
REANALYSIS OF MORPHOLOGICAL EXPONENCE: A CROSS-LINGUISTIC PERSPECTIVE*

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ABSTRACT This paper investigates the complex relationship between Aspect, Voice and verbalizing (e.g. inchoative -v-) morphology. Based on data from previous literature, it discusses data from Greek, Hungarian and English, which lead to new insights into the relationship between morpho-phonological ‘packaging’ and syntactic structure. The morpho-syntactic changes it presents suggest that reanalysis of sub-components of words is a process, in which morphological exponents assume new functions and new structural positions within the verbal functional hierarchy. It shows that this takes place in very local relationships between the functional heads that are affected.

1 AIMS AND GOALS

In this paper, I will investigate the complex relationship between Aspect, Voice and verbalizing (e.g. inchoative -v-) morphology. These are grammatical features of verbs, the morphological realization of which is taken in models in the so-called cartographic tradition to appear in a particular hierarchical order, see e.g., Cinque (1999) and Alexiadou, Anagnostopoulou & Schäfer (2015) for the lower domain:

- (1) Aspect > Voice > v

Typically, languages may have distinct realizations for all three functional heads or some of them may fuse, i.e., two heads receive a single realization.

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Ideally, the most transparent and perhaps easier system to acquire would be one in which each category in (1) would be realized via a separate morpheme, see van Hout's (2008: 1754) *Form-to-Meaning Correspondence*. But clearly, across languages the relationship between form and meaning is not in a one to-one correspondence. Fusion of Aspect and Voice is relatively common across languages and this phenomenon will constitute the bulk of my discussion.

Focusing on Greek, which I will compare to English (and Hungarian), I will discuss two patterns of re-analysis, basing myself on previous literature. In Greek (and Hungarian), markers of *v*, i.e. verbalizers which create verbs out of roots, are re-analyzed as Voice markers, i.e. features lower in the hierarchy are re-analyzed as higher in the hierarchy. In Greek, the re-analysis was triggered by the re-categorization of *v* morphology as Voice morphology, and the emergence of verbalizing morphology, but fusion of Aspect and lower markers remains a characteristic of the language throughout its history. In English, while the situation seems similar to that in Greek in earlier stages, fusion is not a characteristic of the modern language. Basically, the language shifted to a system in which Voice has no lexicalization, while Aspect does. Both Greek and English also underwent a re-analysis of their aspectual systems from an Aktionsart to a grammatical aspect system. While in Greek the same aspectual morphology was used throughout and was simply re-analyzed, in English this re-organization is accompanied also by the loss of aspectual markers and the emergence of auxiliaries.

These cases are interesting as they raise several questions about the relationship between morphological packaging (realization) and morpho-syntactic structure, adopting Embick (2018) terminology. Typically, the examples discussed in the syntactic literature involve some process of re-analysis of lexical material into functional material or re-bracketing of more complex structures including phrases, as we will see in section 2. The cases discussed here are different as they involve re-analysis of pieces that build words, i.e., sub-components of words that assume new functions within the functional hierarchy. They do not involve strictly speaking re-bracketing of strings that are independent words. Importantly, the cases presented here show that morpho-syntactic re-analysis may also involve novel recruitment of morphological exponence of sub-elements of words, see Diertani (2011) for a discussion of several such cases. In order for this to take place, strict locality conditions should be obeyed: this type of re-analysis takes place when adjacent functional heads as in (1) are involved.

The paper is structured as follows. In section 2, a discussion of my understanding of the term re-analysis is offered. Section 3 discusses some details of

Greek verbal morphology. Section 4 models aspects of the Greek verbal morphology, following recent work by [Christopoulos & Petrosino \(2018\)](#). Section 5 offers a cross-linguistic perspective and some general remarks on the process of re-analysis. Section 6 concludes.

2 DEFINING RE-ANALYSIS

As mentioned in the introduction to this volume, it is rather hard to come up with a satisfactory definition of the term re-analysis, as it is applied to a wide variety of phenomena and is used in very different theoretical frameworks. Re-analysis is often defined as a “change in the structure of an expression or class of expressions that does not involve any immediate or intrinsic modification of its surface manifestation” (see e.g. [Langacker 1977: 58](#), [Harris & Campbell 1995: 51](#)). Basically, as pointed out in [De Smet \(2009\)](#), re-analysis causes a sequence of elements to receive a novel syntactic and semantic representation. The term has been discussed controversially in the literature, its status as a basic mechanism of change often disputed. For instance, [De Smet \(2009\)](#) argues that re-analysis can in fact be decomposed into more basic mechanisms of change and thus should be seen as an epiphenomenon.

In [Langacker \(1977\)](#), a sub-type of re-analysis is discussed, labeled boundary shift. Langacker suggests that boundary shift can further be sub-divided into two processes, boundary creation and boundary loss. Boundary shift is referred to as re-bracketing in [Hopper & Traugott \(1993\)](#) and it is precisely this idea has been adopted within the generative tradition: syntactic re-analysis is generally understood as involving ambiguity of structural representation for a given element, i.e., a given expression can receive multiple syntactic representations, see e.g. [Lightfoot \(1979\)](#) and [Roberts & Roussou \(2003\)](#). For these authors, the availability of more than one structural representation for a given string leads to re-analysis, but see [Whitman \(2012\)](#) for some criticism. The type of data that are analyzed in this tradition involve boundaries across different lexical categories. In other words, the elements that undergo re-analysis build phrases and what changes is the boundaries between these different phrases. For instance, according to [Harris & Campbell \(1995: 62\)](#), *for* as a complementizer arises from the following rebracketing: a matrix PP [*for* NP] and infinitive complement is the input structure, [[_{PP} *for* NP] [_{IP} PRO to VP]], which is re-analyzed with *for* as a complementizer, and NP as part of the infinitival clause, i.e., [_{CP} *for* [_{IP} NP to VP]].

[Roberts & Roussou \(2003: 208\)](#) distinguish cases of upwards re-analysis from cases of downwards re-analysis. The former gives rise to new functional material, while the latter does not. The former is accompanied by phonological reduction and semantic bleaching. Furthermore, upwards re-analysis

involves category change and applies only sporadically, while downwards re-analysis does not involve category change and applies to all members of the relevant class, i.e., loss to V-to-T movement in the history of English. By contrast, [Weiß \(2019\)](#) shows that the emergence of new complementizers out of nouns, prepositions or verbs is downward reanalysis which nevertheless creates new functional material, and it involves category change.

[Diertani \(2011\)](#) shares with the above authors the view that re-analysis is the result of multiple options but focuses on cases that involve ambiguity with respect to the placement of a particular exponent within a morphological word. [Diertani](#) criticizes the directionality that is inherent to the [Roberts & Roussou](#) system, as it strongly implies that downwards re-analysis never gives rise to new categories, contrary to fact, see also the discussion in [Weiß \(2019\)](#). As [Diertani](#) states, systems such as the one presented in [Roberts & Roussou](#) deal with cases of shift involving lexical elements which become functional and not cases that involve sub-components of words. [Diertani](#) shows that once we concentrate on such cases, we see that speakers may shift morpheme boundaries, and crucially they may also interpret a morpheme as an exponent of a different structural position than it was previously associated with. This is especially the case, when null exponents were involved, [Diertani](#) claims. This re-interpretation then leads to morpho-syntactic change.

Let us consider some examples that involve processes of the type discussed in earlier literature, i.e. re-categorization, and the morpho-syntactic implementation [Diertani \(2011\)](#) offers. An example of affix genesis discussed in [Diertani \(2011: 34ff\)](#) is the re-analysis of a postposition *râ*, which developed into a dative marker *râ* and is used in Modern Persian as a differential object marker. She states that in Persian, “generation P has an analysis in which the terminal X is the head of PP, (2a); Generation P+1 has an analysis of X as the head of KP, (2b). KP is hierarchically lower than PP, but string-vacuously there has been no change in the surface linear string”, [Diertani \(2011: 40\)](#). According to [Diertani](#), the reasons that led to this change have to do with the fact that Persian in general has prepositions, thus what used to be a postposition became a case marker. By contrast, in cases of what she labels affix-exodus, an affix is realized in a position higher than the one it was originally associated with. [Diertani \(2011: 172\)](#) takes Northern Saami *haga*, which was a case affix and was re-analyzed as a postposition, (2c-2d):

- (2) (a) [PP [KP [DP] Ø] *râ*]
 (b) [PP [KP [DP] *râ*] Ø]
 (c) [PP [KP [DP] *haga*] Ø]
 (d) [PP [KP [DP] Ø] *haga*]

These cases of re-analysis could be viewed as re-categorization, i.e., change in the categorial status of the elements in question, see [Whitman \(2001\)](#). More interesting are cases in which the phonological forms of the sub-words do not change but their structural and surface positions do. These are regarded similar to instance of affix genesis, but crucially involve sub-words. In other words, affixes as well as words assume new functions via the creation of new functional positions or association with other positions. [Diertani \(2011: 257f.\)](#), citing [Mithun \(2000\)](#), offers the development of a nominalizing suffix into a mood suffix in Central Alaskan Yup'ik and the development of an instrumental suffix into an infinitive in Cherokee as examples of the process of sub-word migration. Interestingly, she notes, [Diertani \(2011: 264\)](#), that “if one or more of the Vocabulary Items in the M-word were phonologically null, learners do not have any clear evidence telling them which structural position an overt sub-word belongs to.” A rather complex example of this type is the Ionic Greek *-sk-* affix, which, depending on the particular analysis, involves one of two changes: “either the iterative *-(e)sk-* suffix has become the exponent of another category and moved to a different functional projection, or the various imperfective/perfective formants have done so”, [Diertani \(2011: 272\)](#). The point is that once one assumes that words have a complex internal structure, we expect word internally changes similar to the ones described in the literature involving relationships between different words/categories.

The cases I discuss here are all similar to affixal migration in the sense that they all involve migration to a different structural position within the verbal functional sequence, i.e. they involve sub-words. Diertani's system is tailored to handle morpho-syntactic changes below the word level and is neutral with respect to directionality. I will adopt this here and I will basically assume that morpho-syntactic re-analysis involves re-interpretation of exponence of morphemes, which could be both upwards and downwards the functional hierarchy.

Specifically, the cases discussed here involve category change that relates to the relationship between exponence and the functional hierarchy in (1). While the Greek and Hungarian case could be classified as an instance of upwards re-analysis in the system of [Roberts & Roussou](#), it is not immediately clear how to best categorize the English case within that system.

3 VOICE-ASPECT INTERACTIONS IN GREEK

3.1 *Voice and the functional hierarchy*

In Greek, Voice morphology is associated with alternations involving the verb's argument structure, which are reflected in the verb's morphology in

most cases leading to a split between active Voice, typically for transitive verbs, and non-active Voice, typically for intransitive variants of transitive predicates.¹ Modern Greek has two sets of forms for Voice across two tenses (\pm Past) and two aspects (\pm Perfective), see Table 1 from Alexiadou & Anagnostopoulou (2004a: 117), \pm Active:

| a. Active forms of <i>grafo</i> 'write' | | | | |
|---|----------|-----------|------------|-------------|
| -Perfective | | | Perfective | |
| PN | -Past | Past | -Past | Past |
| 1s | graf-o | e-graf-a | grap-s-o | e-grap-s-a |
| 2s | graf-is | e-graf-es | grap-s-is | e-grap-s-es |
| 3s | graf-i | e-graf-e | grap-s-i | e-grap-s-e |
| 1pl | graf-ume | graf-ame | grap-s-ume | grap-s-ame |
| 2pl | graf-ete | graf-ate | grap-s-ete | grap-s-ate |
| 3pl | graf-un | graf-ane | grap-s-un | e-grap-s-an |

| b. -Active forms of <i>grafo</i> 'write' | | | | |
|--|-------------|--------------|------------|--------------|
| -Perfective | | | Perfective | |
| PN | -Past | Past | -Past | Past |
| 1s | graf-ome | graf-omuna | graf-t-o | graf-tik-a |
| 2s | graf-ese | graf-osuna | graf-t-is | graf-tik-es |
| 3s | graf-ete | graf-otan | graf-t-i | graf-tik-e |
| 1pl | graf-omaste | graf-omastan | graf-t-ume | graf-tik-ame |
| 2pl | graf-este | graf-osastan | graf-t-ite | graf-tik-ate |
| 3pl | graf-onde | graf-ondan | graf-t-un | graf-tik-an |

Table 1 Forms of *grafo* 'write'

-active (NAct) morphology appears on intransitive members of verbs undergoing the causative alternation labeled anticausatives, and also on passives and reflexives, see (3), (Tsimpli 1989, 2006, Embick 1998, 2004a, Alexiadou & Anagnostopoulou 2004a, Zombolou 2004, Alexiadou et al. 2015 among others, see Haspelmath 1990 for a typological perspective):²

1 In the typological literature, typically two non-active Voice heads are recognized, passive and middle, see e.g. Klaiman (1991). See also the discussion below.

2 Next to NAct marked anticausatives (2b), Greek has unmarked anticausatives, (i):

(i) *i porta anikse*
the door opened

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- (3) (a) *o Janis ekapse ti supa*
the John-NOM burnt-ACT the soup-ACC
John burnt the soup *causative*
- (b) *i supa kegete*
the soup-NOM burns-NACT
The soup is burning *anticausative*
- (c) *to violio diavastike ktes*
the book-NOM read-NACT yesterday
The book was read yesterday *passive*
- (d) *i Maria htenizete*
the Mary-NOM combs-NACT
Mary combs herself *reflexive*

The above distribution is a case of Voice syncretism, whereby distinct syntactic alternations are realized with identical morphology.

These morphological features of Greek verbs are thought of as represented as part of the functional hierarchy, i.e. the functional categories that combine with verbal stems in the generative tradition, following Pollock (1989) and Ouhalla (1991). There is a certain amount of consensus that functional information has a universal hierarchical ordering. It is generally acknowledged that Voice is low in the functional hierarchy, (4), see e.g. Cinque (1999); and Rivero (1990), Alexiadou (1997), and references therein for Greek:

- (4) [TP [AspectP [VoiceP [vP]]]]

Following Kemmer (1993), Manney (2000), Doron (2003), Kaufmann (2001), Alexiadou & Doron (2012), the Nact Voice head that participates in all the intransitive structures in (3) is labelled Middle Voice (5). Active morphology is associated with transitive Voice. NAct morphology realizes a structure that lacks an external argument, following Embick (1998), signaled as [-D] in (5) to express that no argument is projected in its specifier, in the spirit of Schäfer (2008), Alexiadou et al. (2015):³

- (5) [MiddleVoiceP [-D] NAct [vP [ResultP √burn]]]

3.2 Interaction with Aspect

Alexiadou & Anagnostopoulou (2004b), Roussou (2009), Merchant (2015), Christopoulos & Petrosino (2018) as well as Embick (2018) all noted that

³ Or the absence of Voice as in the case of unmarked anticausatives and unaccusatives.

there is a complication with the exponence of Voice in Greek. Consider Table 1 again and also Table 2, from [Christopoulos & Petrosino \(2018\)](#), the paradigm of the verb *idrio* ‘found’:

| | | | | | |
|-----------|-----------------|--------------------|------------------|---------------------|--|
| a. | Act | <i>–Perfective</i> | | <i>Perfective</i> | |
| PN | –Past | Past | –Past | Past | |
| 1s | idri-o | idri-a | idri-s-o | idri-s-a | |
| 2s | idri-is | idri-es | idri-s-is | idri-s-es | |
| 3s | idri-i | idri-e | idri-s-i | idri-s-e | |
| 1pl | idri-ume | idri-ame | idri-s-ume | idri-s-ame | |
| 2pl | idri-ete | idri-ate | idri-s-ete | idri-s-ate | |
| 3pl | idri-un | idri-ane | idri-s-un | idri-s-an | |
| b. | NAct | <i>–Perfective</i> | | <i>Perfective</i> | |
| PN | –Past | Past | –Past | Past | |
| 1s | idri-ome | idri-omuna | idri-th-o | idri-th-ik-a | |
| 2s | idri-ese | idri-osuna | idri-th-is | idri-th-ik-es | |
| 3s | idri-ete | idri-otan | idri-th-i | idri-th-ik-e | |
| 1pl | idri-omaste | idri-omastan | idri-th-ume | idri-th-ik-ame | |
| 2pl | idri-este | idri-osastan | idri-th-ite | idri-th-ik-ate | |
| 3pl | idri-onde | idri-ondan | idri-th-un | idri-th-ik-an | |

Table 2 Forms of *idrio* ‘found’

In the perfective, Voice morphology appears closer to the root, and is realized as θ (*-th-*), while in the imperfective it is realized as agreement, e.g., in Table 2b *-ome* for 1st person Present and *-omuna* for 1st person Past). Endings on the NAct perfective verb are active, which as mentioned above is the default realization of Voice and also the morphology related with structures that lack Voice altogether, i.e. unaccusatives. A similar situation is observed in Classical Greek, [Grestenberger \(2017\)](#), and [Embick \(2018\)](#). To account for this, [Grestenberger \(2017\)](#) proposes that there are two types of passive in Classical Greek, an inflectional one in the imperfective paradigm, (6a), and a derivational one in the perfective one, (6b).

- (6) (a) *theín-omai*
 strike-IMP.NACT.1SG
 I am hit *inflectional*
- (b) *e-dú-th-en*
 augment-sink-PERFPASS-1SG.ACT
 I was sunk *derivational*

The claim made by [Grestenberger](#) (op.cit.) is that in Classical Greek *-th(e)-* actually realizes *v* in (1) or (5), i.e. Voice is absent. The Classical Greek passive thus receives the default active morphology. As we will see, this cannot be maintained for Modern Greek, suggesting that we have an upwards reanalysis of functional information: an exponent assumes a new function, as a new category emerges. In Greek, an exponent of *v* is re-analyzed as an exponent of Voice. Let us see how this came about in the next section.

3.3 The diachrony of the Greek verb

The table below from [Alexiadou et al. \(2015: 447\)](#) illustrates the Classical Greek Voice forms. Classical Greek, unlike Modern Greek, had two non-active Voices, middle and passive. The forms differ in the future and the aorist:

| | Active | Middle | Passive |
|-------------------|-------------------|-------------------|---------------------|
| Present | <i>Lu-o:</i> | <i>Lu-omai</i> | <i>Lu-omai</i> |
| Imperfective past | <i>Elu-on</i> | <i>Elu-ome:n</i> | <i>Elu-ome:n</i> |
| Aorist | <i>Elu-sa</i> | <i>Elus-ame:n</i> | <i>Eluth-e:n</i> |
| Future | <i>Lu-so:</i> | <i>Lu-so:</i> | <i>Luthe:s-omai</i> |
| Perfect | <i>Leluk-a</i> | <i>Lelu-mai</i> | <i>Lelu-mai</i> |
| Pluperfect | <i>Eleluk-e:n</i> | <i>Elelu-me:n</i> | <i>Elelu-me:n</i> |

Table 3 The Ancient Greek Voice paradigm

Comparing [Table 3](#) to the Modern Greek paradigm, [Tables 1](#) and [2](#), we observe the following:

- i. In Modern Greek, there are only two Voices, active and non-active, i.e. the one we characterized as middle above. The non-active paradigm maintains the aorist passive, where *-th-* occurs, but all other non-active forms in [Table 1](#) and [Table 2](#) belong to the middle. Thus, while there are three Voices in [Table 3](#), there are only two voices in [Tables 1](#) and [2](#).
- ii. The Modern Greek system retained the \pm perfective distinction with respect to Voice. Specifically, in the +active forms, *-s-* realizes + perfective; in the -active forms, *-ik-* realizes past tense, see [\(7\)](#). Now, superficially the active aorist form looks identical to that of classical Greek in [Table 3](#). An important difference between [Tables 1–2](#) and [Table 3](#) is the presence of *-ik-* signaling Past, which is not present in [Table 3](#):

- (7) *idri-s-a* *idri-th-ik-a*
 found-PERF-1SG found-ASPECT/VOICE-PAST-1SG

In spite of the presence of identical aspectual morphology in Classical and Modern Greek, Moser (2009) and Lavidas (2012) argue in detail that this morphological distinction does not realize the same type of semantic difference across diachronic stages. Specifically, Lavidas (2012: 159) states that “the morphological aspectual contrast is stable and present in Classical, Hellenistic, and post-Hellenistic Greek. The change concerns the meaning of this morphological contrast. Before the Hellenistic period, this contrast grammaticalizes differences in the Aktionsart/situation-type aspect. In post-Hellenistic Greek, it grammaticalizes the perfective vs. imperfective contrast.”

- iii. The Future as well as Perfect and Pluperfect are periphrastic in Modern Greek. The future is built on the basis of the particle *tha* and the \pm perfective form of the verb. The perfect and pluperfect are built on the basis of the verb *have* and the participle which carries aspect and Voice inflection; see (8a) and (8b):

- (8) (a) *tha grafo* *tha grapso*
 FUT write-1SG FUT write-PERF-1SG
 tha grafome *tha grafto*
 FUT write-NACT-1SG FUT write-NACT.PERF.-1SG
- (b) *eho/iha* *grap-s-i*
 have-1SG/had-1SG write-PERF.ACT
 eho/iha *graf-t-i*
 have/had-1SG write-PERF.NACT

As shown in (8b), the participial form contains aspect and Voice information, which, however, do not receive distinct realization. As pointed out in Alexiadou & Anagnostopoulou (2004b), this clearly suggests that Greek has Voice-Aspect fusion, see also Embick (1998). Thus, we can conclude that in the Non-active paradigm, *-th-* is an exponence of a Voice-Aspect head. This yields the order of heads as in (9), cf. (1) and (4-5):

- (9) Tense > Aspect_{PERF}/Voice > vP
 -ik- s/th

3.4 Differences between Classical and Modern Greek

Unlike in Classical Greek, where *-th-* was in complementary distribution with verbalizers, in Modern Greek it cannot be analyzed as an exponent of little *v*. [Grestenberger \(2017\)](#) argues that *th(e)-* selected roots, *not* transitive *vs.* The affix itself developed diachronically from a stative/intransitive verbalizing suffix. According to [Grestenberger \(2017\)](#), in Classical Greek, it never co-occurred with other stem-forming morphology and never selected verbs with overt transitivity morphology.

The situation is very different in Modern Greek. Specifically, Modern Greek has several verbalizers, [Alexiadou \(2009\)](#), [Anagnostopoulou & Samioti \(2014\)](#), [Panagiotidis, Spyropoulos & Revithiadou \(2017\)](#); these combine with roots to productively form verbs:

- (10) *-iz-, -on-, -ev-, -ar-* etc.
- (a) *aspr-iz-o*
white-v-1SG
 - (b) *kri-on-o*
cold-v-1SG
 - (c) *hor-ev-o*
dance-v-1SG
 - (d) *scan-ar-o*
scan-v-1SG

As [Christopoulos & Petrosino \(2018\)](#) also note, *-th-* occurs in verbs containing overt verbalizers, see [Panagiotidis et al. \(2017\)](#). The pattern is very systematic and is illustrated in (11):

- (11) (a) *kathar-is-t-ik-e*
clean-v-ASP/VOICE-PAST-3SG
- (b) *plig-o-th-ik-e*
hurt-v-ASP/VOICE-PAST-3SG
- (c) *diskol-ef-t-ik*
hard-v-ASP/VOICE-PAST-3SG

When verbalizers are present, Aspect/Voice does not trigger root allomorphy; however, Aspect/Voice may trigger verbalizer allomorphy, see (12a). By contrast, Aspect/Voice triggers root allomorphy in the absence of verbalizers, (12b), [Christopoulos & Petrosino \(2018\)](#) for further discussion, see also [Merchant \(2015\)](#):

propose that in Classical Greek, the derivational passive was an unaccusative structure that lacked Voice and thus did not quite tolerate demoted agents.

As Voice is not present, [Grestenberger \(2017\)](#) offers an analysis of *-th-* as realizing a fused Asp-v head, hence, the default active morphology. However, in Modern Greek, *-th-* realizes a fused Aspect-Voice head. (15) illustrates the before and after patterns of Greek verbal morphology.

- | | | |
|----------|-------------------------|---------------------------------|
| (15) (a) | Aspect / v > Root | Classical Greek (Before) |
| (b) | Aspect/Voice > v > Root | Modern Greek (After) |

As stated in [Grestenberger \(2017\)](#), this points to an upwards reanalysis as in [Roberts & Roussou \(2003\)](#) or late Merge in [van Gelderen \(2011\)](#): elements lower in the hierarchy are analyzed as higher in the hierarchy. Note, however, that the elements we are dealing with are sub-components of words. Thus, what we have is that an existing exponent now realizes a new fused head, while v receives its own lexicalization. This is what [Diertani \(2011: 272\)](#) described in her work: “a suffix has become the exponent of another category and moved to a different functional projection”. In Greek, this was triggered by the emergence of several affixes realizing v, and the emergence of Voice as functional category. This type of re-analysis is accompanied by a type of re-bracketing, where Aspect and now Voice fuse, see (15). I turn to this in the next section.

4 MODELING ASPECT-VOICE FUSION

To account for the patterns in (15), I will appeal to the mechanism of Fusion and assume the analysis [Christopoulos & Petrosino \(2018\)](#) presented for Modern Greek and [Grestenberger \(2017\)](#) for Classical Greek. Fusion is a morphological operation that leads to the creation one syntactic head out of two independent ones and the insertion of one vocabulary item to realize this single head. Fusion in Distributed Morphology applies when there is one vocabulary item that satisfies the requirements of two distinct nodes. Typically, fused nodes are adjacent in the functional hierarchy. In our case, it involves Aspect and Voice in (1).

[Christopoulos & Petrosino \(2018\)](#) offer an analysis of MG Aspect-Voice fusion, which I summarize here. They adopt re-bracketing defined in [Radkevich \(2010: 189\)](#) as in (16), which leads to the new head in (16') for our particular two heads:

(16) ...] X]Y]... → ...][XY]]... where X and Y are any nodes

(16') [Aspect [Voice]] → [Aspect Voice]

The type of formalization offered in (16) and (16') is presumably a type of boundary loss, as described in Langacker (1977).

Christopoulos & Petrosino (2018) argue that the vocabulary items for the realization of the fused head, Aspect/Voice and for +Past are as in (17):

(17) (a) [+perfective, +active] ↔ s

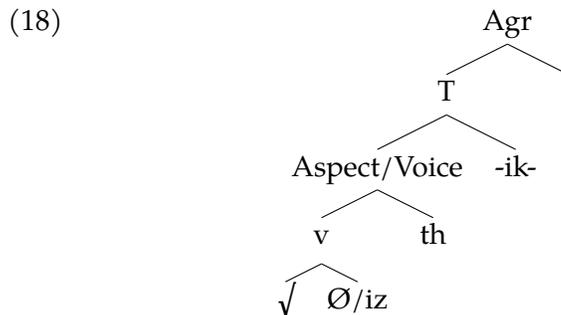
(b) [-perfective, +active] ↔ ∅

(c) [+perfective, -active] ↔ th

(d) [-perfective, -active] ↔ ∅

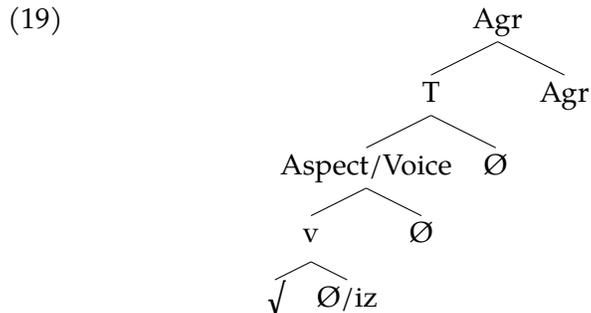
(e) [+past] ↔ ik

Turning now to concrete representations, let us first consider the case of the *-active +perfective +past*. Christopoulos & Petrosino (2018) argue that the complex head formed is as in (18):



In (18), Aspect/Voice triggers allomorphy on *v*, if *v* is overt but not on the root. Christopoulos & Petrosino (2018) assume that root allomorphy can be triggered if *v* is zero, assuming the operation *Pruning* which deletes nodes with ∅-exponence (Embick 2010). Active agreement appears as default in this case, cf. Bjorkman (2011).

In their system, the complex head of the *-active -perfective -past* is as in (19):



As [Joseph & Philippaki-Warbuton \(1987\)](#) have already pointed out, this part of the paradigm contains forms which only occur in the imperfective, and indicate voice, tense, as well as features of the subject.⁵

Pruning of nodes with \emptyset exponence, basically Tense and Aspect/Voice, leads to Tense and Agreement being close to the root or root-*v* complex, in case there is an overt verbalizer. These forms are more specified than the active ones, including Tense information. In other words, these are not the default forms and must be inserted when the conditions for insertion are satisfied, following [Christopoulos & Petrosino's \(2018\)](#) analysis.

A fusion approach can also be assumed for the Classical Greek system, the difference being that Voice was absent and thus Aspect fused with *v*, assuming [Grestenberger's \(2017\)](#) analysis. The emergence of Voice in MG triggered by the development of verbalizers and other changes in the Voice system of the language, see [Luraghi \(2010\)](#), led to the picture just described for the Present Day system. As detailed in [Luraghi \(op.cit.\)](#), passive became increasingly obligatory in the language, and its extension proceeds from prototypically transitive verbs with accusative objects, to verbs with lower degrees of transitivity with non-accusative objects.

5 A COMPARATIVE PERSPECTIVE

5.1 Hungarian

A similar case of re-categorization of exponence *v* to Voice markers has been reported for Hungarian by [Halm \(2020\)](#). According to [Halm](#), frequentative suffixes (*v* heads) were re-interpreted as middle voice suffixes (Voice heads).

⁵ [Merchant \(2015\)](#) considers this as a lexicalization of the span Voice-Aspect-T(Agr). From the perspective adopted here, one vocabulary item realizes all the relevant features. Following [Christopoulos & Petrosino \(2018\)](#), this involves (i):

- (i) (a) [3sg, -pst] ↔ ete / [-pfv, -act] __
- (b) [3sg, +pst] ↔ otan / [-pfv, -act] __

As Halm details, Late Old Hungarian had two verbal conjugation paradigms: the active paradigm (the standard paradigm), see (20), and a middle paradigm (the *-ik* paradigm), shown in (21), examples from Halm (2018):

- (20) (a) *szeg*
 ‘someone cuts sg’
 (b) *mosd*
 ‘someone washes sg’
 (c) *gyón*
 ‘someone confesses sg’
- (21) *szeg-ik* ‘someone gets cut’
 mosd-ik ‘someone washes herself’
 gyón-ik ‘someone makes her confession’

The collapse of the middle paradigm is complete, according to Halm (2020) in 19th century, but its beginning can already be noted in the 15th century. The change observed is summarized as follows by Halm (2020): initially the middle paradigm was strictly associated with middles. Subsequently, some unaccusative verbs such as ‘diminish’ adopted the middle paradigm, e.g. *fogy* ‘it diminishes’ *fogy-ik* ‘it diminishes’. The middle paradigm was then adopted by certain unergative verbs such as ‘climb’ *mász/mász-ik*. The first step is explained by Halm as generalization of middle morphology to verbs lacking an external argument, along the lines of (5) above. The second step involves generalization of middle morphology to single argument verbs. The final step involves the extension of the middle marking to transitive verbs. When this step takes place, Halm argues that middle morphology becomes irregular morphology, and its presence does not diagnose any grammatical property. Due to the collapse of the middle paradigm, middle morphology was no longer transparent. By contrast, in Modern Hungarian, there are several middle suffixes, e.g. *-sz-*, *-d-*, *Vdik*, (Halm 2020: 21):

- (22) (a) *lát-sz-ik*
 see-MID-3SG
 it seems
 (b) *mos-d-ik*
 wash-MID-3SG
 she washes herself
 (c) *kever-ed-ik*
 mix-MID-2SG
 it gets mixed

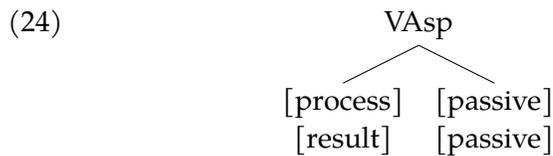
According to Halm, these middle suffixes are all derived from originally frequentative suffixes. In Present Day Hungarian, the (productive) frequentative suffix *-gat/-get* in Hungarian has functions related to causative alternations and the verb-formation from category-neutral roots, which Halm analyses as being merged to *v*:

- (23) (a) *for-og*
 √turn-FREQ
 ‘turn-inchoative’
- (b) *for-gat*
 √turn-FREQ
 ‘turn-causative’

As Halm argues, *v* heads are re-interpreted as Middle Voice markers, a reanalysis that serves transparency and facilitates learnability. This is slightly different from what we saw in Greek, where Voice was absent. In Hungarian, Voice was present all along, and exponents of *v* were re-assigned a new function as exponents of Voice.

5.2 A more complex case: English

According to Cowper & Hall (2013), before the late 18th century, the system of Voice and Aspect in English was characterized by a three-way contrast in aspect, cross-classified with a two-way voice contrast, as in (24). Every surface form can be interpreted as either active or passive, and the affixal morphology (*-ing*, *-en*) is entirely aspectual. The representation they give in (24) is close to what we saw for Greek, i.e. there is fusion of the two heads:



- (25) (a) [PROCESS] \Leftrightarrow *-ing*
 (b) [RESULT] \Leftrightarrow *-en*

The third feature, [VOICE], had no morphological exponence. To support this conclusion, the authors discuss various phenomena, illustrated in (26a-c) taken from their paper, including the so-called passival as well as cases involving intransitive verbs that can be used as passives. Moreover, they point

out that prior to the grammaticalization of the progressive, verbs were neutral with respect to viewpoint aspect as can be seen in (26d):

- (26) (a) Passive clause with *be+ing* (passival)
A new Oath was now fabricating, for all the Cleargy to take...
 (J. Evelyn, *Diary*, 1688–89; PPCEME)
- (b) Passive clause with *be+en* (resultative passive):
A barber was sent for from the market towne hard by, who searcht his mouth... (R. Armin, *A nest of ninnies*, 1608; PPCEME)
- (c) Intransitive for passive:
Tis a play that shall read and act with any play that ever was born.
 (T. Shadwell, *The Sullen Lovers*, III, 1668, quoted in OED s.v. *read*)
- (d) Plain active clause, neutral with respect to viewpoint aspect:
He knows the answer.
He wrote a letter.
What do you read, my Lord?

Cowper & Hall argue for that there were five simultaneous changes affecting the morpho-syntax of verbs:

- (27) (a) The passival fell out of use.
 (b) The previously ungrammatical progressive passive became grammatical.
 (c) The resultative *be*-perfect was lost.
 (d) The intransitive-for-passive was lost.
 (e) The simple present lost its imperfective interpretation.

The authors then propose that these changes have to be seen as consequences of a single change that affected the Aspect and Voice System of English. Specifically, they suggest that while before the change Aspect and Voice were a fused category, in Present Day English Aspect and Voice are distinct categories, as in (28). They assume, as we see in (29), that *-en* now expresses passive:

- (28)
- $$\begin{array}{c} \text{AspP} \\ \wedge \\ \text{VoiceP} \end{array}$$

- (29) The letter was being written *-en-* expresses passive rather than result

As can be seen by their structures, they treat *-en* as an exponent of Voice. This change, the authors argue, correlates with the fact that the passival and intransitive for passive disappear at the same time as the grammaticalization of the progressive. As also discussed in [van Gelderen \(2011\)](#), basically we observe the emergence of *have* and *-ing-* as aspectual markers. Assuming the functional hierarchy in (1), this in turn means that Earlier English had fusion, while Modern English does not.

- (1) Aspect > Voice > v

[Cowper & Hall \(2013\)](#) relate this to the re-analysis of the particular item *-en*, which was re-interpreted as a Voice marker. Because of this, Aspect/Voice fusion of the type we saw for Greek is no longer possible, and each head receives its own exponent, (28). With respect to the reasons that caused this re-analysis of *-en*, [Cowper & Hall](#) suggest the following: this is related to the decline of the resultative *be*-perfect, see [McFadden & Alexiadou \(2010\)](#). In earlier English, such perfects were very common, however they radically decline during the 18th century.

A slightly different analysis is offered in [Bjorkman \(2011\)](#). While [Bjorkman](#) adopts the view that *-en* is a marker of Voice in Present Day English, she maintains that the functional sequence in (28) was also present in Earlier English, the difference being that Voice remained null. [Bjorkman](#) adopts this analysis, as she regards the auxiliaries the realization of the aspectual categories themselves.

While I believe [Cowper & Hall](#) are right as far as the fusion analysis is concerned, it is not clear why the development discussed by [Cowper & Hall](#) is not the result of fission; **fission** in Distributed Morphology is a process a single terminal node splits into two or more nodes prior to lexical insertion, allowing more than a single morpheme to realize the features from a single syntactic terminal. This process would yield the structure in (28) or (1), and then the next step is to consider as to whether or not the two heads receive distinct lexicalization.

With respect to their treatment of Modern English *-en* as a marker of a passive structure, [Embick \(1998\)](#) points that since participles appear in both active, perfect, and passive environments with the same morphology, this suggests that they are not marked for Voice. [Embick \(1998\)](#) as well as [Embick \(2004b\)](#) argued that *-en* may appear with so-called resultative participles that do not imply the presence of an agent. Consider the data in (30):

- (30) *The door was opened.*

According to Embick, the sentence in (30) is ambiguous between an eventive passive reading in which there was an external agent opening the door and a resultative interpretation in which the door was in a state of having become open. This latter reading does not involve an agent. Embick proposes that the two readings are related with two distinct structures, one that contains the layer introducing the external argument, VoiceP (vP in Embick 2004b) and one that does not, see (31), where the structures follow the decomposition in Alexiadou et al. (2015):



In Embick's analysis, *-en*, *-ed* etc. are realizations of Aspect, not Voice, in both structures in (31). We must then conclude that Voice has no particular realization in English, although it is presumably a distinct category from Aspect, see Alexiadou (2010) for some discussion. Specifically, Alexiadou (2010) argues that *en* is not a valency reducing morpheme, meaning that in English this is not a form used to realise the absence of an external argument. It is rather an aspectual affix and this is related to the fact that English lacks any type of valency reducing morphology (see also Hallman 2000, Embick 2003).

Let us now briefly compare English to Greek: van Gelderen (2011) argued in detail that the category of Aspect in Old English signaled Aktionsart distinctions, as was the case for earlier Greek. Thus, in both languages fusion of Aspect with lower verbal categories goes hand in hand with the semantic import of Aspect. In Greek, the grammaticalization of Aspect was accompanied by the restructuring of the categories below Aspect, i.e. Voice and v, however fusion remained a constant feature of the language. It is not clear whether something similar happened in English. van Gelderen (2011) does mention the rise of verbalizers after 1300 onwards and a so-called increase in transitivity. Moreover, as van Gelderen (2011) details, in English this reorganization is accompanied also by the loss of aspectual markers such as *ge-* and the emergence of auxiliaries. This is unlike the situation in Greek where the same morphology is re-categorized. As in English it is possible to have aspectual properties in the absence of a Voice layer, while this is not the case in Greek, recall that the participial form always contains fused Aspect/Voice information, we must conclude that Aspect and Voice are not fused in Present Day English, unlike in Greek. Aspect and Voice do not fuse in English, and Voice receives zero realization.

5.3 *Some general observations*

The patterns of re-analysis discussed here involve changes of sub-components of words and make reference to exponents realizing adjacent heads. In Greek and Hungarian, *v* elements are reanalyzed as Voice markers. While Voice was a stable category in Hungarian, it emerged as a new category in Greek. In English, we seem to have specialization of features, leading to separation of nodes, whereby Voice has a zero realization.

Moreover, while the process of lower heads becoming higher heads is similar in our two cases, the triggers differ: the process was triggered by the emergence of verbalizers in Greek, and the collapse of the Middle Voice paradigm in Hungarian. But in all cases, adjacency of heads in functional hierarchy seems to be an important condition regulating this morpho-syntactic change.

The English case is more complex as it involves changes within the aspectual system that seem to make reference to several sub-components as well as the lexicalization of Voice: it involves grammaticalization of Aspect, the emergence of the auxiliary system and a reanalysis of inner as outer Aspect. In both English and Greek, however, the re-analysis takes place due to the emergence of specific exponence for functional heads, Aspect in English and *v* in Greek. In Greek, fusion is triggered by lack of distinct lexicalization, as [Cowper & Hall \(2013\)](#) argue for earlier English, cf. [Embick \(2018\)](#). In English fusion is cancelled through the emergence of a split of the two fused heads into two distinct categories, whereby the exponence is specialized only for one of them, namely Aspect. Such properties are predicted by the framework of Distributed Morphology.

Two related questions arise: first, is this a lexical change or a structural change? In other words, does the morphological exponent receive/lose features through reanalysis? If this is so, then the structural changes (fusion or fission of functional heads) are a consequence of the preceding morphological re-analyses.⁶ In Greek, we saw re-interpretation of affixes as exponents of a different structural position than they were previously associated with. However, this change was accompanied by the emergence of Voice as a separate category, which might be an independent change, a change in the nature of Aspect (Aktionsart to grammatical Aspect) and the emergence of verbalizers.

The second question that arises is whether the cases discussed here can be subsumed under the process of change in category label, discussed in [Whitman \(2001, 2012\)](#). Loss/addition of features on lexical items could be broadly conceived of as change in category label. Specifically, [Whitman \(2001\)](#) posits

⁶ Many thanks to an anonymous reviewer for suggesting this.

(32):

- (32) The first step of syntactic reanalysis is restricted to relabeling, where relabeling refers to a change in the categorial feature of a head. The result of relabeling must be well- formed independently of any changes outside the minimal domain of the relabeled item.

In (32), as Whitman stresses, the role of minimal domain is to rule out structures that affect a larger domain. Clear examples of relabeling discussed in Whitman (2001) are instances of V>P and V>C changes, of the type we saw in section 2, and perhaps specifier to head reanalysis.

Our cases certainly make reference to local domains, as the morphological realization of a particular structure involves, as we saw for Greek, rebracketing, which is defined on the basis of adjacency. However, what changes in the descriptions we saw is the feature specification of the exponents, not strictly speaking their categorial status. In fact, in two of our cases, if not all, we witness the emergence of a new category, and exponents are recruited to realize it, which is unlike the cases Whitman considers.

6 CONCLUSIONS

In this paper, I discussed the complex interaction between Voice and higher and lower functional structure, in particular verbalizers, and Aspect. This interaction leads to new insights into the relationship between morpho-phonological ‘packaging’ and syntactic structure, see Embick (2018). Basically, morpho-syntactic changes of the type discussed here suggest that re-analysis of sub-components of words is a process, in which morphological exponents assume new functions and new structural positions within the functional hierarchy. This takes place in very local relationships between the functional heads that are affected.

The cases discussed here are not typical for the re-analysis literature as they involve changes that affect sub-components of words. The phenomena described and analyzed here support Diertani’s (2011: 293) conclusion that learners’ perception of sub-components of words may change, triggering morpho-syntactic changes. Two types of changes were discussed: i) re-analysis of exponence, i.e. elements that realize lower categories are reanalyzed as exponents of higher categories (Hungarian and Greek); ii) specialization of exponence, perhaps accompanied by fission (English). In Greek and Hungarian, we find reinterpretation of affixes as exponents of a different structural position than they were previously associated with. In English, we find specialization of exponence. Importantly, our examples suggest first

that lexical decomposition is an important tool to deal with changes below the word level, and second that complexity characterizes both words and phrases and the same tools that deal with re-analysis of phrases can also be employed word internally.

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Reanalysis of morphological exponence

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