasing (29b) is more parsimonious than phrasing (29a). We expect in this case, like in transitive constructions, the prosodic heaviness of elements to also leave their imprint on the p-phrasing preferences, but undoubtedly this is an issue for future research.

(29) *sentence stress in SV/VS orders*

{        x    }	{        x }	IP
[[     ] x ]	[     x ]	p-phrase
(     x ) ( x )	( x ) (     x )	PW
a.    ta peḗiá írθan	b.    írθan ta peḗiá	

To conclude, in this section we have shown that several PF constraints, appropriately ranked, not only control p-phrasing in Greek but also regulate which copy will be pronounced. This result has more than abstract interest because, in essence, it derives from an analysis that postulates *one and the same constraint ranking*, given in (30), to account for both p-phrasing and word order. It should be emphasized that only a copy theory of movement provides the necessary leeway to the PF interface to dynamically process the syntactic output. In this sense, the present analysis attains considerable descriptive and explanatory economy.

(30) SA » {NoSTRAY, BINARITY, RIGHTMOST-φ/IP, PH} » PRONOUNCE

## 6. Conclusion

We presented an analysis of the derivation of Greek subjects which postulates a movement operation that targets an EPP Spec,TP position and creates a chain of copies, which Spell-Out sends to the PF and the LF interfaces for processing. Focusing on the PF side, we showed that the linearization of the subject chain depends on a set of well-established PF constraints which exist independently, so as to regulate the prosodic organization (p-phrasing, sentential stress, etc.) of the output. These PF constraints, articulated within the optimality theoretic framework are appropriately ranked and, via a single, monostratal ranking, can account for the observed patterns of variation in the surface realization of subject within the clause. The analysis advanced here enjoys several merits at the theoretical as well as at the empirical level: (a) It is able to account for the surface distribution of subjects by means of a single syntactic output; (b) it highlights the PF aspects that are intimately related to the distribution of subjects in Greek; and (c) it brings to light and provides a viable explanation for the patterns of variation attested in certain constructions.

The next step will be to thoroughly look into the specifics of subject movement and the role of prosodic weight of clause constituents, so that other aspects of the derivation and distribution of Greek subjects will be revealed.

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