Greek and English passive: the view from *by*-phrases

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Abstract: This paper proposes an analysis in which passive *by*-phrases are merged as arguments of the active with the corresponding theta roles (D' Hulst 1992, Goodall 1997, 1999, Hasegawa 1988 and Mahajan 1994 i.a.) and the underlying syntactic structure of the active and passive is identical (cf. Collins 2005). This analysis finds support in new data from Greek and English showing that just like 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 non-active morphology must be dissociated from the external argument position (cf. Collins 2005, Merchant 2013). Furthermore, the paper discusses reasons for which we do not side with the proposals that the Greek and English passive are formed in a different manner, or with different Voice heads (Alexiadou and Doron 2012 i.a.), that *by*-phrases are merged as adjuncts (Bruening 2013, Legate 2014) 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 Theta Criterion (cf. Chomsky 1986) holds and constrains the way in which arguments are merged into the syntactic derivation. On the contrary, the rules of semantic composition alone cannot succeed in deriving the effects of the Theta Criterion (*pace* Heim and Kratzer 1998, Bruening 2013).

Keywords: *by*-phrase, adjuncts, arguments, reflexives, Greek, English

1. Introduction:

This paper presents new empirical evidence showing that passive *by*-phrases of Greek and English behave like bare 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 cases of adjunct PPs which, as we show, are unable to bind. Importantly, we assume that the similarities between arguments and *by*-phrases are not accidental. Thus, based on the standard assumption since Chomsky (1986) that binding is only possible from A-positions, we propose that passive *by*-phrases are merged as arguments. Under our proposal, since the external argument is always syntactically present, we suggest that, first, the non-active morphology of Greek does not mark the absence of the external argument (*pace* Embick 1998) and, second, the underlying syntax of the passive and the active is identical. The latter is different from previous proposals according to which underlying syntax of the passive in Greek is distinct from the active and the English and Greek passives are different from each other in that they are formed with distinct Voice heads (*pace* Alexiadou and Doron 2012, Alexiadou et al. 2015). We show that, unlike what these previous works assume, the existence of distinct Voice heads for Greek and English does not find support in the syntactic behavior of *by*-phrases or

elsewhere. Lastly, in light of our findings, we suggest that the Theta Criterion (cf. Chomsky 1986 for a version) is an indispensable principle of languages, as proposed more recently in Collins (2018) (*pace* Heim and Kratzer 1998, Bruening 2013).

We begin with background discussion on Greek non-active morphology and the different contexts in which it may be used (Section 2). Section 3 shows that Greek *by*-phrases can receive the same interpretations as the corresponding DP argument of the passive. 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 show the reasons for which we do not consider these analyses to provide a satisfactory account of the range of facts they discuss or the binding data we present. Section 8 is a short note on deponent verbs, which, as we discuss, have not received a principled account in the previous theories. Section 9 presents a short remark on the Theta Criterion. Section 10 discusses residual issues and section 10 concludes.

2. Background

Greek passives involve non-active morphology on the finite verb, rather than the auxiliary plus a 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 respectively. This morphology occurs in different contexts such as reflexive and reciprocal, (2a)-(2b), middle, (2c), deponent, (2d).

(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 chirokrot-ithik-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.'

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, as with *lero-thike*-'got dirty' in (3) Note, however, that some anticausatives may also appear with active morphology. Hence, compare the verb in (3) to *espase*-'broke' in (4), where the verb is in active form.

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

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

With this basic background on Greek non-active morphology in mind, we are now in a position to examine the syntactic behavior of the passive *by*-phrases in 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 discuss 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 et al. 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 and Roberts 1989: 221 and Collins 2005: 2).

(5) Ta mallia mu stegno-thikan 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'

(6) I Maria aghapi-thike 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-thike 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-thike apo ton Emona.
the letter receive-NACT.PAST.3S by the Emona
'The letter was received by Emonas.'

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

(10) Tha enimero-thike 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 anticausative predicates, which, as (3) and (4) show, can also accept modification by causer *by*-phrases. In order to make sure that the verbs we examine are unambiguous passive and not anticausative with non-active morphology, we use two well established tests: (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 and Rappaport Hovav 1995), *by itself* is licensed "[...] in anticausatives, but not in passives." For Greek, this contrast between passives and anticausatives is illustrated below:

(11) To bukali adjase apo mono tu. *Anticausative*
the bottle emptied.ACT.PAST.3S from alone its
'The bottle was emptied by itself.' (Alexiadou and Anagnostopoulou 2004: (14b))

(12) To vivlio diavastike (*apo mono tu). *Passive*
the book read.NACT.PAST.3S from alone its
'The book was emptied by itself.' (Alexiadou and Anagnostopoulou 2004: (14a))

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 passive ones, (14) (cf. Zombolou 2004, and Alexiadou and Anagnostopoulou 2004: 131 i.a.).

(13) I porta anikse (*skopima) (apo ton aera). *Anticausative*
the door opened.ACT.PAST.3S intentionally from the wind
'The door opened (*intentionally) from the wind.'

(14) To thima dholofoni-thike (skopima). *Passive*
the victim murdered-NACT.PAST.3S intentionally
'The victim was murdered intentionally.'

With this in mind, let us now consider the following set of examples with the verb *chtipithike*-"was hit/ struck".

(15) a. To thima chtipi-thike (*apo mono tu).
the victim hit-NACT.PAST.3S from alone its
'The victim was hit (*by itself).'

b. To thima chtipi-thike (skopima).
the victim hit.NACT.PAST.3S intentionally
'The victim was hit (intentionally).'

c. To thima chtipi-thike (apo ton keravno).
the victim hit-NACT.PAST.3S from the lightning
'The victim was struck (by the lightning).'

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

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

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

c. Ta dhakrighona metafer-thikan edho (apo ton vrochi).
the tear gas transfer-NACT.PAST.3S here from the rain
'The tear gas was transferred here (by the rain).'

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

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

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

In light of the facts in this section, we conclude therefore that just like the English passive, the Greek passive licenses causer PPs (*pace* Alexiadou and Anagnostopoulou 2009, Alexiadou et al. 2015). With this in mind, we turn next to new binding data showing that just like the corresponding arguments in the active sentences, *by*-phrases can bind a reflexive. In this respect, *by*-phrases differ from *bona fide* adjuncts, which, as we discuss, exhibit distinct behavior in terms of their binding possibilities. We begin the next section with a brief overview of basic properties of the Greek reflexive.

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 the relevant features. The possessive pronoun agrees in *φ*-features with its antecedent. *O eaftos mu* has been discussed in the past in a number of articles 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 and Everaert 1999 i.a.). In these analyses it is acknowledged that, despite the peculiar syntactic behavior just mentioned, *o eaftos mu* is no different from the English reflexive in requiring a local c-commanding antecedent:

(18) a. O Jorghos$_1$ estile ta vivlia
the George send.ACT.PAST.3S the books
ston eafto tu$_1$.
to.the self.ACC.S his.GEN
'George sent the books to himself.'

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

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

b. * I mitera tu Jorghu$_1$ aghorase ena dhoro
the mother the George.GEN buy.ACT.PAST.3S a gift
ja ton eafto tu$_1$.
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. There might be interpretive differences between the two forms but this is not

relevant to the current discussion. Both forms of *o eaftos mu* require a c-commanding antecedent, as shown below.

(20) a. Ta koritsia$_1$ kitazan ton eafto tus$_1$
the girls look.ACT.PAST.3P the self.ACC.S their.GEN
ston kathrefti.
in.the mirror
'The girls looked at themselves in the mirror.'

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

(21) a. Ta koritsia$_1$ kitazan tus eaftus tus$_1$
the girls look.ACT.PAST.3P the self.ACC.P their.GEN
ston kathrefti.
in.the mirror
'The girls looked at themselves in the mirror.'

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

A relevant property of *o eaftos mu* which makes it different from the English reflexive, but has received little attention 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 and 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 and Zlogar 2015 and references therein). It is remarkable that *o eaftos mu* is prohibited in contexts in which the English reflexive has been argued to function as a logophor that is anteceded by perspective centers. For instance, consider the following ungrammatical sentences in Greek and compare them with the English sentences in the translation. The latter have been reported as well-formed in the literature, hence, *o eaftos mu* is a non-exempt anaphor. Concretely, the two sentences in (22) feature anaphors with attitude holders as antecedents (cf. Charnavel and Zlogar 2015, 2a,c citing Pollard and Sag 1992 and Reinhart and Reuland 1993, 670, i.a.). In (23) the anaphor has antecedents that have been identified as empathy loci (Kuno 1987, Charnavel and Zlogar 2015, 18a,c).

(22) a. *O Vasilis$_1$ ipe oti i vrochi katestrepse
the Bill say.ACT.PAST.3S that the rain destroy.ACT.PAST.3S
tis fotografies tu eaftu tu$_1$.
the photos the self.ACC.S his.GEN
'Bill said that the rain destroyed the photos of himself.'

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

(23) * O Pavlos$_1$ duleve se ena panepistimio
the Paul worked.ACT.PAST.3S at a university
me ti jineka tu opu fisiki opos o eaftos tu$_1$
with the wife his.GEN where physicts like the self.ACC.S his.GEN
echeran ipsilis ektimisis.
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 and 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 subject to standard Condition A. Notice that we examine the relevant English sentences with inanimate antecedents 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 and 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 different *by*-phrases. The first and last author of the paper, both native speakers of Greek, find the examples fully natural.

(24) ena technito skafos pu kataskevas-tike apo tus theus$_1$
an artificial craft that make.NACT.PAST.3S by the Gods
ja tus eaftus tus$_1$.
for the self.ACC.P their.GEN
'An artificial aircraft that was made by the Gods for themselves.'
(https://apocalypsejohn.com/itan-vivlikos-leviathan-ena-amfivio-ufo-video/)

(25) to minima apostel-ete apoklistika apo kathe Learner$_1$
the message send-NACT.PAST.3S exclusively by every Learner
ston eafto tu$_1$.
to.the self.ACC.S his.GEN
'The message is sent by every Learner exclusively to himself.'
(http://artemis.cslab.ece.ntua.gr:8080/jspui/bitstream/123456789/13503/1/DT2017-0161.pdf)

In the following examples we show that *by*-phrases are different in this respect from DPs hosted in any other sort of (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 (26b,c), *eksetias* 'because of', a P followed by a DP with genitive case (27b,c), adjunct locative PPs (28b,c) and *mazi* "together", a P followed by the functional preposition *me* and an accusative case marked DP (29a,b). The sentences below the ones testing binding from within adjunct phrases, e.g., (26c), (27c), (28c) and (29b) show that ungrammaticality is only due to binding.[1]

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

b. *Aftes i lisis prota-thikan 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.'

c. Aftes i lisis prota-thikan choris tus psichotherapeftes$_1$
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.'

[1] The contrasts reported in this section reflect the judgments of the first and third author native speakers of Greek, the judgments of five participants at the Syntax Reading Group held at the University of Patras in September 2018 and five additional native speakers, non-linguists. An anonymous reviewer, native speaker of Greek, agrees with the judgments we present.

(27) a. Aftes i diataksis psifis-tikan apo tus vuleftes$_1$
these the regulations vote-NACT.PAST.3P by the MPs
tis kivernisis ja ton eafto tus$_1$.
the 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-tikan eksetias ton vulefton$_1$
these the regulations vote-NACT.PAST.3P because the MPs
tis kivernisis ja ton eafto tus$_1$.
the 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-tikan eksetias ton vulefton
these the regulations vote-NACT.PAST.3P because the MPs
tis kivernisis ja aftus ce tis ikojenies tus.
the 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.'

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

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

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

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

b. Aftes i bluzes epilech-tikan mazi me ta phedja
these the t-shirts select-NACT.PAST.3P together with the kids
ja afta ce tis ikojenies tus.
for them 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 (2018,10-11), to also be bound by *by*-phrases. On the other hand, DPs within clear instances of other (non-argument) PPs cannot bind reflexives, exactly like in Greek.

(30) 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$_1$.

(31) 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 seem to encode any kind of perspective center. Definitely they are not attitude holders, as the subjects of *send* or *paint* do not hold attitudes and they cannot be empathy loci.

At any rate, the DP in the *by*-phrase of an English passive can be inanimate and still bind an anaphor, as shown below. Inanimates cannot act as antecedents for logophors because they cannot hold perspective since they cannot be in a mental state (cf. Charnavel and Sportiche 2016).

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

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

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

(35) 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

found the (b) examples ungrammatical.[2] Such examples are easy to find on the internet. All of the following examples from google searches are accepted by the second author:[3]

(36) You find yourself rising and being pulled by the sun$_1$ toward itself$_1$.
(https://www.do-meditation.com/power-chakra-guided-meditation.html)

(37) 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$_1$.
(https://slideheaven.com/black-holes-in-our-universe.html)

(38) which is thus an external demagnetising field applied by the magnet$_1$ to itself$_1$…
(https://e-magnetsuk.com/alnico_magnets/characteristics.aspx)

(39) More recently oxytocin has been found to be released by the brain$_1$ into itself$_1$ during sexual intercourse,
(https://books.google.com/books?isbn=9814488372)

(40) But soon also this will be sucked up by the earth$_1$ into itself$_1$.
(https://gottfriedbennpoems.com/the-poems/)

(41) The investment made by the country$_1$ into itself$_1$ has paid back hundreds of times over, and will keep paying back.
(https://www.entrepreneur.com/article/298127)

(42) The objects presenting themselves, in so far as they are sources of pleasure, are absorbed by the ego$_1$ into itself$_1$,
(https://books.google.com/books?isbn=1416573593)

(43) 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$_1$;
(https://faculty.humanities.uci.edu/bjbecker/PlaguesandPeople/week2j.html)

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[2] In an informal survey with a few native speakers we found that similar examples with inanimate antecedent DPs are acceptable in Greek, as shown below:

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

(ii) I idopiisis stelnodan 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'

[3] In (32-35), the antecedent of the anaphors is a true inanimate. On the other hand, there are very few examples in (36-44) where the antecedent could be understood as animate by means of metonymy.

(44) These are income benefit or resources earned or generated by the organization$_1$ from itself$_1$.
(https://iproject.com.ng/accounting/accounting-as-an-inevitable-tool.../index.html)

5. Analysis

In the previous sections we presented data from two languages, Greek and English, in which DPs in *by*-phrases of passives, unlike DPs hosted in adjunct PPs, can bind non-exempt anaphors. Non-exempt anaphors like *o eaftos mu* or inanimate anaphors as in (32)-(44) 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):

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

In the examples repeated below from previously, we show again that the reflexive cannot be bound by the DP, *tus psichotherapeftes* "the psychotherapists", if that is contained within an adjunct PP. On the other hand, the reflexive can be bound by the same DP if it is contained in the *by*-phrase:

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

b. *Aftes i lisis prota-thikan 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.'

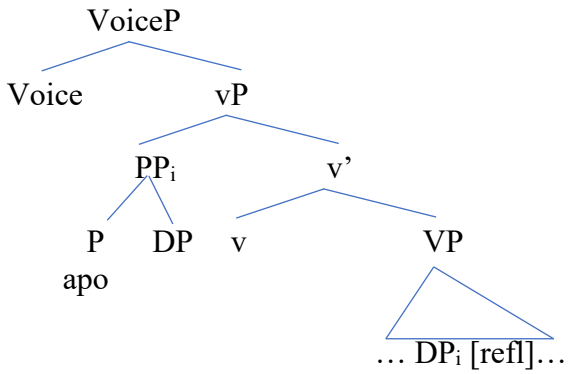
Since the *by*-phrases of Greek and English behave just like the corresponding arguments in terms of binding and theta-role interpretation, it makes sense to assume that in both languages, they are merged as arguments occupying the same position as the external argument DP in the active (cf. Collins 2018, D' Hulst 1992, Goodall 1997, 1999, Hasegawa 1988 and Mahajan 1994). This assumption finds support in the independently motivated claim that binding is only possible from A-positions (cf. Chomsky 1981:184, "The theory of binding is a theory of A-binding.").[4] Furthermore, it is consistent with Baker's (1988, 1997) UTAH (see Collins 2015 on that matter).[5] Hence, the underlying structure we

[4] 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 and Sportiche to appear and references therein).

[5] See also Baker et al. (1989) which also adopts a configurational definition of the external argument.

propose for the Greek and, crucially, English passives is as in (49) (see Angelopoulos 2019a and Collins 2005 for a possible alternative):

(47)



Under this view, note that that the PP binds the reflexive. Nonetheless, as Collins (2018) notes, a problem that arises in this approach is pronominal agreement. Concretely, the example in (46a) clearly shows that the reflexive agrees syntactically with its antecedent. However, since the *apo*-phrase lacks phi-features (since it is a PP), it should not be able to agree with a reflexive that takes it as an antecedent. Collins suggests that this issue can be resolved in the framework for pronominal agreement advocated in Collins and Postal (2012). In that theory, pronominal agreement originates in one of a small set of sources (which include antecedents).

(48) Collins and 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 and Postal (2012), let us consider the following example:

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

In (49), 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, rather it agrees with some other DP (the subject of the matrix clause). Collins and Postal (2012) call the DPs that potentially supply phi-features for pronominal agreement *sources*. In (49), the two sources are the DPs *I* and *who*. Now, in order to account for the pronominal agreement facts in cases like (49) under the theory of Collins and Postal (2012), Collins (2018) proposes that that the DP complement of functional Ps can function as a source of phi-features:

(50) 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 Alexiadou and Anagnostopoulou (2009), Michelioudakis and Angelopoulos (2019) and Angelopoulos (2019), that the *apo*-'by' of Greek is a purely functional preposition that lacks semantic content, in the sense that it is not responsible for the theta-role interpretation of its surface DP complement. 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. It is also noteworthy that other functional prepositions such as *of* or *to* of English and Ps of Greek such as *se*-'to' or *me*-'with' are predicted to be merged in argument positions in which case they should be able to bind a reflexive with their DP complement serving as source for pronominal agreement. Indeed, this prediction is borne out in (51) where it is shown that just like with *apo*-phrases, the PP formed with *s(e)* can bind the Greek reflexive (cf. Anagnostopoulou 2003, Michelioudakis 2012):

(51) Edikse s-tin Maria$_1$ ton eafto tis$_1$.
showed.ACT.PAST.3P 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, in sentences such as (26b), (27b), (28b), (29a). The relevant part of the structure is as below for a PP headed by *without*:

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

(52a) and (52b) describe two distinct situations in which either the PP as a whole or the DP contained in it bind the reflexive. Under our analysis, binding of the reflexive is predicted to be ruled out in both cases. In (52a), the DP inside the *without* PP cannot function as a possible source of pronominal agreement for the reflexive because *without* is not a functional preposition. Furthermore, the *without PP* is standardly assumed to be merged as an adjunct and not as an argument, therefore, it should not be able to bind the reflexive. Lastly, in (52b), the DP contained in the *without PP* is not possible to bind the reflexive due to lack of c-command or due to the fact that it is not in an A-position.[6, 7]

[6] 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.

[7] 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

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:

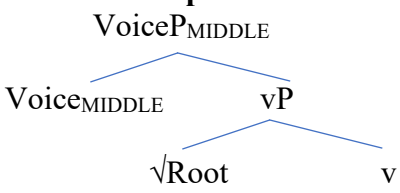
a) the Greek and English passive are built in distinct ways,
b) Greek non-active morphology is the spell-out of a Voice head lacking a specifier,
c) unlike the corresponding DP arguments of the active, the distribution of passive *by*-phrases is severely restricted.

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

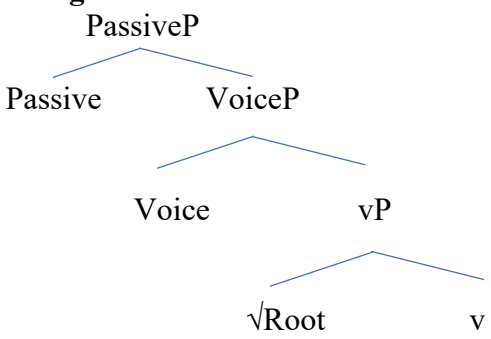
6. Two ways to form a passive

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

(53) **Greek passive**



(54) **English Passive**



Under this view, the non-active morphology of Greek is the result of a post syntactic spell -out rule that targets Voice heads lacking a specifier (cf. Embick 1998, 2004 i.a.):

(55) Voice -> Voice[NonAct]/ ___No DP specifier.

---

like to note that functional Ps of different languages exhibit the behavior we report here. For instance, in addition to the Greek and English functional Ps in this paper, 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 and 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 agreement because, as case markers, functional Ps constitute part of the extended nominal projection of the DP they introduce. Furthermore, we assume that it is not accidental that only functional Ps can be composed syntactically as case markers. It possibly correlates (in ways that admittedly need to be made clear in future work) with the fact that they are not as structurally rich as lexical Ps (cf. Terzi 2017 for discussion of the latter). Lastly, a different 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) (see more discussion on this matter in Section 9). 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. In this case, the DP cannot c-command out of the PP, explaining why binding is ruled out with lexical Ps.

Nonetheless, if agents are uniformly projected in the syntax in the active and the passive, like we showed in the previous section, the rule in (55) 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.[8] Thus, if voice morphology is found in Voice (projecting a VoiceP), as in Rivero (1990), then the external arguments should not be generated in Spec VoiceP, but in some other projection, e.g., in Spec vP, as in Chomsky (1995). 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:

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

Merchant (2013:98) is led to similar conclusions, based on VP-ellipsis facts: "The crucial element involved in these accounts is the separation of the head that determines voice from the head that determines the external valency of the predicate. There is in fact no conceptual reason these two should go together, and the ellipsis facts argue directly against this assumption." (56) and Merchant's claim are consistent with the structure for the Greek passive we proposed in (47) (for further arguments against external arguments being projected in [Spec,Voice], see Zyman and Kalivoda 2020: 8).

Setting the spell-out rule in (55) aside, we discuss briefly a few restrictions that have been argued to correlate with the structure in (53):

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." Given this, they present intuitions and assumptions rather than a full proposal of the possible ways in which the above restrictions could be linked to the proposed structures in (53-54).[9] Since these intuitions/ assumptions are not fully

[8] 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."

[9] The lack of clarity behind the intuitions/ assumptions Alexiadou et al. (2015) is demonstrated in the following extracts:

fledged out it is not immediately clear that they can be used to support the view that the Greek and English passives are formed in distinct ways. At any rate, we focus more closely in what follows on the distribution of Greek *by*-phrases, which is the main topic of this paper. We examine the claims that Greek *by*-phrases exhibit the effects of "reduced agentivity" (cf. restriction iv above) or that their distribution is severely restricted because of the fact that passive Voice in Greek is formed differently from English (cf. fn.9). We show that these claims are not true and as a result, they cannot be used in support of the idea that the Greek passive is special.

6.1 Restrictions on the distribution *by*-phrases

This section presents a detailed overview of previous discussion on the purported severely restricted distribution of Greek *by*-phrases. Let us start by taking into consideration predicates like *kaike* "got burnt" in (57). 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 they allow causer PPs introduced with a different preposition, *me.*

(57) Alexiadou et al. (2015: (19))
I supa kaike me ti dinati fotia/ * apo to Jani.
the soup burnt.NACT.PAST.3S with the strong fire by the John
'The soup got burnt by 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 (58) below, the *by*-phrase is possible:

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."

(58) Alexiadou et al. (2015: (20))

?To	spiti	kaike	apo	tus	ebristes.
the	house	burnt.NACT.PAST.3S	by	the	arsonists

'The house was burnt by the arsonists.'

Alexiadou et al. (2015) argue that in cases as in (58) 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 (57) (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 (57) 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 (58) interpreted as causers?

As we discuss, the answer to all these questions is negative. Based on this, we disagree with previous literature that these facts support the idea that the Greek passive and *by*-phrases are special.

6.2 *By*-phrases and the passive

In this section, we show first, that unlike what is proposed in Alexiadou et al. (2015), verbs as *kaike* in (58) that reject *by*-phrases containing a proper name can still form a passive. This becomes clear from examples as (59) where it is shown that *kaike* can be modified by an agent-oriented adverb and license control in purpose clauses:

(59) Zombolou (2004: (50c))

To	dhasos	kaike	skopima	ja na	ftiaksun	ikopedha.
the	forrest	burnt.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. This finding suggests that if a verb exhibits "reduced agentivity" effects, that is, it rejects a *by*-phrase containing a concrete entity as a proper name, this does not count as sufficient evidence that the verb in question does not form the passive. In other words, this finding conclusively suggests that the formation of the passive syntax, that is, whether a verb forms the passive or not must not be examined in relation to the so-called "reduced agentivity" effects. This addresses question i from Section 6.1.

Now, in order to address question ii, we consider results from an exhaustive investigation we conducted with the verbs that can undergo passivization in Greek. We collected these verbs in their active form from the Triantafyllidis Dictionary (1998). These verbs were turned into their passivized form with or without *by*-phrases and were subsequently examined in regard to their acceptability with a few native speakers of Greek and the two authors of the current paper. We found more than 400 distinct instances which optionally allow *by*-phrases containing strongly referential DPs, including proper names. This is a piece of evidence that disproves the claim that the Greek passive with strongly referential DPs in *by*-phrases, or without *by*-phrases, is severely restricted (see also Zombolou 2004 for a similar conclusion). Still, we should note that instances of verbs as *kaike* in (57), which prefer *by*-phrases introducing non-specific indefinites are not absent. Nonetheless, they are very few and often subject to idiolectal variation. For instance, the verb *skotothik*e 'was killed' is reported only as ungrammatical in Alexiadou and Anagnostopoulou (2009) when followed by an agentive *by*-phrase:

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

Similar examples are reported in Philippaki-Warburton (1975) as just degraded (? or ??). One of the authors of this paper finds (60) 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. Finally, we find similar examples from google searches perfectly grammatical:

(61) O Odhiseas skoto-thike 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, given the circumstantial character of the "reduced agentivity" effects and the fact that they are also subject to idiolectal variation, we conclude that they 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, unlike what Alexiadou et al. (2015) propose.[10]

Turning to question iii of the previous section, we present evidence against the claim that non-specific definites in *by*-phrases are interpreted as causers. Let us start with the empirical observation that causer PPs are incompatible with agent-oriented modifiers (62). Given this, we claim that 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 (62). Interestingly, (63) shows that *by*-phrases with non-specific nouns do not behave like causers. Instead, they have the distribution of agent *by*-phrases which are compatible with agent-oriented modifiers:

(62) To thima htipi-thike skopima (*apo ton keravno).
The victim hit-NACT.PAST.3S intentionally by the lightning
'The victim was (*intentionally) struck by the lightning.'

(63) To dhasos kaike skopima (apo tus ebristes).
the house burnt.NACT.PAST.3S intentionally by the arsonists
'The forest was burnt intentionally by the arsonists.'

[10] As a side note, we would like to note that if it were the case, as Alexiadou et al. (2015: 132) assume, that the "reduced agentivity" effect seen with the Greek *by*-phrases arise as a result of the fact that Greek forms the passive as in (53), then the *by*-phrases of English or German which in this work realize the distinct syntactic structure in (54) should be formed freely with proper names or any other kind of DP. Interestingly, as an anonymous 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/
it become.PAST.3S by everyone. DAT.S three man.pl him
*Johann getanzt.
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 as well could possibly 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 (61) where the *by*-phrase comprising the emphatic pronoun *o idhjos* is improved. Lastly, it is worth nothing 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 might be a number of additional considerations that need to be taken into account. This is the reason why we only present this remark as a side note.

We conclude on the basis of the contrast in (62-63) that the Greek *by*-phrases comprising non-specific nouns are clearly agentive. This suggests that Greek *by*-phrases cannot be taken to exhibit "reduced agentivity" effects in the sense that if they contain animate definite DPs as in (63), they must be interpreted as causers. Lastly, the fact that the *by*-phrase in (63) 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 shown, pose strong challenge to the idea that *by*-phrases are merged as adjuncts.

7. Binding Data in alternative theories of the passive

Now 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 (64). For Bruening (2013: 24), the *by*-phrase is an adjunct:

(64) "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."

This conclusion is familiar from the Principles and Parameters literature which also analyzed the *by*-phrase in 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):

(65) a. $[\![\text{by}]\!] = \lambda x \lambda f_{<e,st>} \lambda e.f(e,x)$
b. $[\![\text{by the lobbyist}]\!] = \lambda f_{<e,st>} \lambda e.f(e,\text{the lobbyist})$

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 (denoting a function of functions). Like other adjuncts, the DP inside the PP adjunct should be incapable of binding an anaphor. This is illustrated in the following example:

(66) *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, *by*-phrase is not in an A-position (it is an adjunct), and the binding theory is limited to relations between A-positions. Second, the *by*-phrase under Bruening's analysis is of the wrong semantic type to be the antecedent of a pronoun. This so because this P is analyzed as a semantically contentful preposition with complex semantics denoting a function of VoiceP denotations (cf. 65a).

8. Non-active morphology and deponent verbs

This section focuses on deponent verbs, responding to a reviewer's comment, and 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. 55). We start with a basic description of the syntactic behavior of deponent verbs. These verbs have active syntax, that is, they take a nominative and an accusative argument, however, they are marked morphologically with non-active morphology, as shown in (67).

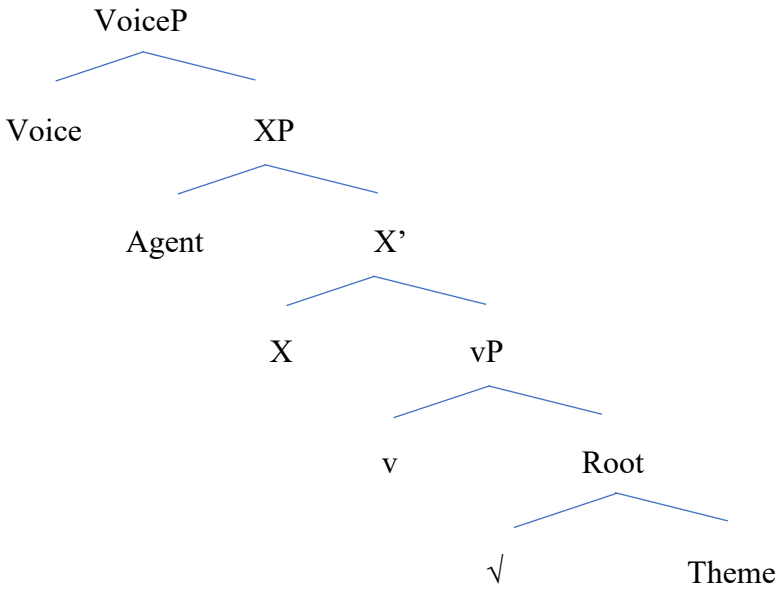
(67) O dhikastis iperaspis-tike to thima.
the judge.NOM defended-NACT.PAST.3S the victim.NOM
'The judge defended the victim.'

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 (55), 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 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.

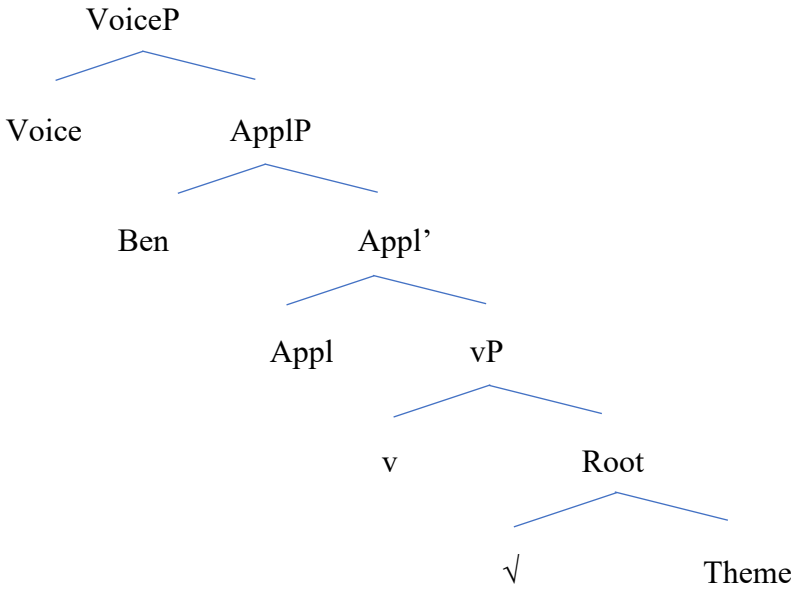
Importantly, Alexiadou's analysis is challenged by a number of facts. First, as an anonymous reviewer points out, there are deponent verbs as *hirizome*-'handle' or *epititheme*-'attack' whose external argument is clearly an agent (cf. Zombolou and Alexiadou 2014) and under standard assumptions, must be introduced in Spec VoiceP on the theory put forward in Alexiadou et al. (2015). Moreover, as Grestenberger (2018 and references therein) shows, some deponent verbs behave as agentive verbs, not as experiencer verbs with respect to a number of syntactic diagnostics 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 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, as shown below:

(68)



Here, the agent is introduced in Spec XP. There is also a Voice head lacking a specifier, which, as in Alexiadou et al. (2015), is spelled out as non-active morphology. Importantly, (68) is the result of a diachronic reanalysis process by which a benefactive argument is reanalyzed as an agent. The structure that serves as the basis for the reanalyzed one is the one below:

(69)



According to Grestenberger (2015: 504), (69) is the structure corresponding to a class of verbs that she calls self-benefactives (see also Zombolou and Alexiadou 2014). These are three place predicates like the ones below where the "[...] benefactive argument of an action

is identified with the subject of the same action." Under this view, the benefactive argument is introduced in Spec ApplP and undergoes movement to Spec TP.

(70) Egho promithev-ome trofima.
I get-NACT.PAST.1S food
'I get food for myself'

ApplP of (69) is turned into XP of (68) due to a diachronic reanalysis process. XP introduces agents and serves as the basis for the formation of deponent verbs.

We would like to note that the syntactic structure that self-benefactive verbs are assumed to realize in Grestenberger's analysis is based on theory internal arguments lacking independent support. For instance, an alternative analysis according to which the external argument of self-benefactive verbs is merged in Spec ApplP in (69) and subsequently moves to Spec VoiceP is not considered to be possible in Grestenberger (2014). This is so because if these movement steps were also to take place in (68), the resulting structure would not be compatible with the assumption that non-active morphology is the result of a spell-out rule targeting a Voice head lacking a specifier. However, since we have serious reasons to doubt the existence of such a spell-out rule, we consider the two structures in (68) and (69) to be weakly motivated in the first place. We believe that both are the result of an *ad hoc* diachronic reanalysis process whose only purpose is to salvage the spell-out rule in (55).

More recently, Alexiadou (2019) proposes that the non-active morphology in (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."

(71) a. em- pistev-ome
em believe-.NACT.PST.1S
'trust'
b ek- metal-evome
ek exploit-NACT.PST.1S
'exploit'
c. ipo- psiaz-ome
ipo suspect-NACT.PST.1S
'suspect'

These 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:

(72) a. em- fitevo
em plant-ACT.PST.1S
'implant'
b. ek- lamvano
ek receive-ACT.PST.1S
'perceive'
c. ipo- grafo
ipo write-ACT.PST.1S
'sign'

One could of course assume that the prefixes in (72) 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, which we doubt, it would be unclear what these specifiers host and why deponent verbs can only combine with prepositions that lack a specifier.

9. Discussion: The Theta Criterion

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 we have discussed (and rejected) dismiss syntactic theta roles and the Theta Criterion in the overall. For instance, take Bruening (2013: 15), who argues that "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 Theta Criterion is done by the semantics." This is also the view presented in Heim and Kratzer (1998: 51-53), where the Theta Criterion is replaced by the weaker principle of interpretability. This principle only requires that the output of syntax be interpretable by the principles of semantic composition, as is roughly sketched by Bruening.

Collins (2018) discusses confounds in the claims of Heim and Kratzer (1998) and shows how these confounds render their claims against the Theta Criterion rather weak and inconclusive. Collins also argues, in light of the binding facts we present here, that some version of the Theta Criterion must hold (*pace* Heim and Kratzer 1998, Bruening 2013 i.a.). We briefly summarize his arguments: if it were the case that the Theta Criterion can be totally replaced by the weaker principle of interpretability, the derivation Bruening (2013) proposes for the passive should in principle be possible because it simply is interpretable. Under his view, recall that the Voice head is not combined with an external argument in the passive. Instead, VoiceP denotes a function of functions, <e,st>, and serves as the argument of the *by*-phrase, which is of a higher type, that is, <<e,st>e>.

A question that arises, given that both the derivation we propose and Bruening's derivation are compatible with the principles of semantic composition, is why the only structure that is actually attested in languages is the one where the external argument is syntactically realized in the passive (cf. 47), as suggested by the binding facts of both Greek and English? We believe that this cannot be an accident of languages. Given this, we propose that any principles of semantic composition must be supplemented with the Theta Criterion (Chomsky 1986: 97). This is because only if the Theta Criterion holds, the external argument must always be syntactically realized.[11] Under this view, little v is roughly speaking a theta-assigning head which, as a result, must be always merged with an argument, as in (47), in order to satisfy the Theta Criterion.[12]

10. Residual Issues

Before closing the paper, we would like to address a few residual issues. First, passivized verbs precede *by*-phrases in Greek. Nonetheless, in (47), it is not obvious how the surface order verb > *by*-phrase can be derived if the verb stays in "little v". Following Rivero (1990:136-138), we assume that the verb in the Greek passive always moves at least as high as Voice. Given this, the verb precedes Greek *by*-phrases, because Voice in our analysis merges higher than the vP. Alternatively, the surface order is due to movement of the VP to a specifier higher than Spec vP, smuggling the internal argument à la Collins (2005). Lastly, under the analysis of prepositions as probes (cf. Kayne 2005), Angelopoulos (2019) proposes and motivates a number of movement steps deriving the order verb > *by*-phrase without invoking smuggling.

Second, it is unclear under our analysis what blocks *by*-phrases from merging e.g. in the complement position of the verb (see discussion in Collins 2005 on this issue). We clearly do not address this question as it touches upon issues that are beyond the immediate scope of the current paper e.g. the constituency structure of the *by*-phrase (see also Legate 2014). However, we would like to refer the reader to Angelopoulos (2019a), who presents a view which preserves the intuitions behind the proposal we put forward here. Concretely, based on Collins (2005) and Kayne (2000, 2005) Angelopoulos proposes that *by* is merged on the spine and selects the verbal projection with which it combines. Furthermore, passive *by* selects the vP (or VoiceP) thus blocking *by*-phrases from merging in the complement position of the verb, that is, lower than VoiceP. The surface complement of *by* is a DP which is merged, just like we assume here, in the corresponding argument position.

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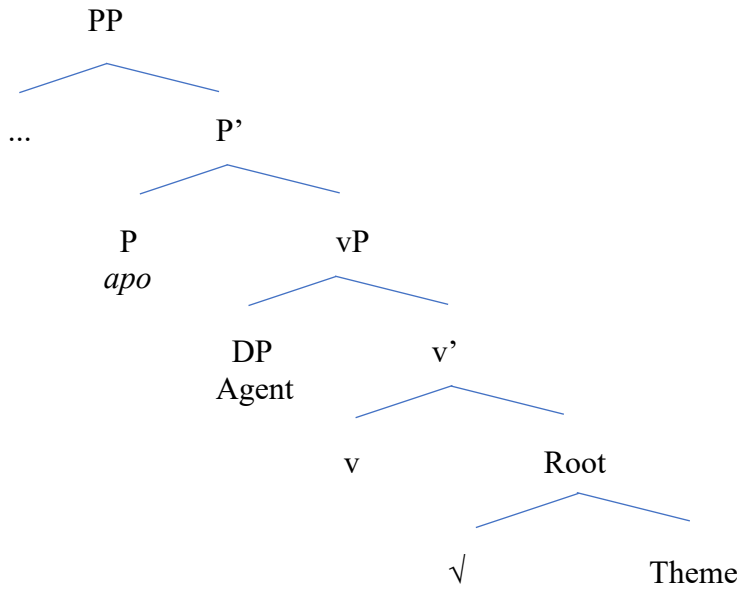
[11] The exact formulation of the Theta Criterion and questions as to whether it can be reduced to theta-features that certain heads e.g. little v, are associated with (cf. Chomsky 1981 i.a.) are beyond the scope of the current paper.

[12] The Theta Criterion is defined in Chomsky (1986) as follows:

(Chomsky 1986: 97)
Each argument α appears in a chain containing a unique visible theta-position P, and each theta-position P is visible in a chain containing a unique argument α.

(73)



Under this proposal, it is important that *by* is merged as a true preposition. Furthermore, the surface order P>>DP is derived via several steps of movement, as in Kayne (2000, 2005). These movement steps, which are shown to be independently motivated, are also responsible for turning the PP into a constituent.

Let us now turn to the last residual issue we would like to discuss. Looking at deadjectival verbs which exhibit the (anti)causative alternations as *steghnose*-"dried" in (74), Alexiadou et al. (2015) note that when they are combined with non-active morphology, as in (75), these verbs cannot be modified by *by*-phrases which are interpreted as causers:

(74) O ilios/ i komotria steghnose ta malia mu.
the sun the hairdresser dried.NACT.PAST.3P the hair mine
'The sun/ hairdresser dried my hair.'

(75) Alexiadou et al. (2015: (21b-c))
a. Ta mallia mu stegno-thikan 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 stegnosan *apo tin komotria/ apo ton ilio.
the hair mine dried.ACT.PAST.3P from the hairdresser from the sun
'My hair was dried from the hairdresser/ from the sun'

Thus, (75a) is argued to show that while *stegnothikan*-"were dried" can accept a specific definite in a *by*-phrase, with a strong agentive interpretation, it rejects modification by a causer PP. Based on verbs like *stegnothikan* that exhibit the (anti)causative alternation – Alexiadou and Anagostopoulou (2009), Alexiadou and Doron (2012), Alexiadou et al. (2015) conclude that the Greek passive blocks causer *by*-phrases. Note that this statement

contradicts the previous claims by Alexiadou et al. according to which *by*-phrases are interpreted as causers exhibiting "reduced agentivity". It also contradicts our findings in (16) and (17) where we showed that Greek *by*-phrases can be interpreted as causers.

The facts in (75) are definitely puzzling and merit more discussion in the future. We (tentatively) propose that with verbs that undergo the anticausative alternation, the non-active form of the verb, e.g., *stegnothikan* in (74a) is possibly blocked from licensing a causer PP by the less complex – as morphology suggests – anticausative active variant, that is, *stegnose* in (74b), via means of competition.[13] On the other hand, the non-active form can license agent PPs (cf. 74a), that is, *apo tin komotria*, as there is no competition with the active anticausative variant, which cannot license agent PPs (cf. 74b).

11. Conclusion

In this paper, we have established that the *by*-phrase in Greek passives can bear a variety of theta-roles (see Jaeggli 1986 and Collins 2005 for English), just like the external argument in the actives. 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 hence, does not justify a different account than that of the English passive. In fact, the *by*-phrase of Greek passives can also bind a reflexive, which is a property of arguments. 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 and is in a local domain in which binding of reflexives is possible. This is clearly not the case with adjunct PPs.

Our results have a number of consequences for recent analyses of the Greek and English passive. First, our analysis argues against recent analyses of Bruening (2013), Legate (2014) and Alexiadou et al. (2015) who claim that the *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 or that non-active voice morphology in Greek is the spell-out of a Voice head lacking a specifier (*pace* Embick 1998). Lastly, 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.

In future work, we would like to investigate implicit arguments in the Greek passive, and compare them to the English passive. The Theta-Criterion, which, as discussed must hold, implies that the implicit argument in the passive should be projected syntactically in Greek, just as it is in English. Such a prediction could be tested by looking

[13] In addition to the inflectional suffix *-e*, the non-active *stegno-thik-e* 'dry-NACT-3SG' comprises a distinct morpheme, *thik*, which also 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 must also correlate with a difference in the underlying syntax in which case the morphologically simpler form that anticausatives realize might be preferred as a result of the fact that their underlying syntax might also "simpler"—in the sense that it involves less structure and fewer syntactic operations, smuggling being one of them—than the one involved in the formation of the passive form.

at the distribution of reflexive, secondary predicates, Helke expressions and adjunct control (see Collins 2018c). Whether the prediction holds or not is a topic for further research.

References

Alexiadou, A. (2013). Where is non-active morphology? *Proceedings of the 20th International Conference on Head-Driven Phrase Structure Grammar (HPSG 2013)*, 244–62. Online: http://cslipublications.stanford.edu/HPSG/2013/alexiadou.pdf.

Alexiadou, A. (2019). A form-function mismatch? The case of Greek deponents. In J. Brown, A. Schmidt & M. Wierzba (eds) Of trees and birds: A Festschrift for Gisbert Fanselow.

Alexiadou, A., & Anagnostopoulou, E. (2004). Voice morphology in the causative-inchoative alternation: Evidence for a non-unified structural analysis of unaccusatives. *The unaccusativity puzzle*, 114-136.

Alexiadou, A., & E. Anagnostopoulou. (2009). Agent, causer and instrument PPs in Greek: implications for verbal structure. *MIT working papers in linguistics*, *57*, 1-16.

Alexiadou, A., E. Anagnostopoulou, and F. Schaefer (2015). *External arguments in transitivity alternations: A layering approach*. Oxford Studies in Theoretical Linguistics.

Alexiadou, A. and E. Doron. (2012). The syntactic construction of two non-active Voices: Passive and middle. *Journal of Linguistics* 48(1), 1-34.

Anagnostopoulou, E. and M. Everaert (1999). Toward a more complete typology of anaphoric expressions. *Linguistic Inquiry* 30(1), 97–119.

Angelopoulos, N. (2019a). *Complementizers and Prepositions as probes: Insights from Greek*. UCLA PhD Dissertation.

Angelopoulos, N. (2019b). Reconstructing Clitic Doubling. *Glossa: a journal of general linguistics*, *4*(1).

Angelopoulos, N. & Dominique Sportiche. (to appear). Clitic Dislocations and Clitics in French and Gree: From Interpretation to Structure. In Natural Language and Linguistic Theory.

Baker, M. (1988). *Incorporation*. Chicago: Chicago University Press.

Baker, M. (1997). Thematic roles and syntactic structure. In Elements of grammar, ed. L. Haegeman, 73–137. Dordrecht: Kluwer.

Baker, M., Johnson, K., & Roberts, I. (1989). Passive arguments raised. *Linguistic inquiry*, *20*(2), 219-251.

Bruening, B. (2013). By phrases in passives and nominals. *Syntax* 16(1), 1–41.

Bruening, B. (2014). Precede-and-command revisited. *Language*, 342-388.

Charnavel, I. and D. Sportiche (2016). Anaphor binding: What French inanimate anaphors show. *Linguistic Inquiry* 47(1), 35–87.

Charnavel, I. C. and C. D. Zlogar (2015). English reflexive logophors. *CLS 51: Proceedings of the Fifty-First Annual Meeting of the Chicago Linguistic Society (2015)*, 83–97. Chicago: Chicago Linguistic Society 2016.

Chomsky, N. (1986). *Knowledge of Language*. Praeger, New York.

Chomsky, N. (1981). Lectures on government and binding. *Dordrecht: Foris*.

Chomsky, N. (1995). *The Minimalist Program*. Cambridge, Mass.: MIT Press.

Collins, C. (2005). A smuggling approach to the passive in English. *Syntax* 8(2), 81–120.

Collins, C. (2018a). Is the passive *by*-phrase an adjunct. Ms., NYU.

Collins, C. (2018b). The Theta-Criterion, UTAH and the Projection of External Arguments in the Passive. Ms., NYU.

Collins, C. (2018c). On the Phi-Features of the Implicit Argument in the Passive. Ms., NYU. https://ling.auf.net/lingbuzz/004331

D'Hulst, Yves. (1992). La sintassi del passivo italiano nel quadro della Grammatica Universale. PhD Dissertation, KU Leuven.

Embick, D. (1998). Voice systems and the syntax/morphology interface. *MIT Working Papers in Linguistics* 32.

Embick, D. (2004a). Unaccusative Syntax and Verbal Alternations. In A. Alexiadou, E. Anagnostopoulou, and M. Everaert (eds), *The unaccusativity puzzle: explorations of the syntax–lexicon interface.* Oxford: Oxford University Press, 137–58.

Goodall, Grant. (1997). Theta-Alignment and the *By*-Phrase. In *Chicago Linguistic Society* 33, 129-139.

Goodall, Grant. (1999). Passives and Arbitrary Plural Subjects in Spanish. In Jean-Marc Authier, Barbara E. Bullock and Lisa A. Reed (eds.), *Formal Perspectives on Romance Linguistics*, 135-150. John Benjamins Publishing Company.

Grestenberger, L. (2018). Deponency in finite and nonfinite contexts. *Language*, *94*(3), 487-526.

Hasegawa, N. (1988). Passives, Verb Raising and the Affectedness Condition. In *West Coast Conference on Formal Linguistics* 7, 99-113.
Heim, I. & A. Kratzer. (1998). *Semantics in Generative Grammar*. Blackwell, Oxford.

Iatridou, S. (1988). Clitics, anaphors, and a problem of coindexation. *Linguistic Inquiry* 19(4), 698–703.

Jaeggli, O. A. (1986). Passive. *Linguistic inquiry*, 587-622.

Kaufmann, I. (2001). *Medium: Eine Studie zur Verbsemantik*. Ph. D. thesis, University of Düsseldorf.

Kayne, R. S. *Parameters and universals*. Oxford University Press on Demand.

Kayne, R. S. (2005). Movement and silence. Oxford University Press.

Kratzer, A. (1996). Severing the external argument from its verb. *Phrase structure and the lexicon*, pp.109–137. Springer.

Legate, J. A. (2014). *Voice and v: Lessons from Acehnese*. MIT Press.

Mahajan, Anoop. (1994). ACTIVE Passives. In Raul Aranovich, William Byrne, Susanne Preuss and Martha Senturia (eds.), *The Proceedings of the Thirteenth West Coast Conference on Formal Linguistics*, 286-301.

Manzini, M. R., A. Roussou, and L. M. Savoia (2016). Middle-passive voice in Albanian and Greek. *Journal of Linguistics* 52(1), 111–150.

Merchant, J. (2013). Voice and ellipsis. *Linguistic Inquiry* 44(1), 77–108.

Michelioudakis, D. (2012). *Dative arguments and abstract case in Greek* (Doctoral dissertation, Department of Theoretical and Applied Linguistics, University of Cambridge).

Michelioudakis, D and N. Angelopoulos (2019). Selecting Roots: the view from Compounding. *The Linguistic Review*.

Mpampiniotis, G. (1998). *The dictionary for the modern Greek*. Mpampiniotis, Athens.

Oikonomou, Despina. 2014. In the middle of passive: Middle voice in Modern Greek vs. passive voice in English. Cambridge, MA: MIT, ms.

Pesetsky, D. M. (1996). *Zero syntax: Experiencers and cascades* (No. 27). MIT press.

Philippaki-Warburton, I. (1975). The passive in English and Greek. *Foundations of Language* 13, 563–578.

Pollard, C. and I. A. Sag (1992). Anaphors in English and the scope of binding theory. *Linguistic inquiry* 23(2), 261–303.

Reinhart, T. and E. Reuland (1993). Reflexivity. *Linguistic inquiry* 24(4), 657–720.

Rivero, M.-L. (1990). The location of nonactive voice in Albanian and Modern Greek. *Linguistic Inquiry* 21(1), 135–146.

Roberts, I. (1989). *The representation of implicit and dethematized subjects* (Vol. 10). Walter de Gruyter.

Roberts, I. (2019). *Parameter hierarchies and universal grammar*. Oxford University Press, USA.

Sportiche D., H. Koopman and E. Stabler (2013). *An introduction to syntactic analysis and theory*. John Wiley & Sons.

Terzi, A. (2017). Complex Spatial Expressions. In M. Everaert & H. van Riemsdijk (eds.) *The Companion to Syntax, 2nd Edition*, 1027-1051, Hoboken, N.J.: Wiley-Blackwell.

Vergnaud, J. R. (1974). *French relative clauses*. PhD Dissertation. MIT.

Zombolou, K. (2004). *Verbal alternations in Greek: a semantic approach*. Unpublished Doctoral Dissertation, University of Reading.

Zyman, E. and N. Kalivoda. (2020). XP- and X^0- movement in the Latin verb: Evidence from mirroring and anti-mirroring. *Glossa* 5(1): 20, 1-38.