

Two puzzles with agentive nominalizations¹

Artemis Alexiadou

Humboldt Universität zu Berlin & ZAS

artemis.alexiadou@hu-berlin.de

Abstract

This paper discusses two puzzles with agentive nominalizations. The first one concerns certain restrictions in the formation of agentive nominalizations derived from change of state verbs in Greek. The second one relates to gradience: according to Baker & Vinokurova (2009), cross-linguistically we do not find an agent-denoting construction that has a mixture of verbal and nominal properties, while we do find event-denoting constructions that display such mixed properties. I will focus here on the first puzzle, which I will discuss in the context of what we know about the causative alternation. With respect to the second puzzle, building on the results of the discussion of the first one, I will show that there is indeed some variation and then explore the question why the individual/entity denoting nominalizations seem to behave differently from eventive ones.

Keywords: agentive nominalization, instrumental nominalization, Greek, causative alternation, change of state verbs

1. Introduction

In this contribution, I will discuss two puzzles surrounding the formation of agentive nominalizations. The first puzzle is observed in the derivation of agentive nominalizations from change of state verbs and will constitute the bulk of my discussion. The observation is the following: in Greek several change of state verbs cannot form the counterpart of an English agentive *-er* nominal, i.e., a nominal having the interpretation *the one who Vs*, while they can form an instrumental nominal or a nominal bearing an idiomatic reading. (1) illustrates the readings available with nominalizations of Greek verbs of change of state, while (2) shows that their English counterparts under an agentive reading are attested. As we can see, the forms in (1b-c) are attested in instrumental readings, meaning collar and a device that tears wood apart respectively, a point I will discuss in detail in section 2.3. The verb in (1a) can form a feminine instrumental nominalization:

- (1) a. *skotono* ‘kill’ **skototis* ‘killer’
ok *skotostra* ‘dangerous road, car or engine’

¹Parts of the discussion in this paper were presented at the *JeNom 8 Workshop* organized at the University of Stuttgart on June 21-22, 2019. I am grateful to the participants for their comments. AL 554/8-1 is hereby acknowledged. Many thanks to Dan Bondarenko, Despina Oikonomou and Florian Schäfer for comments. I would like to express my deepest gratitude to Hagit for inspiration and insightful discussions through the years.

- b. *pnigo* ‘drown’ *pnihitis* ‘*person who, drowner’
ok ‘instrument that drowns’
- c. *shizo* ‘tear’ *shistis* ‘* person who tears’
ok ‘tool that tears’ (Zombolou 2004: 125)²

- (2) a. they implied that we knew the **killer's** name and let him roam free
<https://www.english-corpora.org/coca/>, MAG: Vanity Fair
- b. The near **drowner** was an elderly man with a thick fringe of gray beard
<https://www.english-corpora.org/coca/>, FIC: Sadar's Keep
- c. The ticket **tearer** smiles and talks about how he hopes I have a good time
<https://www.english-corpora.org/coca/>, NEWS: Atlanta Journal Constitution

English change of state verbs, as shown in the examples in (3), may also form nominals bearing an instrumental reading only, but see Ryder (1999) for some counterexamples.

- (3) opener, dryer, freezer, heater

In English, as stated in Levin and Rappaport Hovav (1988: 1075), “*-er* nominals derived from verbs of change of state, which have both transitive and unaccusative uses, refer to instruments on their nonevent interpretation and are associated with the transitive and not the unaccusative uses of the related verbs.” In other words, in a non-eventive construal, which typically do not license complements, such nominals never denote the internal argument of the change of state verb only the external one and they are associated with the instrumental interpretation. Keyser & Roeper (1984) suggest that in English change of state verbs can nevertheless form agentive nominals, when they appear with complements, and we will see such examples below.

The important difference thus between English and Greek is that while in Greek change of state verbs may yield instrumental nominalizations, as do their English counterparts, most of them, if not all, cannot be produce agentive ones, a pattern we will discuss in detail in the next section.

According to Levin and Rappaport Hovav (1988) and Rappaport Hovav & Levin (1992: 132) and others following them, *-er* nominals obey the external argument generalization (EAG). Importantly, according to the EAG in (4), *-er* nominals are derived from verbs that have external arguments but see Lieber & Andreou (2018) for the claim that *-er* nominals have a range of readings.

- (4) *-er* nominals correspond to the external argument of the base verb, whatever its thematic role

² Note here that for (1b) we find compound forms like *skilo-pnihitis* ‘dog-drowner’, referring to a ship that is in danger of sinking and *liko-pnihitis* ‘wolf-drowner’, referring to a particular dog breed. Unlike their English counterparts, the Greek nouns do not denote agents, but see Ryder (1999) for similar such English examples.

Thus, an agentive interpretation of the nominalization should always be possible if an agent theta role is available for the source verb. Somewhat differently, Borer (2013) views ER type affixes as bearing originator functions. However, for both views, the puzzle remains: why do the Greek counterparts of English *-er* nominals derived from change of state verbs prefer the instrumental reading and not the agentive one?

The second puzzle relates to the following claim, made in Baker & Vinokurova (2009: 542): “a language might have a true agentive nominalisation, which has no verbal properties beyond (maybe) the taking of an object. Or it might have a construction that is purely verbal other than (maybe) having a determiner and being used in an argument position - especially if the morphosyntactic trappings are similar to what one would expect a subject relative to look like in the language. Or it might have both constructions or neither. But it will not have an agent-denoting construction that has a mixture of verbal and nominal properties, even though it might have event-denoting constructions that display such mixtures.” The question they raise is why agentive nominalizations lack the gradience observed in other nominalization structures, as discussed in e.g., Alexiadou (2001), (2020), Borer (2013) and others.

The paper is structured as follows. In section 2, I first discuss agentive nominalization in Greek in comparison to English and establish the empirical picture of what is to be explained. In section 3, I turn to some previous analyses and then present my proposal. In section 4, I briefly discuss Baker & Vinokurova's puzzle. In section 5, I conclude.

2. Agentive nominals in Greek in comparison to English

In this section, I will first briefly summarize what we know about the formation of *-er* nominals in English and then turn to the affixes that form agentive nominals in Greek. I will look at several verb classes that have been argued to undergo the causative alternation in the language and examine whether they can produce agentive *-er* nominals. The reason for this is that I want to see whether the restriction is a more general pattern to be explained, affecting all verbs that undergo the causative alternation and not simply change of state verbs.

2.1 Two types of -er nominals in English

As is well known, *-er* in English is polysemous, characterized along the [\pm event] dimension, see Rappaport Hovav & Levin (1992): specifically, [+event] *-er* nominals are not necessarily [+agentive], they simply correspond to the external argument of the base verb irrespective of the thematic role that this verb assigns to its external argument (agent, causer, holder, experiencer, instrument, see the EAG in (4)). In the case of [-event] *-er* nominals, again we find both [+agentive] and [+instrumental] nouns; in this case, the nominals denote entities which are *designated* for some specific job or function, but which do not have to have actually been involved in such a job or function (the [-event] property), (5).

- (5) a. lifesaver,
fire-fighter → a person educated for a specific job
teacher
- b. a grinder → a person and machine intended for grinding
things
- c. the destroyer → a person and/or something intended for the
purposes of destroying, warship

The [\pm event] division has been argued by Rappaport Hovav & Levin (1992) to correlate with the availability of complement structure (CS), as follows: i) An *-er* nominal has a complement structure iff it has an eventive interpretation, i.e., it is [+event], but cf. Borer (2013). ii) An instrumental reading is possible only for the nominals derived from verbs for which the expression of an instrumental performing a 'subject' role is available, see also Alexiadou & Schäfer (2010). Importantly for my discussion, the instruments that yield good *-er* nominals are so-called *intermediary instruments*, i.e., they can be understood to perform the action expressed by the verb (to some extent) independently, see (6), from Levin & Rappaport Hovav (1988: 1071-1072). This property that qualifies them as subjects of these verbs (Marantz 1984, Rappaport Hovav & Levin 1992, Kamp & Rossdeutscher 1994, Alexiadou & Schäfer 2006 and references therein). They are labelled *instrument causers* in Kamp & Rossdeutscher (1994), and Alexiadou & Schäfer (2006):

- (6) a. Doug opened the door with the new gadget.
b. The new gadget opened the door.
c. Bill ate the meat with a fork.
d. *The fork ate the meat.
e. opener *eater

Levin & Rappaport Hovav conclude that “instrumental *-er* nominals, refer to those instruments which can appear as subjects, precisely those instruments which there is reason to believe are external arguments.”, Levin & Rappaport Hovav (1988: 1072). However, this does not explain why change of state verbs in Greek yield instrumental nominalizations and not agentive ones if both agent and instrument are possible thematic roles for the subject of the base verb. Note that the additional qualification that it is the presence of an event construal and CS that leads to an agentive interpretation does not hold in Greek, as we will see in the next section. Hence, we cannot appeal to that either.

2.2 Agentive nominals in Greek

There are several agentive affixes in Greek. The first one is *-t-is*_{MASC}, which also has a feminine form *-t-r-(i)a*, whereby *-is* and *-(i)a* are declension class (DC) markers. Normally, if the male agentive nominal is formed, its female counterpart can be formed as well. In (7), we see that the feminine form is more complex than the masculine one; it can thus be argued that the masculine form is the input to the feminine nominalization (Kramer 2015, Alexiadou 2017). Note also that the nominal forms contain a different verbalizer than the verb itself (7a), namely *-i-* in (7b-c). According to Spyropoulos et al.

(2015), this verbalizer surfaces in the perfective stem of second conjugation verbs, to which the Greek verb *sing* belongs. (7b-c) suggest that the nominalization is built out of the perfective stem:

- (7) a. *tragud-a-o*
sing-v-1SG
b. *tragud-i-s-t-ís*
sing-v-PERF-er- DC
c. *tragud-i-s-t-r-ia*
sing-v- PERF-n-n-DC
female singer

Greek has been argued to have two variants of *-t-is*: unstressed /*t-is*/ is attached to monosyllabic verbal stems, while stressed /*-t-ís*/ is attached to polysyllabic ones (Drachman et al. 1995); crucially, whenever there is a verbalizer, e.g. *-is-* in (6b) or (7), the stressed one will be used, as shown in (8b):

- (8) a. [[kléf]_V*tis*]_N MASC ‘thief’
b. [[kaθar-ís]_V*tis*]_N MASC ‘cleaner’

There is a second affix, *-e-as*, which attaches to monosyllabic and prefixed verbs. This form does not have a feminine counterpart, and the default grammatical masculine form is gender neutral. Again here *-as* is DC information; it can also attach to other nouns, (9c), to yield profession nouns, (9d). Other nominalizations simply involve affixes signaling declension class (DC), namely *-os*, as shown in (10a), i.e., they are zero-derived:

- (9) a. *sigraf-o*
write-1SG
b. *sigraf-e-as*
writ-er
c. *skapani*
axe
d. *skapani-e-as*
digger
- (10) a. *dolofon-os*
murderer
b. *dolofon-o*
murder-1SG

As in English, unergative and clearly agentive verbs form *-er* nominals, see e.g. (7), (10) and (11) below:

- | | | | |
|------|-----------------------------|---|--|
| (11) | <i>altis</i> ‘jumper’ | > | <i>alome</i> , archaic ‘jump’ ³ |
| | <i>peripatitis</i> ‘walker’ | > | <i>peripato</i> ‘walk’ |
| | <i>ergatis</i> ‘worker’ | > | <i>ergazome</i> , ‘work’ |
| | <i>horeftis</i> ‘dancer’ | > | <i>horevo</i> ‘dance’ |
| | <i>plindis</i> ‘washer’ | > | <i>pleno</i> ‘wash’ |
| | <i>daskalos</i> ‘teacher’ | > | <i>didasko</i> ‘teach’ |
| | <i>odigos</i> ‘driver’ | > | <i>odigo</i> ‘drive’ |

Koutsoukos & Pavlakou (2009) report that some verbs can only form a feminine agentive nominalization, as shown in (12):

- | | | | |
|------|-----------------|---------------------|---------------------|
| (12) | <i>mirologo</i> | <i>mirologitra</i> | <i>#mirologitis</i> |
| | ‘lament’ | ‘woman who laments’ | ‘man who laments’ |

However, several of the verbs they cite do give masculine *-er* nominals, see (13), albeit they are archaic or not often used; in fact, I was able to find a masculine form for (12) as well for the man who laments.

- | | | | |
|------|------------------------|--------------------------------------|------------------------|
| (13) | <i>pleko</i> ‘knit’ | <i>plektria</i> ‘woman who knits’ | <i>plektis</i> |
| | <i>gazono</i> ‘stitch’ | <i>gazotria</i> ‘woman who stitches’ | <i>gazotis</i> |
| | <i>klotho</i> ‘twine’ | <i>klostria</i> ‘woman who twines’ | archaic <i>klostis</i> |

The authors took this as evidence suggesting that the feminine forms are directly derived from the verb. They support this conclusion by pairs such as the ones in (14), where masculine and feminine forms have distinct semantics.

- | | | | |
|------|--------------------|-----------------------------------|-----------------------------------|
| (14) | a. <i>enishio</i> | <i>enishitis</i> _{masc} | <i>enishitria</i> _{fem} |
| | ‘boost’ | ‘amplifier’ | ‘woman who strengthens/amplifier’ |
| | b. <i>thermeno</i> | <i>thermastis</i> _{masc} | <i>thermastra</i> _{fem} |
| | ‘heat’ | ‘boilerman’ | ‘heater’ |

In (14b) we do not have a compositional agentive nominalization, as *thermastis* is a profession noun, denoting the individual responsible for a boiler in a train or a ship, and for (14a) an instrument reading is possible for the feminine nominalization as well.

While in English *-er* is ambiguous between agentive and instrumental readings, Greek has several dedicated instrumental affixes, e.g., masculine *-tir-as*_{DC}, and neuter *-tir-i*_{DC}, see (15). Interestingly, the instrumental affix seems to be more complex than the agentive one. The feminine affix *-tra/-tria*, however, is ambiguous between agentive and instrumental readings, see (12)-(14).

³ Note that the Modern Greek verb *pidao* ‘jump’ forms an *-er* nominal, but as a diminutive; interestingly the diminutive, which I take to be a denominal formation, is built on the basis of the non-active form of the verb. This would suggest, contra to Baker & Vinokurova (2009), that the nominal affix is not a Voice head. The nominal form in (i) does not seem to take complements. Thanks to Despina Oikonomou for pointing this out to me. There is also a more archaic nominal form, namely *piditis* ‘jumper’:

- | | |
|-----|-----------------------|
| (i) | pid-i-ht-ul-is |
| | jump-v-NACT-DIM-DC |
| | ‘one who jumps a lot’ |

- | | | |
|------|---------------------------|------------------------------------|
| (15) | <i>anig-o</i>
open-1SG | <i>anih-tir-i</i>
opener-n-NEUT |
|------|---------------------------|------------------------------------|

Finally, unlike in English, as noted in Kakouriotis (1993), *-tis* nominals may never refer to the affected object of a transitive verb, e.g., *best seller*, *sleeper*. They only refer to external arguments.

2.3 *-Tis* nominals and the causative alternation

As has been discussed in the literature, intransitive variants of verbs undergoing the causative alternation in Greek appear either bearing active or non-active morphology, as shown in (16). -Active (NAct) morphology appears also on passives and reflexives and middles (Tsimpli 1989, 2006, Embick 1998, Alexiadou & Anagnostopoulou 2004, Zombolou 2004, Alexiadou, Anagnostopoulou & Schäfer 2006, 2015 among others).

- | | | | |
|------|----|----------------------------------|-----------------|
| (16) | a. | o Janis ekapse ti supa. | (causative) |
| | | the John-NOM burnt the soup-ACC | |
| | | ‘John burnt the soup.’ | |
| | b. | i supa kegete | (anticausative) |
| | | the soup-NOM burns-NAct-3SG | |
| | | ‘The soup is burning.’ | |
| | c. | O Janis adiase ti sakula. | (causative) |
| | | the John-NOM emptied the bag-ACC | |
| | | ‘John emptied the bag.’ | |
| | d. | I sakula adiase. | (anticausative) |
| | | the bag-NOM emptied | |
| | | ‘The bag emptied.’ | |

We saw in the examples in (1) that certain verbs of change of state do not form agentive nominalizations. In Table 1 I present a list of Greek verbs undergoing the causative alternation, from Alexiadou, Anagnostopoulou & Schäfer (2015: 88). The classification into three classes refers to whether or not they form intransitive variants with NAct or active morphology. Class A has intransitive variants with NAct, class B has intransitive variants with active morphology, and class C has both NAct and active intransitive variants:

Table 1. Greek change of state verbs undergoing the causative alternation

class A	class B	class C
kommatiazo (tear)	asprizo (whiten)	zarono (wrinkle)
miono (decrease)	kokinizo (redden)	tsalakono (crumple)
eksafanizo (diminish)	mavrizo (blacken)	zesteno (heat)
veltiono (improve)	katharizo (clean)	skizo (tear)
dhiplasiazo (double)	stroggilevo (round)	erimono (desert)
singentrono (collect/gather)	klino (close)	madao (pluck)
dhiadhidho (spread a rumor)	anigo (open)	lerono (dirty)
dhialio (dissolve)		

vithizo (sink)		
kovo (cut)	plateno (widen)	
skotono (kill)	spao (break)	gremizo (demolish/collapse)
keo (burn)		

Certain verbs in this list, namely *dhiplasiazo*, *dhiadhidho*, *dhialio*, *kovo*, *spao*, *skizo*, and *katharizo* can form a *-tis* nominal, as shown in (17), but with an instrumental reading only. *katharizo* ‘clean’ is the only one that yields an agentive nominalization. *dhiadhidho* forms a *-tis* nominal with an instrumental interpretation as well as an idiomatic one via a different affix (*dhiadosias* ‘spreader of false rumors’). *Spao* forms an idiomatic *-tis* noun, and I will come back to this point, see also (1) and footnote 2.⁴

(17)	<i>dhialio</i> ‘dissolve’	<i>dhialitis</i> ‘substance used to dissolve’
	<i>dhiplasiazo</i> ‘double’	<i>dhiplasiastis</i> ‘device that duplicates voltage’
	<i>skizo</i> ‘tear’	<i>skistis</i> ‘tearer of wood’, instrument
	<i>kovo</i> ‘cut’	<i>koftis</i> ‘the cutting instrument’
	<i>katharizo</i> ‘clean’	<i>katharistis</i> ‘cleaner’
	<i>spao</i> ‘break’	<i>spastis</i> ‘instrument for breaking/annoying person’
	<i>dhiadhidho</i>	<i>dhiadhotis</i> ‘device, propagator’

While certain verbs are not able to form either an agentive or an instrumental nominal, e.g., *asprizo* or *widen*, other verbs form an instrumental nominal and not an agentive one; most of them bear the special Greek instrumental affix *-tir/tr-*. As shown in (18), *kill* only forms a feminine instrumental nominalization. As we also see, *spao* forms an instrumental nominal as well:

(18)	<i>skonotono</i> ‘kill’	<i>skotostra</i> ‘dangerous road, car or engine’
	<i>vrazo</i> ‘boil’	<i>vrastiras</i> ‘kettle’
	<i>katastrefo</i> ‘destroy’	<i>katastrofeas</i> ‘destroyer’, instrument
	<i>stegnono</i> ‘dry’	<i>stegnotiras</i> ‘drier’, instrument
	<i>kseskonizo</i> ‘dust’	<i>kseskonistiri</i> ‘the duster’
	<i>keo</i> ‘burn’	<i>kafstiras</i> ‘device that burns’
	<i>anigo</i> ‘open’	<i>anihtiri</i> ‘device that opens’
	<i>spao</i> ‘break’	<i>spastiras</i> ‘instrument for breaking’

We saw that *killer* is an agentive nominalization in English, but an instrumental nominalization in Greek. Unlike, e.g., *open* that undergoes the causative alternation in English, *kill* does not. However, the Greek counterpart of *kill* undergoes the causative alternation, as detailed in Alexiadou, Anagnostopoulou & Schäfer (2015). Thus, the behavior of Greek the pattern can be summarized as follows: verbs that undergo the causative alternation in Greek cannot form an agentive nominal, while they may form an instrumental one.

⁴ As noted in Kakouriotis (1993), *spastis* may appear within compounds, e.g., *apergo-spastis* ‘strike-breaker’ and *rizo-spastis* ‘root-breaker = reformer’. Both nouns bear an idiomatic reading, thus they cannot really be accounted for by the observation in Embick & Marantz (2008) about the obligatory transitivity of certain verb classes in English *-er* formation.

What I will show now is that this behavior is not restricted to change of state verbs but applies to other verb classes that have been argued to undergo the causative alternation as well. For instance, Anagnostopoulou (2018) observed that instrumental verbs undergo the causative alternation. Specifically, Anagnostopoulou discussed two classes of instrumental verbs, so-called *wipe* verbs and *tape* verbs, illustrated in (19) and (20), using the list provided in Alexiadou & Anagnostopoulou (2013) and Anagnostopoulou (2018). I note that in (20) the profession nominal *klidas* bears the *-as* affix, which is typical for derived nominals out of nouns and thus may not be verb derived:

(19) wipe verbs: instrumental verbs		
<i>Root-verbalizer-1sg</i>	<i>Root-nominal inflection</i>	<i>-er nominal</i>
<i>psalid-iz-o</i>	<i>psalid-i</i>	<i>psalidistis</i>
‘trim’	‘scissors’	(instrument)
<i>ravd-iz-o</i>	<i>ravd-i</i>	<i>ravdistis</i>
‘flog’	‘stick’	(idiomatic, policeman)
<i>sfug-iz-o</i>	<i>sfug-ar-i</i>	<i>sfugaristra</i>
‘sponge/wipe’	‘sponge’	(fem.instrument, mop)
<i>sider-on-o</i>	<i>sider-o</i>	<i>siderostra</i>
‘iron’	‘iron’	(fem.instrument, ironing board)
(20) tape verbs: instrumental verbs		
<i>Root-verbalizer-1sg</i>	<i>Root-nominal inflection</i>	<i>-er nominal</i>
<i>klid-on-o</i>	<i>klidi</i>	<i>klidas</i>
‘lock’	‘key’	‘one who makes keys’
<i>sfrag-iz-o</i>	<i>sfragida</i>	<i>sfragistiras</i>
‘seal’	‘seal’	(instrument, sealant)

As we see in (21), these verbs undergo the causative alternation and thus their behavior aligns with other change of state verbs undergoing the causative alternation- they only allow instrumental *er-* nominals:

- (21) a. *O Janis klidose tin porta.*
‘John locked the door.’
- b. *O Janis sfragise tin isodo.*
‘John sealed the entrance.’
- c. *I porta klidose.*
‘The door locked.’
- d. *I isodos sfragise .*
‘The entrance sealed.’

Object experience verbs have also been argued to undergo the causative alternation, (22), (Alexiadou & Iordăchioaia 2014), and these verbs do not form an agentive *-tis* nominal, as noted in Kakouriotis (1993). Arguably, this is expected assuming that object experience verbs in Greek lack external arguments (Alexiadou & Anagnostopoulou 2019,

and see also Kakouriotis 1993), even when they have agentive subjects. Note here that in English these verbs can form an *-er* nominal, (23), (where these verbs do not alternate, as argued by Alexiadou & Iordăchioaia 2014). In addition, the nominals may also denote the experiencer argument, (23a) and (23c), derived from the subject experiencer construal, cf. <https://www.english-corpora.org/coca/>:⁵

- (22) a. *o Janis thimose ti Maria.*
 ‘John angered Mary.’
 b. *i Maria thimose.*
 ‘Mary got angry.’
 c. **thimotis*
 ‘angerer’
- (23) a. Denny always looked like that. He was a worrier.⁶
 b. but on balance, say therapists, there is the Annoyer and the Annoyed.
 c. and this one boy -- he was always a puzzler, he thought about things.

Finally, note that, as discussed in Oikonomou (2012), we find idiomatic interpretations of certain change of state predicates such as *break*, (24). Under this idiomatic reading, they can also form a *-tis* nominal, (25):

- (24) a. *spazo* ‘break’ → ‘get angry’
 b. *tu Jani tu ti espase o Nikos.*
 the John-GEN cl-GEN cl-ACC.FEM broke-3SG the Nikos-NOM
 ‘Nikos annoyed John.’
- (25) *O Nikos ine megalos spastis.*
 ‘Nikos is so annoying.’

(25) is particularly interesting as it suggests that the issue is not morpho-phonological, and see also footnote 4; that is, it is not the case that some verbs cannot form a *-tis* nominal because of a morpho-phonological constraint, it is more about the domain that determines the interpretation of *-tis* formation.

⁵ Note that subject experiencer verbs may form *-tis* nominals (i) and also a derived adjective to refer to the person who possesses the emotional state via the affix (*i-*)*aris/ara.*, (ii). The forms in (ii) are adjectival, as they can modify an overt noun, unlike *-tis* nominalizations. (from Thanks to Despina Oikonomou for mentioning this:

- (i) *thavmazo thavmastis*
 I admire admirer
 (ii) *fovame fovitsiaris (anthropos)*
 I fear fearer man
sihenome sihasiaris (anthropos)
 I detest detester man

⁶ I actually found just one hit online including the formation *anisihiaris* as a translation of *worrier* on its subject experiencer interpretation. See footnote 5.

We can summarize the empirical picture as follows: a) if a verb undergoes the causative alternation in Greek, it does not form an agentive nominalization. b) in English, there seems to be no such restriction. Perhaps *dry* is the only verb that undergoes the causative alternation and only yields an instrumental nominal in English. This can be understood, as a drying event can only be performed by an agent using a particular instrument/device or by a natural cause. Other verbs such as *drown* and *tear* yield agentive nominalizations, as do *open* and *break*. *Break* yields an agentive nominalization predominantly in the presence of a complement, e.g., *heart-breaker*. *Breaker* can also have the idiomatic reading of a ‘wave breaking into foam’. c) Verbs such as *destroy*, and *kill* undergo the causative alternation in Greek, but not in English, and behave as other changes of state verbs in that they do not form agentive nominals.

German seems to pattern as English, see (26), where verbs like *break* and *open* can form instrumental nominalizations. An agentive interpretation is possible if they appear together with an internal argument, e.g., in compounds.⁷ This is reminiscent of the discussion of *password-stealer* and *heart-breaker* in Embick & Marantz (2008: 15), according to which, transitive verbs of specific verb classes require the presence of an object in their agentive nominal form, see also footnote 4.

- (26) a. *Brecher*
 ‘wave’
 b. *Knochenbrecher*
 ‘bones breaker’
 c. *Öffner*
 ‘opener’
 d. *Türöffner*
 ‘door opener’

Notice that for Greek, we cannot appeal to a similar explanation, as the agentive nominalization is simply not possible. In other words, the presence of an internal argument does not give rise to an agentive interpretation. This is certainly clear in the case of nominalizations in (18), where the only available reading is that of an instrumental nominal, but also applies to the forms in (17), irrespectively of whether or not the complement appears next to the noun either in the genitive e.g., *kofitis kalodion* ‘cutter of cables’, or as the non-head member of a compound, e.g., *nihokoptis* ‘nailcutter’. The puzzle then is: if change of state verbs in Greek allow all three types of external arguments, i.e., agents, causers and instruments, as shown in (26), why are agentive nominalizations out with these verbs, while instrumental ones are allowed?

- (27) *O ilios/ i komotria/ to pistoloki stegnose ta malia mu.*
 the sun/ the hairdresser/ the hair.dryer dried-3SG the hair mine
 ‘The sun/the hairdresser/the hair dryer dried my hair.’

⁷ Many thanks to Florian Schäfer for pointing this out to me.

3. Towards an analysis

3.1 The causative alternation

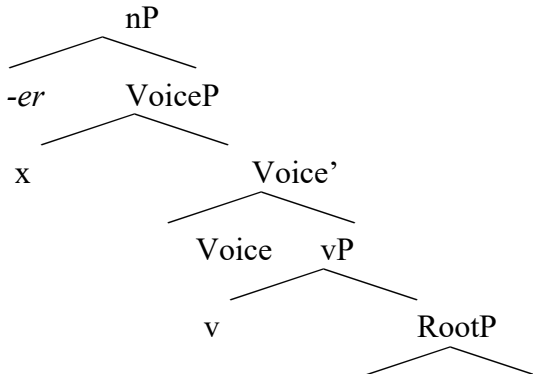
Alexiadou, Anagnostopoulou & Schäfer (2015) proposed that the causative alternation is actually a Voice alternation in the sense that VoiceP introduces the external argument, Kratzer (1996), (28a). Anticausatives either lack Voice, (28c), in which case they appear with unmarked active morphology, or involve a Voice that bears a [-D] feature, (28b), following Schäfer (2008a). In this case, Voice will be spelled-out as NAct, as in (28d), building on Embick (1998):

- (28) a. [VoiceP [+D] Act [vP [ResultP √burn]]]
 b. [VoiceP [-D] NAct [vP [ResultP √burn]]]
 b. [vP [ResultP √open]]
 d. Voice → NAct/_ (no specifier)

As we saw in section 2, it does not really matter what type of morphology we find on the intransitive variant of a verb undergoing the causative alternation in Greek, the formation of an agentive nominal is out, while the instrumental one is in.

3.2 What we know about the structure of agentive and instrumental nominals

This empirical picture is rather problematic for syntactic treatments of agentive nominals. For instance, Alexiadou & Schäfer (2010) argued that the structure involved in the formation of [+event] *-er* nominals is as in (29):

- (29) a. [-er [VoiceP[vP [RootP]]]]
 b. 

```

graph TD
    nP[nP] --- er[-er]
    nP --- VoiceP[VoiceP]
    VoiceP --- x[x]
    VoiceP --- Voice_prime[Voice']
    Voice_prime --- Voice[Voice]
    Voice_prime --- vP[vP]
    vP --- v[v]
    vP --- RootP[RootP]
  
```

For Alexiadou & Schäfer, all external argument *-ers* (agents, holders, experiencers, instruments) involve (29). We assumed that the different theta roles related with the external argument are due to 'flavors' of Voice. This analysis is built upon the *Voice Hypothesis* (Kratzer 1996), according to which the external argument is not introduced by the verb itself, but by a semi-functional Voice-projection on top of vP. This means that all transitive and unergative verbs should yield fine *-er* nominalizations that contain external arguments.

The n-layer is clearly the nominalizer. The main function of this head is to introduce the R-argument and in this particular case is spelt out as *-er* and its counterparts

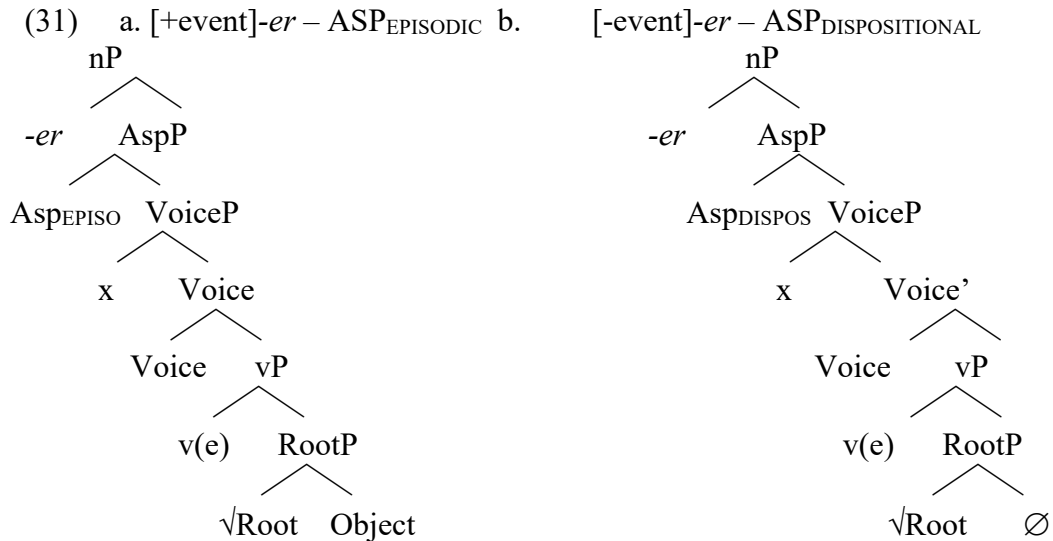
across languages All functional projections above n are nominal. In Greek, as mentioned above, n hosts in addition gender and declension class features, see Alexiadou (2017).

Alexiadou & Schäfer (2010) view the role of R as follows: R has been argued by Williams (1981) to be responsible for the referential reading of the noun. Grimshaw (1990) states that R is identified with an argument of the base verb. Which argument is identified with R is a function of the affix that is added, so the affix must specify which argument it binds. For instance, the affix *-ee* binds a patient argument, while the *-er* binds the external argument, as shown in (30):

- (30) a. detain (y (x)) detainee (R = x) such that y detains x
 b. teach (x (y)) teacher (R = x) such that x teaches y

Since all *-er* nouns are referential, we claimed that R is introduced in n, irrespectively of the [\pm event] classification.

As mentioned above, the individual denoted by the *-er* nominal is, in its productive use, the one that is the external argument of the event entailed by it (see van Hout & Roeper 1998). Alexiadou & Schäfer proposed therefore that in these kinds of *-er* nominals the referential argument <R> binds a variable <x> located in Spec,Voice; this derives the ‘external argument generalization’ and ensures the correct theta role for the *-er* nominal. As shown in (31a) and (31b), the instrumental nominalization does not radically differ from the agentive one; the only difference is that [+event] nominals contain an episodic aspectual projection, while [-event] contain a dispositional aspectual projection:



It is not clear how the analysis proposed by Alexiadou & Schäfer can be altered to capture the restrictions identified with change of state verbs. Importantly, if change of state verbs in Greek, as in English, allow all three types of external arguments, e.g., agents, causers and instruments why are agentive nominalizations out with these verbs? One could argue that (31a) is filtered out by encyclopedic knowledge in the case of change of state verbs, but then why would it be consistently excluded?

Baker & Vinokurova (2009) analyze *-er* as the counterpart of Voice and propose that it combines with VPs. These authors do not discuss instrumental nominalizations. Thus, it is not clear how they would deal with the puzzle Greek change of state verbs present.

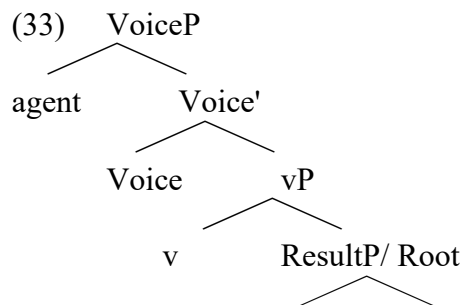
Roy & Soare (2014) propose that instrumental nominalizations are actually root nominalizations. However, in view of the fact that several of our instrumental nominals, at least in Greek, contain verbalizing morphology, located in *v*, the analysis proposed by Roy & Soare cannot be maintained. Their analysis of agentive nominalizations is similar to that in Alexiadou & Schäfer (2010), thus it is also not quite clear why agentive nominalizations are out.

- (32) *stegn-on-o* *stegn-o-tir-as*
 dry-v-1SG dry-v- instrument.IC

Note here that Borer's analysis of *-ER* as bearing an originator interpretation could not work either, as it is unclear why the originator cannot be interpreted as an agent. According to Borer, *-er* is a functor, yielding an originator interpretation, which can be viewed as an underspecified role subsuming agents and instruments. Arguably, however, in Borer's system as well, it could be suggested that it is encyclopedic knowledge that leads to the preference of the instrument interpretation.

3.3 A proposal

In order to deal with the puzzle discussed in section 2, we need to crucially distinguish between two layers in the projection of external arguments. Recall that for Levin & Rappaport Hovav (1988) and Rappaport Hovav & Levin (1992) the type of verbs that allow an instrumental subject are those that allow a special type of instruments, the ones we labelled *instrument causers*. I assume that Agents are introduced in Voice, while causers are introduced at the *vP* level in a verbal decomposition as in (33).



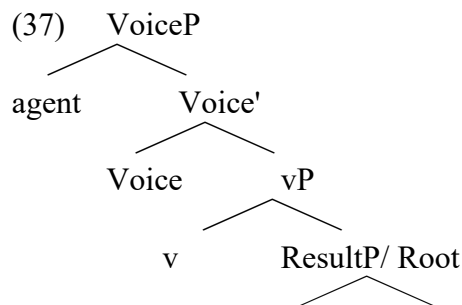
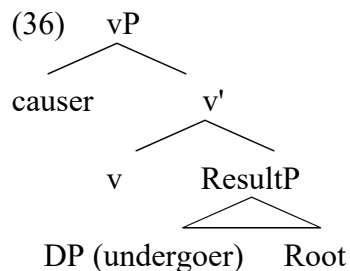
In a nutshell the proposal is the following: change of state verbs do not form agentive *-er* nominalizations as *-er/-tis* nominalization targets the *vP* layer. This particular restriction explains why several *-er* nominalizations are idiomatic in Greek. Idioms cannot include the syntactic projection that hosts external arguments/agents; beyond with this level, only compositional interpretation is available. The reason for this could be phrased in terms of the role Voice has in determining idiomatic interpretations, see (34)-(35), and

Anagnostopoulou & Samioti (2013) for further discussion on idiomatic domains in Greek participial constructions. Greek *-er* nominalizations are a further illustration of this effect.

- (34) “The syntactic head that projects agents defines a locality domain for special meanings. Nothing above this head may serve as the context for the special meaning of any root below this head, and vice versa”
(Marantz 1997:208)
- (35) Idiomatic interpretation is not available above the projection that hosts prototypical external arguments (Agents) – namely, VoiceP.

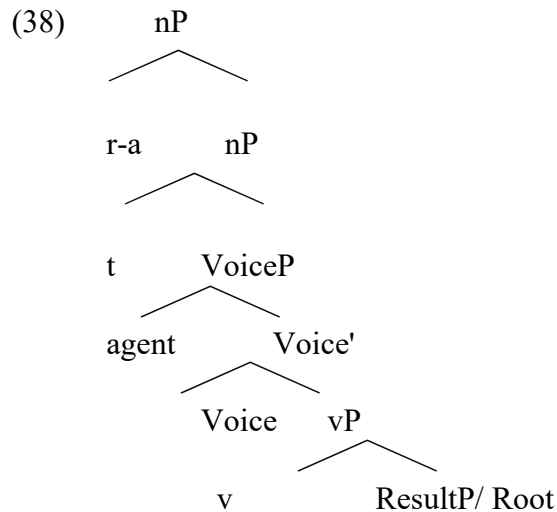
Note that the change of state nominalization facts could also be accounted for under Borer's (2013) treatment of non-compositional meaning. According to Borer (2013), the presence of non-compositional meaning is related to the absence of segments of extended projection within nominals. Such segments license event interpretation and arguments. Basically, *v* does not 'count' as a head creating such an internal complex structure, and thus idiomatic readings are allowed.

Specifically, I assume that there are two ways to introduce external arguments with change of state verbs: Alexiadou (2014, 2018), Alexiadou, Anagnostopoulou & Schäfer (2015), Alexiadou & Anagnostopoulou (2019). Following specifically Alexiadou (2018) and Alexiadou & Anagnostopoulou (2019), when the subject is a causer, the structure is as in (36), i.e. a Voice layer is missing. On the other hand, agentive verbs project an additional Voice layer, as in (37):

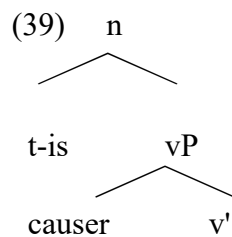


Clearly agentive verbs, i.e. verbs that do not allow any other type of external arguments yield agentive nominalizations, since (37) is the input structure to nominalization. Typically, such formations should have both a masculine and a feminine form, if they refer to individuals. We could argue that the feminine affix *-t-r-* involves is a special affix realizing n [+feminine] on top of the masculine bearing n, i.e. the feminine

nominalization is derived from the masculine one. In other words, there is a further layer of n, as illustrated in (38), and see Kramer (2015) for a discussion of similar derivations.



By contrast, Greek change-of-state verbs involve nominalization of a vP layer, yielding the instrumental or idiomatic interpretation, (39). (39) is also possible for idiomatic nominalizations in English and German as well, but not for instrumental nominals, which must have as their input the structure in (37). In a structure like (39), the affix is sensitive to the properties of v's complement. Moreover, this suggests that change of state verbs, never actually include an external argument introduced in Voice. Again feminine nominalizations would involve a further n layer. The structure in (39) is reminiscent of the one proposed in Schäfer (2008b) for eventive -er nominals in German out of semelfactive verbs, e.g., *Klopfer* 'knock', the difference being that in German the -er affix binds the event variable in v, and there is no individual variable to be bound in the structure:



What explains then the difference between English/German and Greek nominals? I argue that this relates to another difference between these languages, namely the fact that anticausatives in Greek, but not in English (and German), license *instrument causers*, as observed in Alexiadou, Anagnostopoulou & Schäfer (2015: 34), see (40) and cf. Kakouriotis (1994). (40) suggests that instrument causers in Greek anticausatives are licensed at the vP level, since they may modify as PPs the intransitive event, and thus may combine with special instrumental affixes or -t-is, which in turn may never receive a

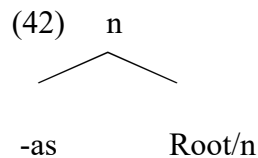
theme interpretation. *-tis* and *-tir-* would be realizations of *n*, although a decomposing *-tir-* to *-t-* and *-ir-* is also possible:

- (40) a. Ta malia mu stegnosan me to pistolaki.
 the hair my dried with the hair.dryer
 ‘*My hair dried with the hair dryer.’
 b. To pani skistike me to psalidi.
 the cloth tore-NACT with the scissors
 ‘*The clothes tore with the scissors.’

Further support for the fact that only clearly agentive verbs can form agent denoting nominals in Greek comes from Grestenberger (2018), who shows that several deponents which are classified as agentive form agentive *-tis* nouns:

- (41) *hiris-tis* ‘user, manipulator’ (*hirizome* ‘use, manipulate’)
ekmetalef-tis ‘exploiter’ (*ekmetalevome* ‘exploit’)

I take it that examples such *skapane-as* ‘digger’/‘pioneer’ are root or *n* derived, i.e., there is no verbal source involved, see (42). In this case, the individual denotation is introduced in *n*:



There are some further issues to be addressed. First, as pointed out by Zombolou (2004), the verbs that form agentive nominalizations, do not form instrumental nominalizations, (43). This is explained, as these verbs cannot involve an instrument as their subject, i.e., they are not causative verbs.

- | | | | |
|------|-------------------------------------|---|--------------------------------------|
| (43) | <i>ekfono</i>
‘deliver a speech’ | <i>ekfonitis</i>
‘the person who Vs’ | * <i>ekfonitiras</i>
instrument |
| | <i>metafrazo</i>
‘translate’ | <i>metafrastis</i>
‘person who Vs’ | * <i>metafarstiras</i>
instrument |
| | <i>ekdido</i>
‘publish’ | <i>ekdotis</i>
‘person who Vs’ | * <i>ekdotiras</i>
instrument |

However, there are some that do, as shown in (44):

- | | | | |
|------|-------------------------|-------------------------------|--|
| (44) | <i>peripato</i>
walk | <i>peripati-tis</i>
walker | <i>peripati-tir-as</i>
walker, instrument |
|------|-------------------------|-------------------------------|--|

(44) involves an archaic verb, which has a Modern Greek variant that does not actually produce an agentive nominalization, only an instrumental one, see (45). This verb is a

Note that under Borer's analysis of *-er*, agentive nominals lack a verbal structure to begin with, and thus the question of why we do not find mixed properties does not lead to tension. Ultimately, however, a special role is attributed to the nominalizer which restricts the structural possibilities available: either because of, as argued in Baker & Vinokurova (2009), *-er* realizes a Voice head, or because the referential argument must bind a variable in its local domain. In other words, while event denoting nominalizations can denote different types of events, individual nominalizations seem to be less flexible. The behavior is not shared by other affixes, which can apply at different layers of structure.

5. Conclusion

In this paper, I discussed two puzzles with agentive nominalizations. The first one, which was the main focus of the paper, was that change of state verbs in Greek do not form such nominalizations. The second puzzle related to Baker & Vinokurova's (2009) observation that cross-linguistically we do not find agent-denoting construction that has a mixture of verbal and nominal properties, while we do find event-denoting constructions that display such mixtures. I argued that the first puzzle relates to the fact that Greek change of state verbs, unlike their English counterparts, license instrument causers, thus the nominalization applies to the vP layer and in the language agentive nominalizations are only licit out of verbs that include a Voice layer, cf. Kakouriotis (1993). With respect to the second puzzle, the formation of the Greek counterparts of *-er* nominals suggests that there is in fact some flexibility, i.e., a nominalization may contain a structure smaller than Voice, but the semantics of the affixes denoting originators/individuals seem to restrict the process.

References

- Alexiadou, Artemis. 2001. *Functional structure in nominals: nominalization and ergativity*. Amsterdam: John Benjamins.
- Alexiadou, Artemis. 2017. Gender and nominal ellipsis. In LaCara, Nicholas, Moulton, Keir, Tessier, Anne-Michelle (eds.), *A Schrift to Fest Kyle Johnson, Linguistics Open Access Publications*.
- Alexiadou, Artemis. 2014. The problem with internally caused change-of-state verbs. *Linguistics* 52: 879-910.
- Alexiadou, Artemis. 2018. Able adjectives and the syntax of psych verbs. *Glossa: a journal of general linguistics* 3, <https://www.glossa-journal.org/article/id/5042/>
- Alexiadou, Artemis. 2020. D vs n nominalizations within and across languages. In Alexiadou, Artemis, Borer Hagit (eds.), *Nominalizations: 50 years on from Chomsky's remarks*, 87-110. Oxford: Oxford University Press.
- Alexiadou, Artemis, Anagnostopoulou, Elena. 2004. Voice morphology in the causative-inchoative Alternation: evidence for a non-unified structural analysis of unaccusatives. In Alexiadou, Artemis, Anagnostopoulou, Elena, Everaert, Martin (eds.) *The Unaccusativity puzzle: explorations of the syntax-lexicon interface*, 114-136. Oxford: Oxford University Press.
- Alexiadou, Artemis, Anagnostopoulou, Elena. 2013. Manner vs. result complementarity in verbal alternations: a view from the clear alternation. *Proceedings of NELS* 42. 39-52.

- Alexiadou, Artemis, Anagnostopoulou, Elena. 2019. Novel object experiencer predicates and clitic-doubling. *Syntax* 22: 116-145.
- Alexiadou, Artemis, Anagnostopoulou, Elena, Schäfer, Florian. 2015. *External arguments in transitivity alternations: a layering approach*. Oxford: Oxford University Press.
- Alexiadou, Artemis, Iordăchioaia, Gianina. 2014. The psych causative alternation. *Lingua* 148: 53-79.
- Alexiadou, Artemis, Iordăchioaia, Gianina, Schäfer, Florian. 2011. Scaling the variation in Romance and Germanic nominalizations. In Sleeman, Petra, Peridon, Harry (eds.), *The noun phrase in Romance and Germanic*, 25-40. Amsterdam: John Benjamins.
- Alexiadou, Artemis, Schäfer, Florian. 2006. Instrumental -er nominals revisited. Online *proceedings of WCCFL 27* Poster Session. UCLA.
- Alexiadou, Artemis, Schäfer, Florian. 2010. On the syntax of episodic vs. dispositional -er nominals. In Alexiadou, Artemis, Rathert, Monika (eds.), *The syntax of nominalizations across languages and frameworks*, 9-38. Berlin: Mouton de Gruyter.
- Anagnostopoulou, Elena. 2018. Adjectival participles as a tool to study manner and result component in verbs. Paper presented at the Endpoints, scales, and results in the decomposition of verbal predicates. January 30, 2018, Berlin.
- Anagnostopoulou, Elena, Samioti, Yota. 2013. Allosemy, idioms, and their domains: evidence from adjectival participles. In Folli, Rafaella, Sevdalali, Christina, Truswell, Robert (eds.), *Syntax and its limits*, 218-250. Oxford: Oxford University Press.
- Baker, Mark, Vinokurova, Nadezhda. 2009. On agentive nominalizations and how they differ from event nominalizations. *Language* 85: 517–556.
- Borer, Hagit. 2013. *Taking form*. Oxford: Oxford University Press.
- Borsley, Rob, Kornfilt, Jaklin. 2000. Mixed extended projection. In Borsley, Robert (ed.), *The nature and function of syntactic categories*, 101–131. San Diego: Academic Press.
- Chomsky, Noam. 1970. Remarks on Nominalization. In Jacobs, Roderick, Rosenbaum, Peter (eds.), *Readings in English transformational grammar*, 184–221. Waltham, MA: Ginn.
- Drachman, Gaberell, Kager, Rene, Malikouti-Drachman, Alik. 1995. Greek Allomorphy: an Optimality Account. In Dimitrova-Vulchanova, Mila, Hellan Lars, (eds.), *Papers from the First Conference on Formal Approaches to South Slavic Languages*, 345-361.
- Embick, David. 1998. Voice systems and the syntax/morphology interface. *Papers from the UPenn/MIT roundtable on argument structure and aspect* 32: 41–72.
- Embick, David, Marantz, Alec. 2008. *Architecture and blocking*. *Linguistic Inquiry* 39: 1-53.
- Grestenberger, Laura. 2018. Deponency in non-finite contexts. *Language* 94: 487-526.
- Grimshaw, Jane. 1990. *Argument structure*. Cambridge, MA: MIT Press.
- Iordăchioaia, Gianina. 2020. D and N are different nominalizers. *Glossa: A Journal of General Linguistics* 5.
- Kakouriotis, Athanasios. 1993. On the so-called agentive nominals in English and their counterparts in Modern Greek. *Proceedings of the 7th International Symposium of the English and Greek Language*, 198-213. Thessaloniki.

- Kakouriotis, Athanasios. 1994. Theta-roles and middle constructions. *Proceedings of the 8th International Symposium of the English and Greek Language* 279-304.
- Kamp, Hans, Rossdeutscher, Antje. 1994. Remarks on lexical structure and DRS construction. *Theoretical Linguistics* 20: 97-164.
- Keyser, Samuel Jay, Roeper, Tom. 1984. On the middle and ergative constructions in English. *Linguistic Inquiry* 15: 381-416.
- Kiparsky, Paul. 2017. Nominal verbs and transitive nouns: vindicating lexicalism. <https://web.stanford.edu/~kiparsky/Papers/agentnouns.cleaned.pdf>
- Kornfilt, Jaklin, Whitman, John. 2011. Introduction: nominalizations in syntactic theory. *Lingua* 121: 1160–1163.
- Koutsoukos, Nikos, Pavlaku, Maria. 2009. A construction morphology account of agent nouns in Modern Greek. *Patras Working Papers in Linguistics*, <https://doi.org/10.26220/pwpl.v1i0.19>
- Kramer, Ruth. 2015. *The morphosyntax of gender*. Oxford: Oxford University Press.
- Kratzer, Angelika. 1996. Severing the external argument from its verb. In Rooryck, Johan, Zaring, Laurie (eds.), *Phrase structure and the lexicon*, 109-137. Dordrecht, Kluwer.
- Levin, Beth, Rappaport Hovav, Malka. 1988. Non-event -er nominals: a probe into argument structure. *Linguistics* 26: 1067-1083.
- Levin, Beth, Rappaport Hovav, Malka. 1995. *Unaccusativity: at the syntax-lexical interface*. Cambridge, MA: MIT Press.
- Lieber, Rochelle, Andreou, Marios. 2018. Aspect and modality in the interpretation of deverbal -er nominals in English. *Morphology* 28: 187-217.
- Marantz, Alec. 1984. On the nature of grammatical relations. Cambridge, MA: MIT Press.
- Marantz, Alec. 1997. No escape from syntax: Don't try morphological analysis in the privacy of your own lexicon. In Dimitriadis, Alexis, Siegel, Laura, Carissa Surek-Clark, Carissa, Williams, Alexander (eds.), *UPenn Working Papers in Linguistics* 4(2): 201–225.
- Oikonomou, Despina. 2012. Semantic deponents. Snippets.
- Panagiotidis, Phoevos. 2014. *Categorial features and categorizers*. Cambridge: Cambridge University Press.
- Rappaport Hovav, Malka, Levin, Beth. 1992. -er Nominals: Implications for a Theory of Argument Structure. In Stowell, Tim, Wehrli, Eric (eds.), *Syntax and the lexicon*, 127-153. New York: Academic Press.
- Rappaport Hovav, Malka. 2017. Grammatically relevant ontological categories underlie manner/result complementarity. In Brandel, Noa (ed.), *Proceedings of IATL* 32: 77-98. MIT Working Papers in Linguistics 86. <https://www.iatl.org.il/wp-content/uploads/2017/12/4RappaportHovavPaper.pdf>
- Roy, Isabel, Soare, Elena. 2014. On the internal event properties of -er nominals. *Lingua* 141: 139-156.
- Ryder, Mary Ellen. 1999. Bankers and blue-chippers: an account of -er formations in Present Day English. *English Language and Linguistics* 3: 269-297.
- Schäfer, Florian. 2008a. *The syntax of (anti-)causatives: external arguments in change-of-state contexts*. Amsterdam: John Benjamins.

- Schäfer, Florian. 2008b. Event denoting -er nominalizations in German. In Schäfer, Florian (ed.), *Working Papers of the SFB 732 Incremental Specification in Context 1*: 173-187, University of Stuttgart. https://elib.uni-stuttgart.de/bitstream/11682/5722/1/SinSpeC1_10_Schaefer.pdf.
- Spyropoulos, Vasilios, Revithiadou, Anthi, Panagiotidis, Phoevos. 2015. Verbalizers leave marks: evidence from Greek. *Morphology 25*: 299-325.
- Tsimpli, Ianthi-Maria. 1989. On the properties of the passive affix in Modern Greek. *UCL Working Papers in Linguistics 1*: 235-260.
- Tsimpli, Ianthi-Maria. 2006. The acquisition of voice and transitivity alternations in Greek as native and second language. In Unsworth, Sharon, Parodi, Teresa, Sorace, Antonella, Young-Scholten, Martha (eds.), *Paths of development in L1 and L2 acquisition: In honor of Bonnie D. Schwartz*, 15-55. Amsterdam: John Benjamins.
- van Hout, Angeliek, Roeper, Tom. 1998. Events and aspectual structure in derivational morphology. *MIT Working Papers in Linguistics 32*: 175-220.
- Williams, Edwin. 1981. Argument structure and morphology, *The Linguistic Review 1*: 81-114.
- Zombolou, Katerina. 2004. *Verbal alternations in Greek: a semantic analysis*. University of Reading (doctoral dissertation).