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RESEARCH

Greek and English passives, and the role of *by*-phrases

Nikos Angelopoulos[1], Chris Collins[2] and Arhonto Terzi[3]

[1] KU Leuven, BE

[2] NYU, US

[3] University of Patras, GR

Corresponding author: Nikos Angelopoulos (n.angelopouloss1@gmail.com)

This paper proposes an analysis in which passive *by*-phrases are merged as the arguments of the active with the corresponding theta roles (Hasegawa 1988; D'Hulst 1992; Mahajan 1994; Goodall 1997; 1999; Caha 2009; Collins 2018a; Roberts 2019; Karlík 2020 and Hallman 2020). The analysis finds support in new data from Greek and English showing that, just like the DP arguments of the active, *by*-phrases bear the same range of theta roles and can bind a non-logophoric reflexive. On the other hand, it is shown that PPs with non-argument theta-roles, that is, adjunct PPs, cannot. In light of these findings, the paper reaches a number of independent conclusions such as that VoiceP, the projection responsible for the distinct morphological realization of the different Voice phenomena, does not introduce the external argument (Collins 2005; Merchant 2013; Manzini et al. 2016; Ramchand 2017; Roberts 2019; Zyman & Kalivoda 2020; Newman 2020). Furthermore, in light of the new data presented here, the paper discusses reasons for which the following proposals cannot be maintained: that the Greek and English passive are formed in a different manner, or with different Voice heads (Alexiadou & Doron 2012 i.a.), that *by*-phrases are merged as adjuncts (Bruening 2013; Legate 2014; Alexiadou et al. 2015 i.a.) or that Greek *by*-phrases systematically exhibit distinct behavior from the corresponding DP arguments of the active (Alexiadou et al. 2015). Lastly, it is argued that the rules of semantic composition, if applied as in Heim & Kratzer (1998) and Bruening (2013), make available more ways in which arguments can be merged than those which are actually attested. The paper suggests that the rules in question must be constrained by independent principles, such as Chomsky's (1981, 1986) Theta Criterion.

Keywords: *by*-phrase; adjuncts; arguments; reflexives; voice; Theta-Criterion; Greek; English

1. Introduction

This paper presents new evidence showing that the passive *by*-phrases of Greek and English behave like the DP arguments of the corresponding active sentences in two respects: first, they are assigned the same range of theta roles, such as agent, causer, instrument or experiencer. Furthermore, passive *by*-phrases can bind a non-logophoric reflexive, differing from standard instances of adjunct PPs which, as we show, are unable to bind. Importantly, the passive *by*-phrases (vs. adjunct PPs) of other languages e.g. Czech (cf. Karlík 2020), have been shown to display the same binding behavior as in Greek and English. We take these facts to suggest that passive *by*-phrases share a common property across languages. Based on the standard assumption since Chomsky (1981) that binding is only possible from A-positions, we propose that passive *by*-phrases exhibit properties of arguments because they are merged as external arguments just as in the active syntax. Under this analysis, passive *by*-phrases are no different from oblique PPs of various languages which are standardly analyzed as arguments on the basis of the fact that they, as well, can bind.

Going through recent analyses of the Greek passive, the paper further shows that the interpretation and the overall distribution of Greek and English *by*-phrases do not exhibit the interpretive and distributional restrictions that were taken to support the view that they are merged as adjuncts (*pace* Bruening 2013; Legate 2014; Alexiadou et al. 2015) or that the English and Greek passive are formed with distinct Voice heads (*pace* Alexiadou & Doron 2012; Alexiadou et al. 2015 i.a.). Furthermore, since, as shown here, *by*-phrases are arguments, the view that the non-active morphology of Greek passive marks the absence of the external argument (Embick 1998; Alexiadou et al 2015 i.a.) is untenable. Lastly, it is argued that the rules of semantic composition, if applied as in Heim & Kratzer (1998) and Bruening (2013), make available more ways in which arguments can be merged than those which are actually attested. The paper suggests that the rules in question must be constrained by independent principles, such as Chomsky's (1981, 1986) Theta Criterion.

We begin with background discussion on Greek non-active morphology and the different contexts in which it is encountered (Section 2). Section 3 shows that Greek *by*-phrases can receive the same interpretations as the corresponding DP arguments of the active. This section focuses primarily on causer *by*-phrases, which, as shown, are compatible with the Greek passive (*pace* Alexiadou et al. 2015 i.a.). Section 4 introduces binding data showing that the Greek and English *by*-phrases can bind non-logophoric reflexives and Section 5 presents the analysis. Section 6 and 7 discuss previous analyses according to which, first, the Greek and English passive are formed in distinct ways and, second, the *by*-phrases are merged as adjuncts. We give reasons for which we do not consider these analyses to provide a satisfactory account of the range of facts they consider or the binding data we present. Section 8 is a short note on deponent verbs, which, as discussed, have not received a principled account in the theories assuming that non-active morphology is the spell-out of a Voice head lacking a specifier. Section 9 presents a short remark on the Theta Criterion. Section 10 concludes.

2. Background

Greek passives involve non-active morphology on the finite verb, rather than the auxiliary and participle of English. Thus, we see in (1a) the verb inflected for active morphology and present tense, and in (1b) and (1c) that the verb combines with a portmanteau suffix encoding non-active and present or past tense. This morphology is found in different contexts, such as reflexive and reciprocal, (2a–2b), middle, (2c), and deponent, (2d).[1]

(1) a. O kathijitis chirokrot-i tus fitites.
the professor applaud.ACT.PRES-3S the students
'The professor applauds the students.'

b. I fitites chirokrot-unde apo ton kathijiti.
the students applaud-NACT.PRES.3P by the professor
'The students are applauded by the professor.'

c. I fitites chirokroti-thik-an apo ton kathijiti.
the students applaud-NACT.PAST-3P by the professor
'The students were applauded by the professor.'

(2) a. O kathijitis ksiriz-ete.
the professor shave-NACT.PRES.3S
'The professor is shaving.'

[1] Glosses here and throughout are our own

b. Ta pedhia agaliaz-onde.
the children hug-NACT.PRES.3P
'The children are hugging each other.'

c. To kenurjo vivlio tu Markari diavaz-ete ghrighora.
the new book the Markari.GEN read-NACT.PRES.3S fast
'Markari's new book reads fast.'

d. I nosokoma peripi-ite kala ton astheni.
the nurse take care-NACT.PRES.3S well the patient
'The nurse takes good care of the patient.'

The Greek non-active morphology is also used in the formation of anticausative predicates, such as *lero-thike* 'got dirty' in (3). Note, however, that some anticausatives may also appear with active morphology. Hence, compare the non-active *lero-thike* in (3) to the active *espase* 'broke' in (4).

(3) To trapezomandilo lero-thik-e (apo ti saltsa).
the tablecloth get dirty-NACT.PAST-3S from the sauce
'The tablecloth got dirty from the sauce.'

(4) To vazo espas-e (apo ton sismo).
the vase broke-ACT.PAST-3S from the earthquake
'The vase broke from the earthquake.'

With this background in mind, we are now in a position to examine the syntactic behavior of the passive *by*-phrases in both Greek and English. We first show that Greek *by*-phrases can realize the range of theta-roles of the corresponding arguments in the active voice. Building on this finding, we demonstrate next that, exactly like the corresponding arguments in the active sentences, passive *by*-phrases of Greek and English can participate in binding dependencies.

3. *By*-phrases and their theta-roles

Greek passive *by*-phrases can be interpreted as agents, (5), experiencers, (6–7), recipients, (8), instruments, (9) (cf. Alexiadou & Schäfer 2006; Alexiadou & Anagnostopoulou 2009). We add that they can also host the subject of idiomatic expressions, (10) (on the range of interpretations of the English *by*-phrases, see Jaeggli 1986: 599; Baker, Johnson & Roberts 1989: 221 and Collins 2005: 2).

(5) Ta mallia mu stegno-thik-an apo tin komotria.
the hair mine dried-NACT.PAST-3P from the hairdresser
'My hair was dried from the hairdresser.'

(6) I Maria aghapi-thik-e poli apo ton adra tis.
the Maria love-NACT.PAST-3S a lot by the husband her
'Maria was loved a lot by her husband.'

(7) I tenia pu misi-thik-e apo ton spudheo skinotheti.
the movie that hate-NACT.PAST-3S by the important director
'The movie that was hated by the important director.'

(8) To ghrama paralif-thik-e apo ton Emona.
the letter receive-NACT.PAST-3S by the Emona
'The letter was received by Emonas.'

(9) I epifania tha kop-i ce tha charaht-i apo
the surface will cut.NACT.PAST-3S and will engrave.NACT.PAST-3S by
to laser.
the laser
'The surface will be cut and engraved by the laser.'

(10) Tha enimero-thik-e apo kapjo pulaci.
must inform-NACT.PAST-3S by some little.bird
'He must have been filled in/informed by some little bird.'

In what follows we show that ~~that~~ the passive *by*-phrases of Greek can also be interpreted as causers. This is not an easy task as passive verbs can easily be confused with anticausatives, which, as (3) and (4) show, can also accept modification by causer *by*-phrases. In order to ensure that the verbs we examine are unambiguously passive, and not anticausative with non-active morphology, we use two well established diagnostics: (i) modification by *by itself*, (ii) compatibility with agent-oriented modifiers. As Alexiadou et al. (2015: 21) note, based on previous literature (cf. Chierchia 1989; 2004; Levin & Rappaport Hovav 1995), *by itself* is licensed "[…] in anticausatives, but not in passives." This contrast between passives and anticausatives is illustrated below:

(11) Alexiadou & Anagnostopoulou 2004: (14b)
To bukali adjas-e apo mono tu. *Anticausative*
the bottle empt~~ie~~d.ACT.PAST-3S by alone its
'The bottle was emptied by itself.'

(12) Alexiadou & Anagnostopoulou 2004: (14a)
To vivlio diavas-tik-e (*apo mono tu). *Passive*
the book read-NACT.PAST-3S by alone its
'The book was read by itself.'

Thus, if a verb rejects a *by itself* PP, chances are that it is not an anticausative verb, but a passive. As for agent-oriented modifiers, the consensus is that they are rejected by anticausative predicates, (13), whereas they are compatible with the passives, (14) (cf. Zombolou 2004, and Alexiadou & Anagnostopoulou 2004: 131 i.a.).

(13) I porta aniks-e (*skopima) (apo ton aera). *Anticausative*
the door ope~~ne~~d.ACT.PAST-3S intentionally from the wind
'The door opened (*intentionally) from the wind.'

(14) To thima dholofoni-thik-e (skopima). *Passive*
th~~e~~ vi~~c~~tim murd~~er~~ed-NACT.PAST-3S intentionally
'The victim was murdered intentionally.'

Having the above in mind, let us now consider the following set of examples with the verbs *apodhiorganothike* 'was disorganized' and *katalithike* 'er~~r~~adicated'.

(15) a. To sistima ijias apodhiorgano-thik-e ce katali-thik-e
the system health disorganize-NACT.PAST-3S and eradicate-NACT.PAST-3S
(*apo mono tu).
by alone its
'The health system was disorganized and eradicated (*by itself).'

b. To sistima ijias apodhiorgano-thik-e ce katali-thik-e
the system health disorganize-NACT.PAST-3S and eradicate-NACT.PAST-3S
(skopima) (ja na to fortos-un s-tin kivernisi).
intentionally for na it[illegible] blame.ACT.PRES-3P to-the government
'The health system was disorganized and eradicated (intentionally) (so that they can blame it on the government).'

c. To sistima ijias apodhiorgano-thik-e ce katali-thik-e
the system health disorganize-NACT.PAST-3S and eradicate-NACT.PAST-3S
(apo tin pandhimia).
by the pandemic
'The health system was disorganized and eradicated (by the pandemic).'

(15a) shows that the verbs *apodhiorganothike* and *katalithike* cannot be modified by *by itself*, providing evidence that it does not form an anticausative. This conclusion is further strengthened by the fact that, unlike anticausative predicates, *apodhiorganothike* and *katalithike* can be modified by an agent-oriented adverb, (15b). Given (15a) and (15b), it makes sense to assume that *apodhiorganothike* and *katalithike* are unambiguous passive verbs. Importantly, (15c) shows that the same verbs are compatible with a causer PP, which clearly suggests that Greek passives can license causer PPs. This conclusion is further supported by additional verbs, such as *metaferthike* 'was transferred', (16), *amavrothike* 'was tarnished', (17) and *vaftike* 'was painted', (18). As shown below, *metaferthike*, *amavrothike* and *vaftike* are not compatible with *by itself*, while, they accept modification by agent-oriented adverbs and can license causer *by*-phrases.

(16) a. Ta dhakrighona metafer-thik-an edho (*apo mona tus).
the tear gas transfer-NACT.PAST-3P here by alone their
'The tear gas was transferred (*by itself).'

b. Ta dhakrighona metafer-thik-an edho (skopima).
the tear gas transfer-NACT.PAST-3P here deliberately
'The tear gas was transferred here (on purpose).'

c. Ta dhakrighona metafer-thik-an edho (apo tin vrochi).
the tear gas transfer-NACT.PAST-3P here by the rain
'The tear gas was transferred here (by the rain).'

(17) a. I ekdhilosi amavro-thik-e (*apo moni tis).
the demonstration tarnish-NACT.PAST-3S by alone its
'The demonstration was tarnished (*by itself).'

b. I ekdhilosi amavro-thik-e (skopima).
the demonstration tarnish-NACT.PAST-3S deliberately
'The demonstration was tarnished deliberately.'

c. I ekdhilosi amavro-thik-e (apo ta jeghonota).
the demonstration tarnish-NACT.PAST-3S by the events
'The demonstration was tarnished by the events.'

(18) a. O tihos vaf-tik-e kokinos (*apo monos tu).
the wall paint-NACT.PAST-3S red by alone its
'The wall was painted red by itself.'

b. O tihos vaf-tik-e (skopima) kokinos.
the wall paint-NACT.PAST-3S deliberately red
'The wall was painted red deliberately.'

c. O tihos vaf-tik-e kokinos (apo to ema ton zoon).
the river paint-NACT.PAST-3S red by the blood the animals
'The wall was painted red by the blood of the animals.'

Notice that there are verbs that distinguish the passive from the anticausative variant morphologically. These verbs are inflected with non-active morphology in the passive variant, (19a), whereas the anticausative is expressed with active morphology, (19b).

(19) Alexiadou et al. (2015: (21b–c))

a. Ta mallia mu stegno-thik-an apo tin komotria/ *apo ton ilio.
the hair mine dried-NACT.PAST-3P from the hairdresser from the sun
'My hair was dried from the hairdresser/ from the sun'

b. Ta mallia mu stegnos-an *apo tin komotria/ apo ton ilio.
the hair mine dried-ACT.PAST-3P from the hairdresser from the sun
'My hair dried from the hairdresser/ from the sun'

(19) shows that causer *by*-phrases are only possible with the anticausative form. It is the behavior of precisely this class of verbs that led Alexiadou & Schäfer (2006), Alexiadou & Anagnostopoulou (2009), Alexiadou et al. (2015) to the conclusion that the Greek passive totally blocks causer *by*-phrases. This conclusion is not supported by the behavior of the verbs in (15–18), which, crucially, do not exhibit the anticausative alternation.[2] We take this fact to suggest that there are confounds in the behavior of verbs exhibiting the anticausative alternation, as e.g. *stegnothikan* 'were dried' in (19a), and as a result of this, they cannot reveal in a straightforward manner what theta roles the Greek passive *by*-phrases may or may not have.[3]

We turn next to new binding data, which establish one of the main points of the paper, namely, that, just like the corresponding arguments in the active sentences, *by*-phrases can bind a reflexive. In this respect, *by*-phrases differ from standard cases of adjunct PPs, which, as we discuss, exhibit distinct behavior in terms of their binding possibilities. We begin the next section with a brief overview of the properties of the Greek reflexive.

[2] *Vaftike* 'was painted' does not exhibit the anticausative alternation in this particular syntactic context.

[3] We tentatively propose that the non-active form of the verbs such as *stegnothikan* in (19a) is blocked from licensing a causer PP by the less complex – as morphology suggests – anticausative active variant, *stegnosan* 'were dried' in (19b), via competition. Thus, note that in addition to the inflectional suffix *-e*, the non-active *stegno-thik-e* 'dry-NACT-3SG' comprises a distinct morpheme, *thik*, which marks non-active morphology. On the other hand, its active variant, *stegno-s-e* 'dry-ASP-3SG' lacks a suffix marking the voice specification of the verb. This morphological difference may correlate with a difference in the underlying syntax, where anticausatives win the competition as a result of the fact that they are structurally 'simpler', in the sense that they involve less structure and possibly fewer syntactic operations. On the other hand, the non-active form can license agent PPs (cf. 19a), that is, *apo tin komotria* 'from the hairdresser', as there is no competition with some other variant of the same verb.

4. Binding Data

4.1. The Greek Anaphor

The Greek anaphor *o eaftos mu* literally translates to 'the self mine'. The *eaftos* 'self' noun is invariably masculine, while the preceding determiner agrees with the *self*-noun in gender, number and case. The possessive pronoun agrees in *φ*-features with its antecedent. There has been considerable discussion of *o eaftos mu* in the literature, focusing on different aspects of its behavior, such as the fact that it can be clitic doubled (cf. Iatridou 1988) without giving rise to Condition B violations or that it can be used with nominative case in some derived subject positions (cf. Anagnostopoulou & Everaert 1999 i.a.). In these analyses it is acknowledged that, despite the peculiar properties just mentioned, *o eaftos mu* is no different from the English reflexive in requiring a local c-commanding antecedent:

(20) a. O Jorghos$_1$ estil-e ta vivlia s-ton eafto tu$_1$.
the George send.ACT.PAST-3S the books to-the self.ACC.S his.GEN
'George sent the books to himself.'

b. *I mitera tu Yorghu$_1$ estil-e ta vivlia s-ton eafto tu$_1$.
the mother the George.GEN send.ACT.PAST-3S the books to-the self.ACC.S his.GEN
'George's mother sent the books to himself.'

(21) a. O Jorghos$_1$ aghoras-e ena dhoro ja ton eafto tu$_1$.
the George buy.ACT.PAST-3S a gift for the self.ACC.S his.GEN
'George bought a gift for himself.'

b. *I mitera tu Jorghu$_1$ aghoras-e ena dhoro ja ton eafto tu$_1$.
the mother the George.GEN buy.ACT.PAST-3S a gift for the self.ACC.S his.GEN
'George's mother bought a gift for himself.'

Note that when *o eaftos mu* has plural antecedents either the possessive pronoun alone is plural or both the possessive pronoun and the *self* noun (with the preceding article, *tus*) are pluralized (cf. 22–23). There might be interpretive differences between the two forms, however they do not affect the binding behavior of the reflexive. Thus, both forms of *o eaftos mu* require a c-commanding antecedent, as shown below.

(22) a. Ta koritsia kitaz-an ton eafto tus$_1$ s-ton kathrefti.
the girls look.ACT.PAST-3P the self.ACC.S their.GEN in-the mirror
'The girls looked at themselves in the mirror.'

b. *I miteres ton koritsion$_1$ kitaz-an ton eafto tus$_1$ s-ton kathrefti.
the mothers the girls.GEN look.ACT.PAST-3P the self.ACC.S their.GEN in-the mirror
'The mothers of the girls looked at themselves in the mirror.'

(23) a. Ta koritsia kitaz-an tus eaftus tus$_1$ s-ton kathrefti.
the girls look.ACT.PAST-3P the self.ACC.P their.GEN in-the mirror
'The girls looked at themselves in the mirror.'

b. *I miteres ton koritsion$_1$ kitaz-an tus eaftus tus$_1$
the mothers the girls.GEN look.ACT.PAST-3P the self.ACC.P their.GEN
s-ton kathrefti.
in-the mirror
'The mothers of the girls looked at themselves in the mirror.'

There is a relevant property of *o eaftos mu*, however, which makes it different from the English reflexive, but has received little attention, and this is that it has limited usages that do not fall under standard Condition A. Anaphors have been argued to behave as exempt from Condition A when they function as logophors (cf. Charnavel & Sportiche 2016 i.a.). A characteristic property of logophors is that they need to be anteceded by perspective centers, such as attitude holders, empathy loci or deictic centers (cf. Charnavel & Zlogar 2015 and references therein). It is remarkable that *o eaftos mu* is prohibited in such contexts, namely, in contexts where the English reflexive has been argued to function as a logophor that is anteceded by some perspective center. To this effect, consider, for instance, the following ungrammatical sentences in Greek and compare them with the English sentences in the translation. The sentences in (24–25) feature anaphors with attitude holders as antecedents (cf. Charnavel & Zlogar 2015, citing Pollard & Sag 1992 and Reinhart & Reuland 1993 i.a.). In (26) the anaphor has antecedents that have been identified as empathy loci (Kuno 1987; Charnavel & Zlogar 2015, 18a,c), and have been reported to be well-formed in English. Since *o eaftos mu* is prohibited in the same sentences, it clearly cannot be considered a non-exempt anaphor.

(24) *O Vasilis$_1$ ip-e oti i vrochi katestreps-e tis fotografies
the Bill say.ACT.PAST-3S that the rain destroy.ACT.PAST-3S the photos
tu eaftu tu$_1$.
the self.GEN.S his.GEN
'Bill said that the rain destroyed the photos of himself.'

(25) *O Janis$_1$ kafchi-thik-e oti i vasilisa kales-e tin Anna
the John boast-NACT.PAST-3S that the queen invite.ACT.PAST-3S the Anna
ke ton eafto tu$_1$ ja poto.
and the self.ACC.S his.GEN for drink
'John boasted that the queen invited Anna and himself for a drink.'

(26) *O Pavlos$_1$ dulev-e se ena panepistimio me ti jineka tu
the Paul worked.ACT.PAST-3S at a university with the wife his.GEN.
opu fisiki opos o eaftos tu$_1$ echer-an ipsilis ektimisis.
where physicts like the self.NOM.S his.GEN enjoy.ACT.PAST-3P high regard
'Paul worked at a university with his wife where physicists like himself were highly regarded.'

Given that *o eaftos mu* resists logophoric usages (cf. also Anagnostopoulou & Everaert 1999 for similar conclusions), it makes sense to assume that in the examples to be discussed in the following section we have clear cases of non-logophoric reflexives that are standardly analyzed as being subject to Condition A. Notice that we examine the corresponding English sentences with inanimate antecedents in the following section, in order to make sure that logophoricity is not implicated in English either. Using inanimacy as

a tool to avoid logophoric usages of the anaphor is proposed in Charnavel & Sportiche (2016).

4.2. Reflexives bound by by-phrases in Greek

In this section we show that Greek reflexives can have a *by*-phrase antecedent. We start by presenting examples we found in google searches, showing reflexives bound by *by*-phrases. The first and last author of the paper, both native speakers of Greek, find the examples fully natural.[4]

(27) Ena technito skafos pu kataskevas-tik-e apo tus theus$_1$ ja tus
an artificial craft that make-NACT.PAST-3S by the Gods for the
eaftus tus$_1$
self.ACC.P their.GEN
'An artificial aircraft that was made by the Gods for themselves.'

(28) To minima apostel-ete apoklistika apo kathe Learner$_1$ s-ton
the message send-NACT.PRES.3S exclusively by every Learner to-the
eafto tu$_1$
self.ACC.S his.GEN
'The message is sent by every Learner exclusively to himself.'

In the following examples we show that *by*-phrases are different in this respect from adjunct PPs, which, as we show, systematically fail to function as antecedents for reflexives. We test adjunct phrases with *choris* 'without', a P followed by an accusative case marked DP (29b,c), *eksetias* 'because of', a P followed by a DP with genitive case (30b,c), adjunct locative PPs (31b,c) and *mazi* 'together', a P followed by the functional preposition *me* and an accusative case marked DP (32a,b). The grammatical sentences below the ones testing binding by adjunct PPs, e.g., (29c), (30c), (31c) and (32b), show that ungrammaticality is only due to binding.[5]

(29) a. Aftes i lisis prota-thik-an apo tus psichotherapeftes$_1$ ja
these the solutions suggest-NACT.PAST-3P by the psychotherapists for
ton eafto tus$_1$.
the self.ACC.S their.GEN
'These solutions were suggested by the psychotherapists for themselves.'

b. *Aftes i lisis prota-thik-an choris tus psichotherapeftes$_1$
these the solutions suggest-NACT.PAST-3P without the psychotherapists
ja ton eafto tus$_1$.
for the self.ACC.S their.GEN
'These solutions were suggested without the psychotherapists for themselves.'

[4] (27) and (28) were found at:

(i) https://apocalypsejohn.com/itan-vivlikos-leviathan-ena-amfivio-ufo-video/

(ii) http://artemis.cslab.ece.ntua.gr:8080/jspui/bitstream/123456789/13503/1/DT2017-0161.pdf

[5] The contrasts reported in this section reflect the judgments of the first and third author, the judgments of five participants at the Syntax Reading Group held at the University of Patras in September 2018 and six additional native speakers, non-linguists. The contrasts also accord with the intuitions of an anonymous reviewer, native speaker of Greek.

c. Aftes i lisis prota-thik-an choris tus psichotherapeftes
these the solutions suggest-NACT.PAST-3P without the psychotherapists
ja ta provlimata tus.
for the problems their.GEN
'These solutions were suggested without the psychotherapists for their problems.'

(30) a. Aftes i diataksis psifis-tik-an apo tus vuleftes$_1$ tis
these the regulations vote-NACT.PAST-3P by the MPs the
kivernisis ja ton eafto tus$_1$.
government.GEN for the self.ACC.S their.GEN
'These regulations were voted by the MPs of the government for themselves.'

b. *Aftes i diataksis psifis-tik-an eksetias ton vulefton$_1$ tis
these the regulations vote-NACT.PAST-3P because the MPs the
kivernisis ja ton eafto tus$_1$.
government.GEN for the self their.GEN
'These regulations were voted because of the MPs of the government for themselves.'

c. Aftes i diataksis psifis-tik-an eksetias ton vulefton tis
these the regulations vote-NACT.PAST-3P because the MPs the
kivernisis ja aftus ce tis ikojenies tus.
government.GEN for them and the family their.GEN
'These regulations were voted because of the MPs of the government for them and their families.'

(31) a. Aftes i bluzes epilech-tik-an apo ta phedhja$_1$ ja ton eafto
these the t-shirts select-NACT.PAST-3P by the kids for the self.ACC.S
tus$_1$.
their.GEN
'These t-shirts were selected by the kids for themselves.'

b. *Aftes i bluzes epilech-tik-an brosta/ koda s-ta phedhja$_1$ ja
these the t-shirts select-NACT.PAST-3P in front/ near at-the kids for
ton eafto tus$_1$.
the self.ACC.S their.GEN
'These t-shirts were selected in front/near the kids for themselves.'

c. Aftes i bluzes epilech-tik-an brosta/koda s-ta phedhja ja
these the t-shirts select-NACT.PAST-3P in front/near at-the kids for
afta ce tis ikojenies tus.
them and the families their.GEN
'These t-shirts were selected in front/near of the kids for them and their families.'

(32) a. *Aftes i bluzes epilech-tik-an mazi me ta pedhja$_1$ ja ton
these the t-shirts select-NACT.PAST-3P together with the kids for the
eafto tus$_1$.
self.ACC.S their.GEN
'These t-shirts were selected together with the kids for themselves.'

b. Aftes i bluzes epilech-tik-an mazi me ta phedja ja afta
these the t-shirts select-NACT.PAST-3P together with the kids for them
ce tis ikojenies tus.
and the families their.GEN
'These t-shirts were selected together with the kids for them and their families.'

4.3. Reflexives bound by by-phrases in English

English reflexives are shown below, with data first reported in Collins (2018a, 10–11), to also be bound by *by*-phrases of passives. On the other hand, DPs within clear instances of other (non-argument) PPs cannot bind reflexives, exactly like in Greek earlier.[6]

(33) a. The packages were sent by the children$_1$ to themselves$_1$.
b. *The packages were sent for the children$_1$ to themselves$_1$.
c. *The packages were sent on behalf of the children$_1$ to themselves$_1$.
d. *The packages were sent because of the children$_1$ to themselves$_{1.}$

(34) a. The pictures were painted by the children$_1$ for themselves$_1$.
b. *The pictures were painted with the children$_1$ for themselves$_1$.
c. *The pictures were painted near the children$_1$ for themselves$_1$.
d. *The pictures were painted in spite of the children$_1$ for themselves$_1$.

The DPs in the *by*-phrases above do not encode any kind of perspective center. Definitely they are not attitude holders, as the subjects of *send* or *paint* do not hold attitudes and cannot be empathy loci.

Moreover, as we show with new data in (35–38) below, the DP in the *by*-phrase of an English passive can be inanimate and still bind an anaphor. Inanimates cannot act as antecedents for logophors because they cannot hold perspective since they cannot be in a mental state (cf. Charnavel & Sportiche 2016).

(35) a. The magnet$_1$ attracted the metallic objects towards itself$_1$.
b. The metallic objects were attracted by the magnet$_1$ towards itself$_1$.

(36) a. The black hole$_1$ drew the planets into itself$_1$.
b. The planets were drawn by the black hole$_1$ into itself$_1$.

(37) a. The tornado$_1$ sucked the houses up into itself$_1$.
b. The houses were sucked up by the tornado$_1$ into itself$_1$.

(38) a. The magnet$_1$ repelled the pieces of metal away from itself$_1$.
b. The pieces of metal were repelled by the magnet$_1$ away from itself$_1$.

In an informal survey, three native speakers of English find either both the (a) and (b) examples above acceptable, or the (b) examples degraded (?), while no speakers have

[6] An anonymous reviewer, native speaker of English, agrees with the contrasts presented here. See also Roberts (2019: (26)) for similar data from English. (33–34) and similar data have also been confirmed with a group of ten graduate students who attended Chris Collins's 2018 NYU seminar on the passive.

found the (b) examples ungrammatical.[7] Similar examples are easy to find on the internet. The following examples, first reported in this paper, are from google searches and are accepted by the second author:[8,9]

(39) You find yourself rising and being pulled by the sun$_1$ toward itself$_1$.

(40) The most direct way to determine it is to examine the far distant behavior of the magnetic field generated by the black hole$_1$ around itself$_1$.

(41) which is thus an external demagnetising field applied by the magnet$_1$ to itself$_1$…

(42) More recently oxytocin has been found to be released by the brain$_1$ into itself$_1$ during sexual intercourse,

(43) But soon also this will be sucked up by the earth$_1$ into itself$_1$.

(44) The investment made by the country$_1$ into itself$_1$ has paid back hundreds of times over, and will keep paying back.

(45) The objects presenting themselves, in so far as they are sources of pleasure, are absorbed by the ego$_1$ into itself$_1$,

(46) For that which is decidedly thick and earthy in nature, and has entirely escaped alteration in the liver, is drawn by the spleen$_1$ into itself$_1$;

(47) These are income benefit or resources earned or generated by the organization$_1$ from itself$_1$.

All in all, we showed in this section that in both Greek and English the ~~DPs of~~ *by*-phrases of passives can bind a reflexive, and that the reflexives they bind are true, non-exempt.

[7] In an informal survey with a few native speakers we found that examples with inanimate antecedent DPs are acceptable in Greek as well:

(i) O server$_1$ esteln-e tis idopiisis ston eafto tu$_1$
the server send.ACT.PAST-3S the notifications to.the self.ACC.S his.GEN
'The computer server sent notifications to itself.'

(ii) I idopiisis stelnod-an apo ton server ston eafto tu
the notifications send.NACT.PAST-3P by the server to.the self.ACC.S his.GEN
'The notifications were sent by the computer server to itself'

[8] The antecedents in (44) and (47) may count as animates, for relevant discussion see Collins, Postal and Moody (2008: 44, (83b)).

[9] (39–47) were found at the following sources on the internet:

(i) https://www.do-meditation.com/power-chakra-guided-meditation.html
(ii) https://slideheaven.com/black-holes-in-our-universe.html
(iii) https://e-magnetsuk.com/alnico_magnets/characteristics.aspx
(iv) https://books.google.com/books?isbn=9814488372
(v) https://gottfriedbennpoems.com/the-poems/
(vi) https://www.entrepreneur.com/article/298127
(vii) https://books.google.com/books?isbn=1416573593
(viii) https://faculty.humanities.uci.edu/bjbecker/PlaguesandPeople/week2j.html
(ix) https://iproject.com.ng/accounting/accounting-as-an-inevitable-tool.../index.html

We proceed with the analysis we propose in the next section. The analysis extends beyond Greek and English, to e.g. Czech, which, as we discuss later, has *by*-phrases that behave as the Greek and English ones in terms of binding (cf. Karlík 2020).

5. The analysis

In the previous sections we presented data from two languages, Greek and English, in which DPs in the *by*-phrases of passives are assigned the theta-role assigned by the predicate to the external argument in the active. We take this fact to speak in favor of the idea that *by*-phrases are merged as arguments, just as in Roberts (2019: 437). Roberts adds a number of theoretical considerations in support of this view, concretely, he argues that "It would be an extraordinary coincidence that an adjunct preposition like *by* can do this [assign the same theta roles to the external argument as in the active], and would require a major complication of any account of how an EA is assigned its compositional θ-role. But this follows straightforwardly on the present analysis. In fact, an appropriately strong version of the Uniformity of Theta-role Assignment Hypothesis (UTAH; Baker 1988, 1997) requires exactly this. Furthermore, no mechanism of 'θ-transmission' (Jaeggli 1986), second-order c-selection (for Voice with an unchecked/unsaturated feature) combined with the stipulation that *by* (alone among 'Voice adjuncts' with the second-order selection property) 'takes a function with an open argument and supplies its own argument to saturate that function' (Bruening 2013: 24), or, in a similar vein, restriction of an existentially closed variable by an argument in an adjunct of the kind envisaged by Legate (2014) need be assumed."

Another fact that the previous sections brought to light is that, in contrast to adjunct PPs, *by*-phrases can bind non-exempt anaphors just like the corresponding arguments in the active can. Importantly, non-exempt anaphors like *o eaftos mu* or inanimate anaphors as in (35)–(47) need to be bound, given the standard formulation of Principle A of Binding Theory (Chomsky 1986, and see Sportiche et al. 2013, 168 below for a more recent formulation):

(48) Principle A: An anaphor must be bound in its domain.

In the examples repeated below, we show again that the reflexive cannot be bound by an adjunct PP, (49b). On the other hand, it can be bound by the *by*-phrase, (49a):

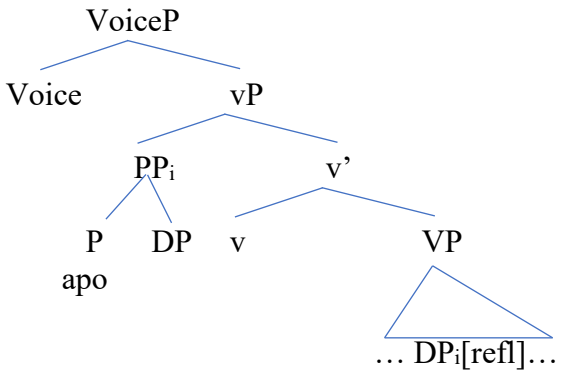
(49) a. Aftes i lisis prota-thik-an apo tus psichotherapeftes ja
these the solutions suggest-NACT.PAST-3P by the psychotherapists for
ton eafto tus$_1$.
the self.ACC.S their.GEN
'These solutions were suggested by the psychotherapists for themselves.'

b. *Aftes i lisis prota-thik-an choris tus psichotherapeftes$_1$
these the solutions suggest-NACT.PAST-3P without the psychotherapists
ja ton eafto tus$_1$.
for the self.ACC.S their.GEN
'These solutions were suggested without the psychotherapists for themselves.'

Since the *by*-phrases of Greek and English behave just like the corresponding DP arguments of the active verbs in terms of binding, it makes sense to assume that in both

languages, they are merged as arguments occupying the same position as the external argument DP in the active (cf. Hasegawa 1988; D'Hulst 1992; Mahajan 1994; Goodall 1997; 1999; Caha 2009; Collins 2018a; Roberts 2019; Karlík 2020; Hallman 2020). These claims build on the standard assumption that binding is only possible from A-positions (cf. Chomsky 1981:184, "The theory of binding is a theory of A-binding.").[10] Hence, the underlying structure we propose for the Greek and, crucially, English passives as well, is as in (50) (see Collins 2005 and Roberts 2019: 430–9):[11]

(50)



Under our analysis it is the PP that binds the reflexive in (50), as it is the external argument which, as such, c-commands the reflexive. There is, however, a problem that arises for this approach: example (49a) shows that the reflexive agrees syntactically with its antecedent. However, since the *apo*-phrase lacks phi-features this should not be possible. Collins (2018a) suggests that this issue can be resolved in the framework for pronominal agreement advocated in Collins & Postal (2012), where pronominal agreement originates in a small set of sources (which include antecedents).

(51) Collins & Postal (2012: 92)
If P is a non-expletive pronoun, then P agrees with some source in those phi-features for which P is not inherently valued.

In order to see how pronominal agreement works in Collins & Postal (2012), let us consider the following example:

(52) I am a person who$_1$ takes care of myself$_1$/himself$_1$.

In (52), the reflexive pronoun is bound by the copy/trace of *who* in the embedded subject position. Nonetheless, *who* is third person singular, as shown by the subject verb agreement. In this case, when the reflexive is *myself* it does not agree with the DP that binds it, but agrees with some other DP (the subject of the matrix clause). Collins & Postal (2012) call the DPs that potentially supply phi-features for pronominal agreement sources. In (52), the two sources are the DPs *I* and *who*. In order to account for the pronominal agree-

[10] The claim that binding is only possible from A-positions has been central in the analysis of various syntactic phenomena in different languages, such as scrambling in the Germanic languages or Hindi, Clitic Doubling and Clitic Left Dislocation in Greek and the Romance languages. These phenomena have long been argued, in light of binding facts, to involve one movement step to an A-position (cf. Angelopoulos 2019b, Angelopoulos & Sportiche to appear and references therein).

[11] This analysis raises the question of why *by*-phrases are not found more widely. For example, why doesn't the *by*-phrase appear in the object position? We do not take up this issue here. For discussion, see Collins 2005; Angelopoulos 2019 and Roberts 2019: 430–431 among others.

ment facts in cases like (49a) under the theory of Collins & Postal (2012), Collins (2018a) proposes that the DP complement of functional Ps can function as a source of phi-features:

(53) Suppose X = [$_{pp}$ P DP] where P is a functional preposition (*by, of, to*).
If X is the antecedent of some pronoun Y, then the DP complement of X is a source of phi-features for Y.

We assume, as in Michelioudakis & Angelopoulos (2019) and Angelopoulos (2019a), that *apo* 'by' of Greek is a functional preposition and that it is not responsible for the theta-role interpretation of its surface DP complement (see also Alexiadou & Anagnostopoulou 2009 on the latter). Given this, the fact that the DP contained in the Greek (and English) *by*-phrases can function as a source of phi-features follows directly from (53). Other functional prepositions, such as *of* or *to* of English, and Greek prepositions, such as *se* 'to' or *me* 'with', are predicted to also be merged in an argument position together with their DP complement and bind a reflexive. Indeed, this prediction is borne out in (54) which shows that, just like with *apo*-phrases, the PP formed with *s(e)* can bind the Greek reflexive (cf. Anagnostopoulou 2003; Michelioudakis 2012):

(54) Ediks-e s-tin Maria$_1$ ton eafto tis$_1$.
sh[illegible]ed.ACT.PAST-3S to-the Maria the self her
'He showed Mary to herself.'

Let us now consider the cases in which the complement of an adjunct P cannot bind a reflexive, that is, sentences such as ~~(26b), (27b), (28b), (29a),~~ (29b), (30b), (31b), (32a). There are two relevant structures to consider for a PP headed by a P such as *without*:

(55) a. *....[without DP]$_1$....DP[refl]$_1$
b. *....[without DP$_1$]....DP[refl]$_1$

(55a) and (55b) show that there can be many reasons for which the sentences in ~~(26b), (27b), (28b), (29a),~~ (29b), (30b), (31b), (32a) are ungrammatical. In (55a) the *without* PP as a whole cannot bind the reflexive. This follows from the fact that binding is not possible from adjunct positions. Second, the PP cannot function as a source of pronominal agreement for the reflexive because *without* is not a functional preposition. Third, the PP is not even the right semantic type to bind a pronoun. Since the pronoun is of type <e>, its antecedent should also be of type <e>, but that is not the case with *without*-phrases or other adjuncts (which are presumably predicative). Lastly, in (55b), the DP contained in the *without PP* is not able to bind the reflexive due to lack of c-command.[12,13]

[12] Pesetsky (1995) discusses a few cases where it looks like a DP hosted in an adjunct PP can bind a reflexive:

(i) Pesetsky (1995: 172)
John spoke to Mary about these people in each other's houses on Tuesday.

Note, however, that in his example the antecedent of the reflexive is an animate DP. Given this, it is not clear whether the reflexive is licensed in such cases as a logophor or as a true reflexive. See also discussion in Bruening (2014: 349), which defends the idea that the reflexives in Pesetsky's examples feature logophors.

[13] An anonymous reviewer asks why functional Ps (and their DP complements) behave differently from the lexical ones with respect to binding and pronominal agreement. Before addressing this question, we would like to note that this behavior is exhibited by the functional Ps of different languages. For instance, the functional preposition *à* of French and its DP complement have been argued to exhibit similar behavior with respect to binding and pronominal agreement, prompting an analysis of the P in question as a case marker (cf. Vergnaud 1974 and Angelopoulos & Sportiche to appear). Under this analysis, PPs composed of functional Ps can bind a reflexive and their surface DP complement functions as a source of pronominal

With this in mind, let us now turn our attention to the analyses according to which the *by*-phrase is merged as an adjunct. These analyses also claim that:

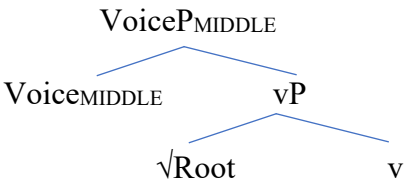
a) the Greek and English passives are built in distinct ways,
b) Greek non-active morphology is the spell-out of a Voice head lacking a specifier,
c) unlike the corresponding DP arguments of the active, the distribution of passive *by*-phrases is severely restricted.

We discuss reasons for which we do not find these claims valid before considering how the competing analyses we cite fare with the binding facts we discussed.

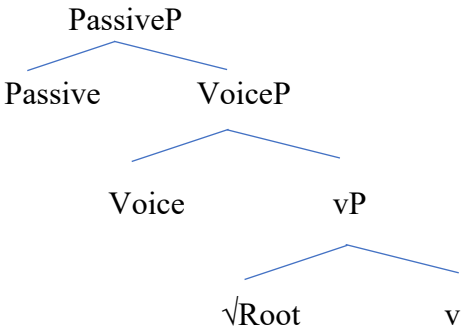
6. Two ways to form a passive

Based on claims introduced first in Alexiadou & Doron (2012), Alexiadou et al. (2015) propose the following two structures for the passive of Greek and English respectively.

(56) **Greek passive**



(57) **English Passive**



The Greek passive is formed via VoiceP$_{MIDDLE}$ whereas in English it is formed via a VoiceP selected by Passive. The two Voice heads differ in the feature makeup, e.g. +/– agentive.

agreement because, as case markers, functional Ps constitute part of the extended nominal projection of the DP they introduce (see also Caha 2009: 154–155 for evidence from Czech that the external argument comprises various KP layers, e.g. dative or instrumental, in the passive). Under this view, *by* could be taken to realize one of the KP layers rather than a P assigning lexical case, dative or instrumental, to its DP complement, *pace* Alexiadou et al. 2017). Similarly, Roberts (2019: 433) notes that "If we treat the *by*-phrase as a KP, with *by* occupying K, and KP as an argument bearing relevant FFs (e.g. φ-features necessary for agreement under binding, but also Neg and Q features for variable-binding and NPI-licensing), then there is no problem with c-command here." Lastly, *s(e)*, in examples where it precedes the direct object as in (54), is also analyzed as case marker in Michelioudakis (2012) on the basis of the fact that it can bind into another argument when in this particular surface order.

We believe it is not accidental that only functional Ps may function as case markers. It possibly correlates, in ways that need to be made precise, with the fact that they are not as structurally rich as lexical Ps (cf. Terzi 2017 for discussion of the latter). Another alternative to the binding facts we present is that functional Ps are merged on the spine with their surface complements merging in specifiers, as in Collins (2005) and Angelopoulos (2019a). This way, the DP surface complement of the functional P can bind the reflexive from the specifier position. If that is correct, one could think that lexical Ps cannot bind a reflexive because they are merged as constituents with their DP complement.

The $\text{Voice}_{\text{MIDDLE}}$ head of the Greek passive is argued to be only agentive (cf. Alexiadou et al. 2015: 120) whereas the Voice head of the English passive can be of different kinds, e.g. causative. Under this view, the *by*-phrases are merged as adjuncts to VoiceP and must match the features of this projection (cf. Alexiadou et al 2015: 35 and references therein). Thus, this work assumes on the basis of the pair in (19) that the passive *by*-phrases of Greek cannot be causers because of a feature mismatch with the agentive features of the VoiceP.

The assumption that the Voice head of the Greek passive is only agentive cannot be maintained since, as we showed in Section 3, causer PPs are in fact allowed. Furthermore, other kinds of non-agentive PPs, e.g. experiencer, goal or recipient, are also compatible with the Greek passive (see Section 3). The issue that arises in this case is that (all kinds of) non-agentive PPs are predicted to be blocked under this account, contrary to fact, because just like causer PPs, they are incompatible with the agentive features of VoiceP.[14]

Setting these issues aside, we discuss the assumptions this literature makes for the non-active morphology of the Greek passive. Concretely, following Embick (1998, 2004), Alexiadou et al. (2015) claim that the non-active morphology is the result of a post syntactic spell-out rule targeting Voice heads lacking a specifier:

(58) Voice -> Voice[NonAct]/ __No DP specifier.

Nonetheless, if agents are uniformly projected in the syntax in the active and the passive, as we showed in the previous sections, the rule in (58) does not correctly describe the distribution of non-active voice morphology in Greek. One way to capture the parallelism is to dissociate voice morphology and the external argument projection.[15] Thus, if voice morphology is found in Voice (projecting a VoiceP), as in Rivero (1990), then the external argument should not be generated in Spec VoiceP, but in some other projection, e.g. in Spec vP, as in Chomsky (1995) (*pace* Kratzer 1996). Under this view, Voice plays a role in the syntax of the passive but has nothing to do with the projection of the external argument (cf. Collins 2005). Thus, based on the Greek data first, we come to the following conclusion:

(59) The external argument is not introduced in Spec VoiceP.

Extensive previous literature has actually adopted (59) in various ways (cf. Manzini et al. 2006; Roberts 2019 and Newman 2020 i.a.). Moreover, based on VP-ellipsis facts, Merchant (2013: 98) shows that (59) must be correct and adds to this claim that "There is in fact no conceptual reason these two should go together, and the ellipsis facts argue directly against this assumption." (for further arguments against external arguments being projected in [Spec,Voice], see Zyman & Kalivoda 2020: 8). Similarly, Ramchand (2017: 10) explicitly argues that the head introducing the external argument in her analysis is not the same thing as VoiceP.

Having shown some of the reasons for rejecting (58), we turn our attention to some restrictions that have been argued to arise from the structure in (56):

[14] The issue arising with experiencer, goal or recipient PPs is mentioned in Alexiadou & Anagnostopoulou (2009: fn.6). Nonetheless, no actual explanation is provided for how these non-agentive PPs are compatible with the agentive features of Voice.

[15] See also Manzini et al. (2016: 111) for an account of the morpho-syntax of the Greek passive where "no hidden features/abstract heads encoding interpretation are postulated, nor any Distributed Morphology-style realizational component."

Alexiadou et. al (2015: (1–4), 135)

i. Some verbs that form anticausatives with active morphology are not allowed to combine with non-active morphology in order to form a passive, either for phonological or for semantic reasons.
ii. Many mono-eventive verbs, i.e. verbs not expressing a change-of-state, resist passivization, subject to idiolectal variation.
iii. Change-of-state verbs combining with expletive Voice in anticausatives are often not allowed to form passives.
iv. *Apo*-phrases are characterized by what has been called "reduced agentivity," i.e. they prefer to introduce non-specifics, plurals, and indefinites.

Alexiadou et. al. claim that these restrictions are "poorly understood" and add that "Sometimes it is not even clear which of the restrictions are semantic in nature and which ones are morpho-phonological." It thus follows that what they present are in fact intuitions and assumptions, rather than a full analysis, of the possible ways in which the above restrictions could be linked to the proposed structures in (56–57).[16] Precisely because these intuitions/ assumptions are not fleshed out it is not obvious how they can support the view that the Greek and English passives are formed in distinct ways. In what follows, we focus more closely on the distribution of Greek *by*-phrases, which is the central topic in the paper. Therefore, we examine restriction iv above, which claims that Greek *by*-phrases exhibit the effects of "reduced agentivity", or that their distribution is severely restricted because of the fact that passive Voice in Greek is formed differently from English. We demonstrate that these claims are unsubstantiated, therefore, they do not support the idea that the Greek passive is special from the perspective of the English passive.

6.1. Restrictions on the distribution by-phrases

This section presents a detailed overview of the purported severely restricted distribution of Greek *by*-phrases. Let us start by taking into consideration predicates like *kaike* 'got burnt' in (60). This predicate is formed with non-active morphology and, as Zombolou (2004) points out, it rejects agentive *by*-phrases i.e. *apo to Jani*, whereas it allows causer PPs introduced with a different preposition, *me*.

[16] The fact that the intuitions/ assumptions of Alexiadou et al. (2015) are not well understood is acknowledged by the authors themselves as shown in the following extracts:

> Alexiadou et al. (2015: 132)
> "there is a strong intuition in Greek that the verb *spao* 'break' cannot combine with Voice for morpho-phonological reasons, i.e. the form *spas-tik-e* is outright ungrammatical, and yet the same form is licit as an idiom. Similarly, while there seems to be a broader semantic generalization preventing change-of-state verbs from passivizing, there is a sense in which the difficulty in forming the passive specifically with verbs in *-eno* (*pach-eno* 'fatten', *fard-eno* 'widen', *lept-eno* 'become thin') lies in morpho-phonology. Finally, there is the puzzling fact that some verbs like "destroy" (*katastrefo*) are allowed to form both anticausatives with expletive Voice and passives with Middle Voice while others like 'burn' (*keo*) and 'tear' (*skizo*) are only allowed to form anticausatives with expletive Voice. More research into this is needed, but, for present purposes, we take restrictions (i)–(iii) to constitute sufficient evidence that the Greek passive is mediated through Voice and not a higher head."

> "[…] Moreover, since Greek lacks a designated Passive head, we expect the *by*-phrases that appear with Middle Voice not to be fully equivalent to their English and German counterparts: in English and German Pass embeds Voice, and thus *by*-phrases will realize exactly the same type of external arguments that Voice introduces; see also our discussion towards the end of this section. In Greek, which only has Middle Voice, this is severely restricted for reasons that await further research."

(60) Alexiadou et al. (2015: (19))
I supa kaik-e me ti dinati fotia/ *apo to Jani.
the soup b[illegible]t.NACT.PAST-3S with the strong fire by the John
'The soup got burnt from the strong fire/ by John.'

In Alexiadou et al. (2015) verbs like *kaike* that exhibit this behavior are argued to be anticausative only, which, just as in English, permit modification by causer PPs and reject agentive PPs. Interestingly, *kaike* does not uniformly block *by*-phrases containing an animate DP. Thus, if this DP is in plural as in (61) below, the *by*-phrase is possible:

(61) Alexiadou et al. (2015: (20))
?To spiti kaik-e apo tus ebristes.
the house bu[illegible]NACT.PAST-3S by the arsonists
'The house was burnt by the arsonists.'

Alexiadou et al. (2015) argue that in cases as in (61) the *by*-phrases are only apparently interpreted as agents, thus, they do not constitute exceptions to their assumption that *kaike* can only form an anticausative, which is only compatible with causer *by*-phrases. Concretely, Alexiadou et al. contend that *by*-phrases containing plural non-specific agents "[…] are considered less agentive than those denoting concrete entities" as, e.g. *to Jani*, in (60) (cf. Kaufmann 2001 i.a.). Given this, they hypothesize that "[…] such PPs are actually interpreted as causers, since they are rather abstract, hence, can happily co-occur with anticausative predicates." Moreover, citing previous literature, Alexiadou et al. admit that Greek *by*-phrases in the overall exhibit this special behavior:

> Alexiadou et al. (2015: 121)
> "several researchers have pointed out that the distribution of the *by*-phrase is severely restricted in the sense that it is characterized by what has been called "reduced agentivity"; see, e.g., Kaufmann (2001) and Manney (2000)."
>
> Alexiadou et al. (2015: 135)
> "*apo*-phrases are characterized by what has been called "reduced agentivity, i.e. they prefer to introduce non-specifics, plurals, and indefinites."

In light of these claims, a number of questions arise:

i. Is the fact that a verb rejects a *by*-phrase containing a concrete entity e.g. a proper name, as in (60), sufficient evidence that this verb does not form the passive?
ii. Is it true that Greek *by*-phrases are subject to the effects of "reduced agentivity"?
iii. Are non-specific definites, such as *tus ebristes* in (61) interpreted as causers?

As we discuss below, the answer to all these questions is negative. Based on such an outcome, we are led to disagree with the literature according to which the Greek passive and the associated *by*-phrases must be distinguished structurally from the English passive.

6.2. By-phrases and the passive

In this section we show first that, unlike what is proposed in Alexiadou et al. (2015), verbs such as *kaike* in (61), which reject *by*-phrases containing a proper name, can still form a passive. This becomes clear in (62), showing that *kaike* can be modified by an agent-oriented adverb and license control in purpose clauses, another diagnostic for the passive:

(62) Zombolou (2004: (50c))
To dhasos kaik-e skopima ja na ftiaksun ikopedha.
the forrest burn.NACT.PAST-3S on purpose in order to create land property
'The forest was burnt on purpose in order create land property.'

Anticausatives reject modification by agent-oriented adverbs (cf. discussion around 13–14). Thus, the fact that *kaike* is compatible with *skopima* 'on purpose' as well as with a purpose clause clearly suggests that this verb can form the passive, despite the fact that it exhibits the "reduced agentivity" effects. In other words, if a verb exhibits "reduced agentivity" effects, that is, it rejects a *by*-phrase containing a concrete entity like a proper name, this shows nothing about the ability of this verb to form the passive (*contra* Alexiadou et al. 2015, question i of the previous section).

In order to address question ii, we considered results from an exhaustive investigation we conducted with verbs that can undergo passivization in Greek. This is how we conducted this investigation: first, we collected the verbs in their active form from the Triantafyllidis Dictionary (1998). Then, we turned them into the passive form and searched in google whether or not they are attested alone or with a *by*-phrase. We found that more than 400 distinct instances of verbs allow *by*-phrases containing strongly referential DPs, including proper names. This is a decisive piece of evidence disproving the claim that the Greek passive with strongly referential DPs in *by*-phrases is severely restricted (see also Zombolou 2004: 39 for a similar conclusion). Still, we should note that instances of verbs as *kaike* in (60), which prefer *by*-phrases introducing non-specific indefinites are not absent. Nonetheless, they are few and often subject to idiolectal variation. Notice, for instance, that the verb *skotothik*e 'was killed' is reported as ungrammatical in Alexiadou & Anagnostopoulou (2009) when followed by an agentive *by*-phrase:

(63) O Janis skoto-thik-e (*apo tin Maria).
the John kill-NACT.PAST-3S by the Maria
'John was killed by Maria.'

However, similar examples reported in Philippaki-Warburton (1975) are just considered degraded (? or ??). Actually, one of the authors of this paper finds (63) just degraded, while the other does not accept it. The latter author found, however, that this example was widely accepted by a group of ten graduate students of linguistics, native speakers of Greek, in a class she taught. Finally, we find similar examples from google searches to be acceptable (cf. 64).[17]

(64) O Odhiseas skoto-thik-e apo ton idhjo tu ton jo.
the Ulysses kill-NACT.PAST-3S by the same his the son
'Ulysses was killed by his own son.'

To sum up, we conclude on the basis of the limited character of the "reduced agentivity" effects and the fact that it is subject to idiolectal variation, that it cannot be taken to correspond to a systematic grammatical property of Greek *by*-phrases that must be reflected in the syntax of the Greek passive.[18]

[17] What is noteworthy about (64) is that the DP following the *by*-phrase receives a focus interpretation via the intensifier *ton idhjo* 'the same'.

[18] We would like to add that if it were the case, as Alexiadou et al. (2015: 132) assume, that the "reduced agentivity" effect seen with the Greek *by*-phrases arises as a result of the fact that Greek forms the passive as in (56), then the *by*-phrases of English or German, which in this work realize the distinct syntactic structure in (57), should be formed freely with proper names or any other kind of DP. Interestingly, as an anonymous

Turning to question iii of the previous section, we argue against the claim that non-specific definites in *by*-phrases are interpreted as causers. We start with the empirical observation that causer PPs are incompatible with agent-oriented modifiers (65). If it were true that *by*-phrases comprising non-concrete nouns are interpreted as causers, they should exhibit the same behavior as the causer *by*-phrase in (65). However, (66) shows that *by*-phrases with non-specific nouns do not behave as causers. Instead, they behave as agent *by*-phrases hence, they are compatible with agent-oriented modifiers:

(65) To thima htipi-thik-e skopima (*apo ton keravno).
The victim strike-NACT.PAST-3S intentionally by the lightning
'The victim was (*intentionally) struck by the lightning.'

(66) To dhasos kaik-e skopima (apo tus ebristes).
the house burn-NACT.PAST-3S intentionally by the arsonists
'The forest was burnt intentionally by the arsonists.'

We conclude on the basis of the contrast in (65-66) that the Greek *by*-phrases comprising non-specific animate nouns are clearly agentive. This suggests that Greek *by*-phrases cannot be taken to exhibit "reduced agentivity" effects. Lastly, the fact that the *by*-phrase in (66) is agentive further corroborates our previous claim that the verb in this case is passive, not anticausative.

We turn next to the binding facts, which, as we will show, pose strong challenge to the idea that *by*-phrases are merged as adjuncts.

7. Binding Data in alternative theories of the passive

Consider a theory like that of Bruening 2013 (similar remarks hold for Legate 2014 and Alexiadou et al. 2015) with respect to the binding theory data reported in section 4. For Bruening (2013: 24), the *by*-phrase is an adjunct:

(67) "As detailed earlier, *by* phrases, instrumentals, and comitatives all require the category Voice. I take this to mean that, although they are adjuncts, they strictly select the syntactic category of the phrase they adjoin to."

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reviewer points out, impersonal passives of German show the "reduced agentivity" effects we see with the Greek *by*-phrases (cf. Roberts 1987, 2019):

(i) Roberts (1987: 293)
Es wurde von allen/ drei Männen/ ??ihm/ *Johann getanzt.
it become.PAST.3S by everyone.DAT.S three man.PL him John dance.PTPL
'There was dancing by everyone/three men/him/John.'

(i) shows that, as is the case with some *by*-phrases in Greek, the *by*-phrase of the German impersonal passives cannot be formed with definite DPs or proper names whereas pronouns are degraded. On other hand, universal quantifiers or numerals can occur in the *by*-phrase. The fact that the German *by*-phrases of impersonal passives exhibit the "reduced agentivity" effects seen with Greek *by*-phrases could be taken to suggest that these effects have nothing to do with the assumption that the passive of German/ English vs. Greek is formed in different ways. It is interesting that the *by*-phrase with the proper name in (i) becomes better with focus (Florian Schäfer and Marcel Pitt, p.c.). In Greek, the effects of focus or emphatic interpretation can be seen in (64) where the *by*-phrase comprising the emphatic pronoun *o idhjos* is improved. Lastly, it is worth noting that the *by*-phrases of German do not exhibit the behavior illustrated in (i) in the personal passive. Why this is so merits further research which is beyond the scope of the current paper. We acknowledge that the parallelism we draw here between impersonal and personal passives of German and the passive of Greek might be premature, as there are presumably a number of additional considerations that need to be taken into account. Yet, the similar effects of focusing the DP of the *by*-phrase should be noted.

This conclusion is familiar from the Principles and Parameters literature which also analyzed the *by*-phrase of the passive as an adjunct. The novelty of Bruening's analysis is that it is tied to an explicit treatment of the semantics of the preposition *by* (see Bruening 2013: 25, and see Legate 2014: 41 for a related proposal):

(68) a. ⟦by⟧ = $\lambda x \lambda f_{<e,st>} \lambda e.f(e,x)$
b. ⟦by the lobbyist⟧ = $\lambda f_{<e,st>} \lambda e.f(e,\text{the lobbyist})$

For example, the phrase *by the lobbyist* denotes a function which takes the denotation of a Voice-phrase as an argument (so *by the lobbyist* denotes a function of functions).

On Bruening's theory the *by*-phrase is an adjunct, and the preposition *by* has a complex denotation. Like other adjuncts, the DP inside the PP adjunct should be incapable of binding an anaphor. Thus, the following grammatical sentence is predicted to be ungrammatical in the indicated structure, which is the one proposed by Bruening:

(69) *The packages were sent $[_{PP}$ by $[_{DP}$ the children$]_1]$ to [each other]$_1$.

In this structure, [the children] does not c-command the reciprocal, and so by principle A of the binding theory, it should not be able to bind it. Furthermore, on Bruening's theory it would not be possible for the *by*-phrase itself to act as an antecedent. First, the *by*-phrase is not in an A-position (it is an adjunct), and binding theory is limited to relations between A-positions. Second, the pronoun would have no source for phi-features under (53). This is so because this P is analyzed as a semantically contentful preposition (cf. 68a). Third, the *by*-phrase is a predicate in Bruening's analysis and thus, is of the wrong semantic type to be the antecedent of a pronoun of type $<e>$.

8. Non-active morphology and deponent verbs

This section focuses on deponent verbs, responding to a reviewer's comment. It shows that, despite ~~the~~ numerous attempts ~~in previous literature~~, the syntactic behavior of these verbs speaks against the idea that non-active morphology in Greek is the spell-out of a Voice head lacking a specifier (cf. 58). We start with a basic description of the syntax of deponent verbs. These verbs have active syntax, namely, they take a nominative and an accusative argument; however, they are marked morphologically with non-active morphology, shown in (70).

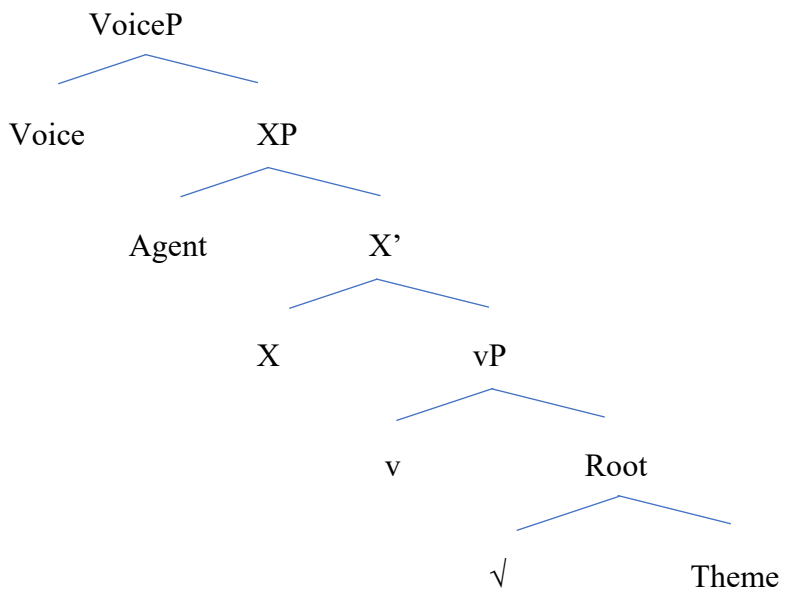
(70) O dhikastis iperaspis-tik-e to thima.
the judge.NOM defend-NACT.PAST-3S the victim.ACC
'The judge defended the victim.'

The challenge deponent verbs pose for the theories according to which non-active morphology signals the presence of a Voice head lacking a specifier is clear: if the nominative DP argument above, which is interpreted and functions as an agent is merged in Spec VoiceP, the verb should appear in active morphology according to the spell-out rule in (58), contrary to fact.

In Alexiadou (2013; 2019), the nominative argument of deponent verbs is assumed to be an experiencer. In her analysis, experiencers are different from agents in that they are introduced in a root internal position, instead of Spec VoiceP. Given this, deponent verbs are allowed to combine with a Voice head, which, just as in the passive, lacks a specifier. This head gives rise to the non-active morphology that deponent verbs realize.

Alexiadou's analysis is challenged by a number of facts. First, as an anonymous reviewer points out, there are deponent verbs as *hirizome* 'handle' or *epititheme* 'attack' whose external argument is undoubtedly an agent (cf. Zombolou & Alexiadou 2014) and, under standard assumptions, it must be introduced in Spec VoiceP on the theory put forward in Alexiadou et al. (2015). Moreover, citing data from Embick (1997), Grestenberger (2018) discusses that some deponent verbs behave clearly as agentive verbs, not as experiencer verbs with respect to a number of syntactic diagnostics, such as agent-noun formation, Clitic Doubling, word order, Clitic Left Dislocation and agent-oriented modification (see also Oikonomou 2014, which also finds the analysis of deponent verbs as experiencer verbs hard to maintain in some cases). In light of these findings, Grestenberger (2018) proposes an alternative analysis, according to which nominative arguments of deponents constitute true agent arguments, which, however, are merged non-canonically in a projection below VoiceP, that is, XP, as shown below:

(71)



In Grestenberger (2018), (71) arises as a result of a diachronic process by which a benefactive argument, hosted in Spec XP, is reanalyzed as an agent. The only reason for which Spec VoiceP cannot host the external argument either via base generation or via movement from Spec XP is that it does not accord with the assumption, adopted from Alexiadou et al. (2015) among others, that non-active morphology marks the absence of specifier in VoiceP, (58). Nonetheless, since this assumption has already been shown to be incorrect here and elsewhere, it cannot support (71), the *ad hoc* reanalysis process and Grestenberger's analysis of deponents in the overall.[19]

[19] More recently, Alexiadou (2019) proposes that the non-active morphology of (at least) some deponent verbs is conditioned by the presence of certain prefixes that look like prepositions. Concretely, Alexiadou (2019: 12) discusses the following cases where the prefixes "[…] are also found in several of the transitive deponents in the other verb classes, e.g. *apo* 'from', *pros* 'towards', *meta* 'with', *ek* 'from', *kata* 'against', *ipo* 'under', etc."

(i) a. em- pistev-ome
em believe-.NACT.PRES.1S
'trust'

b ek- metal-evome
ek exploit-NACT.PRES.1S
'exploit'

9. Discussion

This section constitutes a short note on the Theta Criterion, responding to a reviewer who is wondering whether our findings have implications for it. Let us start by noting that the competing theories of the passive (cf. Bruening 2013) that we have discussed (and rejected) dismiss the effects of the Theta Criterion. These theories are based on Heim & Kratzer (1998: 51–53), where the Theta Criterion is replaced by the weaker principle of interpretability, a principle only requiring that the output of syntax be interpretable by the principles of semantic composition. Take for instance Bruening (2013), which notes:

> Bruening (2013: 23)
> "Because there are no syntactic thematic roles in this system, there is also no θ-Criterion. Elements will either combine semantically, or they will not. If a head is a function that calls for an argument and an argument of the appropriate type combines with it, the semantics will be well-formed. If a predicate calls for an argument and no argument combines with it, it will be ill-formed. If there is an argument that does not serve as the argument of any predicate in the semantics, the result will also be ill-formed. All the work of the θ -Criterion is done by the semantics."

If it were the case that the Theta Criterion can be totally replaced by the weaker principle of interpretability, the derivation proposed in Bruening's (2013), where passive *by*-phrases are merged as adjuncts, should in principle be possible because it yields an interpretable structure (cf. Section 7). Nonetheless, the binding facts from different languages, e.g. Greek, English and Czech,[20] show that the only structure that is attested is the one where the passive *by*-phrases are syntactically realized as the external argument (cf. 50). This can be reduced to Chomsky's (1981, 1986) Theta Criterion whose effect is to force the syntactic projection of arguments. Alternatively, in the configurational approach to

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c. ipo- psiaz-ome
ipo suspect-NACT.PRES.1S
'suspect'

The prefixes are merged low in the syntactic structure of deponent verbs as prepositions heading a PP projection that lacks a specifier. These prepositions introduce the nominative argument, an experiencer in her view. In a nutshell, the idea that Alexiadou pursues is that just like the Voice head of the Greek passive, the absence of a specifier in the PP gives rise to non-active morphology of deponent verbs.

We are skeptical of the idea that these prefixes are responsible for the non-active morphology of deponent verbs because the same prefixes are used in the formation of verbs with active morphology, as the following examples demonstrate:

(ii) a. em- fitev-o
em plant-ACT.PRES-1S
'implant'

b. ek- lamvan-o
ek receive-ACT.PRES-1S
'perceive'

c. ipo- graf-o
ipo write-ACT.PRES-1S
'sign'

One could of course assume that the prefixes in (ii) do not trigger non-active morphology because in these particular cases they are merged as prepositions with a specifier. However, even if that were true, it would be unclear what these specifiers host and why deponent verbs can only combine with prepositions that lack a specifier.

[20] Citing the data in (33) and (34), from a previous version of this paper, Karlík (2020) shows that the passive *by*-phrases of Czech can also bind into another argument.

theta theory outlined in Hale & Kayser (1993) and Chomsky (1995: 312ff.; 2000: 103ff.), theta roles are understood to be associated with particular syntactic positions:

(72) Chomsky (1995: 313)
A θ-role is assigned in a certain structural configuration;

This entails that if a syntactic position, e.g. Spec vP, is not projected, an agent theta role cannot be assigned because the relevant configuration is not structurally available. Consequently, the configurational approach has the effect of ruling out the derivations proposed for *by*-phrases in Bruening (2013), Legate (2014) and Alexiadou et al. (2015).

10. Conclusion

In this paper, we have established that the *by*-phrase in Greek passives can bear the same variety of theta-roles as the external argument in the active (see Jaeggli 1986 and Collins 2005 for English). This finding supports a view according to which the Greek *by*-phrase is projected in the same manner as the external argument in the active. In fact, the *by*-phrase of Greek passives can also bind a reflexive. We have shown that this binding fact can be accounted for by externally merging the *by*-phrase in both English and Greek into Spec vP, which is the position of external arguments. From Spec vP, the *by*-phrase c-commands and binds non-exempt reflexive pronouns contained in the VP. As we have shown, the binding possibilities with adjunct PPs are completely different, therefore showing that *by*-phrases are not adjunct PPs (contrary to Bruening 2013, Legate 2014 and Alexiadou et. al. 2015).

Our results have a number of consequences for recent analyses of the Greek and English passive and beyond. First, our analysis argues against recent analyses of Bruening (2013), Legate (2014) and Alexiadou et al. (2015) which claim that the passive *by*-phrase is an adjunct. The data and discussion in this paper also argue against the hypothesis that external arguments are externally merged in Spec VoiceP (*contra* Kratzer 1996) or that non-active voice morphology in Greek is the spell-out of a Voice head lacking a specifier (*pace* Embick 1998). Furthermore, the paper discussed extensively why the claims that the Greek and English passive are formed differently are not supported by the actual distribution of Greek *by*-phrases. Lastly, the paper showed that the external argument position must always be projected in the passive. We proposed that this follows from principles such as Chomsky's (1981, 1986) Theta Criterion.

Abbreviations

The following glosses are used in this paper: S = singular; PL = plural; 1 = First person; 2 = Second person; 3 = Third person; NOM = Nominative; ACC = Accusative; GEN = Genitive; DAT = Dative; PRES = present; CL = clitic; PTPL = participle. An example marked with '*' means that the example is unacceptable for grammatical reasons.

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Competing Interests

The authors have no competing interests to declare.

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