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THE DIACHRONY OF VERBALIZERS IN INDO-EUROPEAN: WHERE DOES *V* COME FROM?*

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Abstract This paper discusses directionality in the diachrony of derivational morphology, specifically the rise of new verbalizers (v) through reanalysis of nominal morphology in highly synthetic, fusional (older) Indo-European languages. It is argued that these changes can be understood as instances of "Upwards Reanalysis", as argued by Cournane (2014) for the diachrony of modal auxiliaries, and thus instantiating the Late Merge Principle (e.g., van Gelderen 2013). I discuss three case studies that show this kind of $n \rightarrow v$ reanalysis in the context of denominal verb formation and its interaction with concomitant argument structure changes. Tying argument structure change to changes in categorizing and derivational morphology constrains the predicted directions of change in verb meaning(s). Moreover, in syntactic approaches to word formation such as Distributed Morphology, the parallelism in directionality between morphological and syntactic instances of reanalysis is entirely expected and follows from general assumptions of computational economy during the L1 acquisition process.

1 Introduction: Morphological and syntactic change

Generative approaches have greatly advanced our understanding of the processes that lead to syntactic change. In particular, the notion that syntactic change follows cyclic pathways in the development of negation markers and negative concord, determiner systems, and subject-verb agreement (among others) has become a useful tool for exploring regularity and directionality in syntactic change. However, morphological change in the traditional sense and morphosyntactic change have not received the same amount of attention. For example, while we have a fairly good sense of where a clausal negation

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marker or negative polarity item may come from (an indefinite or negative indefinite) or what the diachronic source of a third person pronoun is likely to be (a demonstrative pronoun), we are unlikely to be as certain in the case of category-assigning and category-changing, i.e., derivational morphology. The aim of this paper is to outline a research program that can accomplish precisely that, by determining how the morphosyntactic properties ("formal features") of categorizing derivational morphemes change, with an emphasis on the verbal system. The core question to be answered is: How do new categorizers arise diachronically, and is their development governed by the same principles that drive syntactic change? I will argue that we can understand much of what we see in the diachrony of categorizing morphology by applying the same tools that we use to understand directional syntactic change.

This paper is structured as follows. Section 2 discusses the theoretical background for studying cyclic change in syntax and morphology and the theoretical framework used in this paper (Distributed Morphology, DM). The proposal in this section is that this framework allows us to discern diachronic trajectories in the development of verbalizers, (broadly) from (certain kinds of) denominal verbs to unergative verbalization and from (certain kinds of) deadjectival verbs to inchoative/unaccusative verbalization. Section 3 discusses three case studies from (older) Indo-European languages that illustrate these developments: 1) The development of the Ancient Greek agent noun-forming suffix *-eu-* to the Modern Greek all-purposes verbalizer *-ev-*, 2) the development of the reconstructed Proto-Indo-European (PIE) suffix *-eh_1- to a stative/inchoative stem-forming suffix seen in, e.g., Latin -$\bar{e}$-verbs (2nd conjugation) or the Greek -(*th*)$\bar{e}$- (-(θ)η-) aorist, and 3) the development of the Germanic nominal diminutive suffix *-*il*(*a*)- to a *verbal* diminutive-forming suffix in German (*-el-*) and other West Germanic languages. Section 4 concludes with some generalizations over the patterns that emerge from these observations and implications for future work.

Thus, while the first part of this paper is somewhat programmatic, the second part discusses empirical evidence in favor of this research program.

2 Background: Syntactic vs. morphological cycles

2.1 Cyclical change & reanalysis

A rich research tradition within (not just generative) diachronic syntax operates with the notion that syntactic change is *cyclic*. Well-studied instances of cycles of syntactic change include the subject and object agreement cycle, the DP cycle, and the negation cycle or "Jespersen's cycle" (Jespersen 1917; cf. van Gelderen 2008; Jäger 2008; Breitbarth 2017). In all these cycles, an el-

ement changes from "more lexical", prosodically and syntactically independent to "more functional" and prosodically dependent, undergoing changes typically associated with grammaticalization in the traditional sense (i.e., semantic bleaching and phonological weakening, cf. Hopper & Traugott 2003). Eventually, it becomes replaced by a new item that takes over the original function, thus potentially restarting the cycle. This cyclic nature of (morpho)syntactic change is generally considered to be grounded in *economy principles* of the language faculty in Minimalist approaches, e.g., van Gelderen (2004, 2009, 2013). Specifically, van Gelderen argues that the economy principles in (1) are the drivers of the familiar cycles of change.

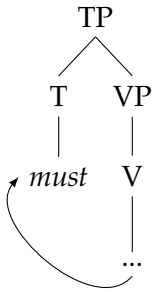
(1) a. **Head Preference Principle (HPP)**:
Be a head, rather than a phrase
b. **Late Merge Principle (LMP)**:
Merge as late as possible

While the HPP reduces (functional) material, the LMP prioritizes Merge over Move, under the (early) Minimalist assumption that Move involves two instances of Merge (external + internal; or Merge + Copy) and is therefore less economical than just one instance of Merge.[1] As Walkden (2014: 43) points out, these principles should not be taken to be causal of syntactic change, as this would lead to a regress problem. Rather, they describe *how* syntactic change arises due to a combination of principles of language acquisition and the structure of the Primary Linguistic Data (PLD; cf. the "second factor" of Chomsky 2005; see also Lightfoot 2006) with "third factor" principles (principles not specific to the languages faculty having to do with efficient processing and computation, for example). In other words, the assumption is that given ambiguous or varying input, the acquirer will choose the derivation that requires as few derivational steps (e.g., instances of movement) and as few formal features as possible as part of their grammar. These assumptions also form the basis of the "Maximise Minimal Means" principle (MMM; Biberauer 2017, 2019; Biberauer & Roberts 2017) and the "Minimize Structure" principle (Cardinaletti & Starke 1999; Breitbarth 2017), all of which describe the prioritization of reducing structure and formal features as much as possible. The upshot is that from a diachronic perspective, the changes described by these principles, and especially by the LMP in (1-b) will appear to be direc-

1 Though as a reviewer has pointed out, this is no longer the case in more recent Minimalist (PoP, "Problems of Projection") accounts such as Chomsky (2013, 2019), where internal Merge is argued to be freely available and less "costly" because it operates on an element already available in the derivation. For reasons of space I will not discuss the diachronic implications of this view here; see van Gelderen (2018b) for a discussion of how economy principles such as (1) can be integrated into PoP accounts.

tional and move (functional) material "upwards" along the structural tree.[2] "Upwards Reanalysis" (UR; Roberts & Roussou 2003, followed by Cournane 2014, 2015) thus describes the reanalysis of (lexical) material in lower projections as base-generated in higher functional projections over time. For instance, in the "modal cycle" lexical verbs or "*v*"-elements are reanalyzed as as modal auxiliaries base-generated in T, (2).

(2) UR in the "modal cycle"



Cournane (2014, 2015) adds evidence from L1 acquisition to this picture, showing that the acquisition of modal auxiliaries in English displays evidence of "overextension", in that children do actually extend the functions of (different types of) modals "upwards" compared to adult grammars (cf. also Cournane 2017, 2019 on overextension and incrementation in L1 acquisition), precisely as predicted by the diachrony of modals illustrated in (2). Descriptively, we can speak of diachronic reanalysis here, in the sense that a given surface string in the acquirer's grammar G_2 receives a different underlying representation than in the input or "target" grammar G_1 during L1 acquisition, or "a hearer successfully analyses an incoming sentence using a grammar different from the one that the speaker used to generate it" (Walkden 2021: 19).[3]

2 It must be stressed that the focus of this paper is on the reanalysis of syntactic heads/terminal nodes, which is always "upwards" as described by the LMP. Note that the type of change described by the HPP, or "Spec-to-Head"-reanalysis, is descriptively "downwards" in that a specifier becomes the head of its own projection. See Meelen & Roberts (2022) for a recent discussion of diachronic "downwards reanalysis".

3 Throughout this paper, the term reanalysis is intended purely as the description of a change event, thus "reanalysis$_2$" in the sense of Walkden (2021), and not as a mechanism, cause, or result of change. See also Hale (1998, 2007), Roberts & Roussou (2003), Roberts (2007), and Walkden (2014: 39) on the role of reanalysis in Minimalist approaches to diachronic syntax.

2.2 *Cycles in derivational morphology?*

2.2.1 *Morphological change and morphological theory*

The general framework described in the previous section has proven useful for modeling different types of syntactic changes and for integrating many of the directional changes generally discussed under the label "grammaticalization" (e.g., Hopper & Traugott 2003; Rainer 2015; Norde 2020; or "agglutination", Haspelmath 1995), where a formerly (semantically and phonologically) independent word becomes more "grammatical" (= functional rather than lexical) and loses meaning and/or phonological substance, as in well-known examples like development of the Romance adverbial suffix *-ment(e)* from a Latin syntagm consisting of the ablative (f.) noun *mente* and an adjectival modifier agreeing for gender, number and case (e.g., Lat. *clarā mente* 'with a clear mind' → Fr. *clairement*, It. *chiaramente*, etc.; cf. Detges 2015). However, it has not been applied to changes that are traditionally considered core "morphological" changes in the domain of derivational and categorizing morphology *in synthetic word formation*, in which affixes stay affixes and the usual definitions of grammaticalization do not hold. Do these changes mirror syntactic changes in terms of directionality and "upwards reanalysis"? In lexicalist approaches like the one by Haspelmath (1994), who provides a detailed typology of "morphological reanalyis" (his term for these types of changes), there is no *a priori* reason why this should be the case, as word formation happens in the lexicon and there is thus no reason to assume that changes in the order of derivational morphemes — especially in synthetic word forms — should mirror syntactic changes.[4] However, in non-lexicalist, realizational approaches to word formation such as Distributed Morphology (DM) or Nanosyntax, diachronic reanalysis — specifically, UR — should in principle apply to "morphological" and "syntactic" changes equally, as these are not considered to be discrete domains. To the extent that diachronic reanalyis in the domain of derivational morphology is indeed "upwards" (or, in linear terms, "rightwards"), this would hence favor syntacticocentric approaches to word-formation in which this directionality follows from general principles of syntactic structure building.[5] In this section I argue from a DM perspective that it is possible and feasible to study changes in derivational and categorizing morphology using the same principles of cyclic (syntactic) change that were discussed in the previous section, and that this approach

4 Haspelmath (1994: 20–21) does in fact observe an asymmetry in the direction of affix reanalysis, which is unexpected from his perspective.

5 See also Diertani (2011) and Dali & Mathieu (2021) for this type of approach to word structure change.

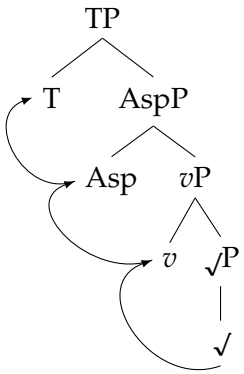
leads to generalizations and testable predictions concerning argument structure change.

2.2.2 *Categorizers in DM*

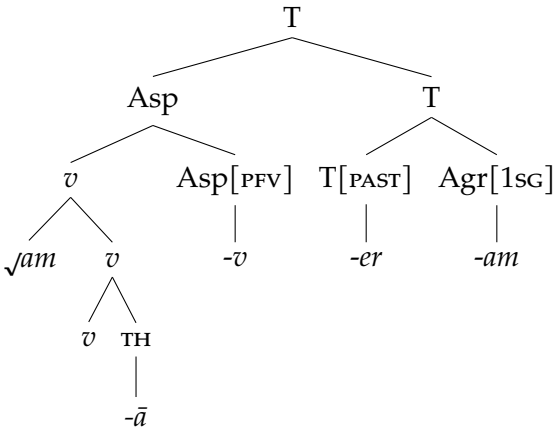
Among the core tenets of DM is the principle of Full Decomposition, that is, complex word forms, including "irregular" forms and non-concatenating forms, are fully decomposable into component parts or functional "terminal nodes", i.e., compositional all the way down (Halle & Marantz 1993; Harley & Noyer 1999; Embick & Noyer 2007; Embick 2015; Bobaljik 2017). These nodes are then spelled out or 'realized' depending on their feature content and context, in competition with contextually dependent realizations (allomorphs).

Moreover, the order of morphemes in a complex word form is expected to mirror the order of functional projections built up by the syntactic component (the Mirror Principle, Baker 1985), with divergences arising through (language-specific) post-syntactic processes such as Local Dislocation or Lowering (Embick & Noyer 2001; Harley 2013b; Embick 2015). To illustrate this with an example from the verbal domain, a synthetic verb is thus a complex head built by successive cyclic head movement and adjunction of terminal nodes of verbal functional projections, as in (3). The resulting complex head is illustrated in (4) with an example from Latin (the pluperfect active form *amāveram* 'I had loved', based on Embick 2000: 196–7); see Harley (2013a) and Bjorkman (2022) for a detailed discussion of verb formation in DM.

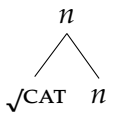
(3) Head movement along the verbal spine



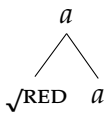
(4) Synthetic verb forms as complex heads



In (3), a categorially unspecified root merges with a *categorizing* (in this case, verbalizing) functional projection v, which then merges with functional projections relating to Voice (not illustrated here), Asp(ect) and T(ense). The root then moves upwards and forms a complex head with v (i.e., $[v\ [\sqrt{\ }\ v]]$), which in turn moves upwards and forms a complex head with Asp, and so on. The resulting complex head, which translates into to the linear order of morphemes of the resulting word form, is illustrated in (4). Conjugational class markers or "theme vowels" (TH in (4)) and Agreement morphology are here assumed to postsyntactically adjoin to functional projections (see, e.g., Oltra-Massuet 1999; Oltra-Massuet & Arregi 2005; Calabrese 2015, 2019, 2021), as in (4). Importantly, roots obtain their syntactic category by merging with a designated categorizer: nominalizing n for nouns, verbalizing v for verbs, and adjectivizing or "stativizing" a for adjectives, as in (5) (e.g., Embick 2015; Alexiadou & Lohndal 2017).

(5) a. 

b. 

c. 

While categorizers can be phonologically null in English,[6] the languages under discussion here for the most part have overt categorizers. Furthermore, it is a matter of debate whether categorizing morphology can be equated with derivational morphology in the more technical sense, that is, category-changing morphology with specific (argument- and event-structure changing) functions, e.g., agent noun- and verbal abstract-forming morphology in

6 The notion of zero categorizers is not uncontroversial; see especially Borer (2013, 2015) for criticism.

the nominal domain or causativizing and applicativizing morphology in the verbal domain. For empirical arguments in favor of separating "low" categorizing morphology from "higher" functional, category-changing projections see, e.g., Borer (2005a,b, 2013, 2015); de Belder (2011); Panagiotidis, Spyropoulos & Revithiadou (2017); from a very different perspective Himmelmann (2005), who argues that these cannot be equated on functional grounds. For present purposes I assume that the only difference between categorizers that attach to roots and "higher" verbalizers and nominalizers is that the former seem to form a special domain for meaning and possibly a Spell-Out domain, that is, properties associated with "first Merge" in classic DM (e.g., Marantz 1997). I moreover follow much of the literature in assuming that they can be associated with specific functions (on which more below).

The question now is, where do these categorizers come from? That is, how do new *n*'s, *v*'s and *a*'s arise diachronically? In the verbal domain, answering this question will naturally have implications for understanding argument structure change and argument structure cycles as well (van Gelderen 2018a).[7]

2.2.3 *Verbalizing morphology and argument structure in DM*

The categorizer that forms verbs and is realized as verbal stem-forming morphology is the verbalizer *v*, which according to the standard view comes with different features or "flavors" (Folli & Harley 2005; Harley 2005, 2009, 2013a; Alexiadou & Lohndal 2017; Panagiotidis et al. 2017, etc.), such as v_{CAUSE} for causatives, v_{BECOME} for anticausatives/inchoatives,[8] $v_{\text{BE/STATE}}$ for states and v_{DO} for unergatives. Like other categorizers, *v* mediates between the root and higher functional projections. Argument and event structure alternations such as the causative alternation, passivization, etc., are due to the interaction of *v* with the external-argument introducing projection Voice (Alexiadou & Anagnostopoulou 2004; Alexiadou & Doron 2012; Alexiadou 2013; Harley 2013a, 2017; Alexiadou, Anagnostopoulou & Schäfer 2015; Schäfer 2008, 2017, Kastner 2020, etc.).

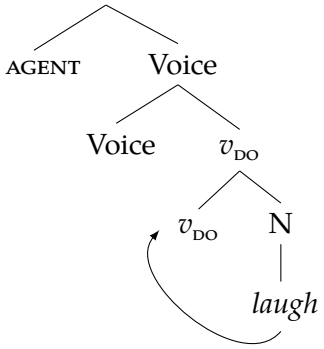
7 Note again that the focus here is on synthetic constructions, which are somewhat understudied in this regard. Grammaticalization of analytic to synthetic forms, as in the development of the Romance synthetic future from a late Latin periphrastic infinitive + HAVE construction (Ledgeway 2012: 134ff.; Gisborne 2017), or second members of nominal compounds to synthetic derivational morphemes, as in the grammaticalization of the Romance adverbial marker It. *-mente*, Fr. *-ment* (Detges 2015), etc., are thus not the primary focus of this study.

8 Though these can also be conceptualized as v_{CAUSE} without an external argument, that is, without a cause argument, cf. Harley 2008, 2013a, depending on the language. However, since in some languages causatives and inchoatives surface with different stem-forming morphology or light verbs (in periphrastic constructions, see Folli & Harley 2005, 2007; Harley 2017), I use v_{BECOME} for inchoatives here.

Moreover, different types of verbalizers are assumed to interact with cross-categorial derivation in a very specific way. According to, e.g., Harley (2005, 2011) (building on work by Hale and Keyser, e.g., Hale & Keyser 1998, 2002), v_{DO} creates unergative verbs that are essentially denominals, in that a bare noun[9] incorporates into ("conflates with" in Hale and Keyser's terms) the selecting verbal projection v_{DO}. Unaccusatives/change-of-state verbs (of the causative alternation), on the other hand, are syntactically deadjectival verbs in this approach, in that an adjective incorporates into/conflates with v_{BECOME}. (6) illustrates the proposed structure of unergatives and unaccusatives according to this proposal.

(6) Unergative (a.) vs. unaccusative (b.) verbs

a.



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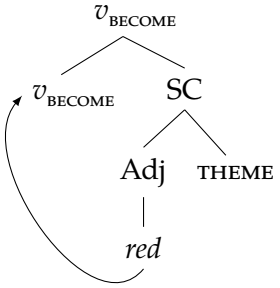


Evidence for this conception of unergatives and unaccusative change-of-state verbs comes from languages in which these verbs are expressed as analytic constructions consisting of a light verb DO and an (abstract) noun in the case of unergatives, as for example in Basque, Tanoan, Hiaki, Farsi, and Italian (cf. Table 1) and a light verb BECOME and an adjective or a deadjectival verb in the case of unaccusative change-of-state verbs (cf. Table 2; see further Koontz-Garboden 2007; Francez & Koontz-Garboden 2015, 2017 on the observation that change-of-state verbs are cross-linguistically often morphologically related to property concept adjectives).

9 Or a "nominal root", cf. Harley (2005), Bleotu (2019).

a.	Basque			b.	Jemez	
	lo	*egin*	'sleep'		*se-'a*	'speak'
	sleep	do			speech-do	
	barre	*egin*	'laugh'		*sae-'a*	'work'
	laugh	do			work-do	

Table 1 Unergative verbs in Basque & Jemez (Tanoan; Hale & Keyser 1998, cit. after Harley 2011: 431–2)

siki	*siki-si*	*awi*	*awi-a*	*bwalko*	*bwalko-te*
'red'	'to redden'	'fat'	'to fatten'	'soft'	'to soften'

Table 2 Hiaki (Yaqui, Uto-Aztecan) deadjectival verbs (Harley 2011: 433)

In other words, unergatives and unaccusative change-of-state verbs in Basque, Hiaki, and English share the same structure (and therefore the same syntactic properties), but differ in whether or not the selected noun/adjective "conflates" with its selecting verbalizing projection.

2.2.4 Diachrony of verbalizing morphology

If this general approach to unergatives and inchoative-unaccusatives is correct, then some interesting diachronic predictions that have not yet been explored follow from it. Specifically, in languages with rich *synthetic* derivational morphology and overt verbalizers, we now expect that synthetic unergatives should be formed either

i. with verbalizers that are historically related to light verbs like DO or

ii. *with verbalizers that are historically related to nominal (derivational) morphology*

In particular, (ii) follows from the theoretical analysis outlined in the previous section because unergatives are structurally denominal verbs – taken at face value, we hence expect to see overt nominal morphology in this class in languages with overt categorizing morphology, at the very least historically.

Similarly, synthetic (unaccusative) change-of-state-verbs should be formed either

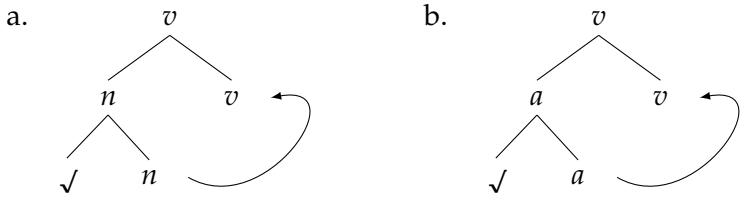
i. with verbalizers that are historically related to light verbs like BECOME or

ii. *with verbalizers that are historically related to adjectival* (*derivational*) *morphology*.

In each case, the first option is reasonably well-studied as it presents a classic case of "grammaticalization", in which a lexical element becomes successively more "functional" by losing prosodic independence, semantic content, and pragmatic salience (Hopper & Traugott 2003). Examples include the Germanic "weak preterite" dental suffix which is generally assumed to have developed from an analytic construction with *dōn* 'do' and the Latin imperfect suffix *-bă̆-* from a construction with a BECOME-light verb, both of which eventually gave rise to new, synthetic TAM morphology. However, option 2) is understudied in both instances, with some exceptions: Calabrese (2019, 2021) discusses the diachrony of different types of conjugational class markers and theme vowels in Latin and Sanskrit and their development into the Romance languages, Bertocci (2017) treats the Latin first conjugation from a DM perspective, and Grestenberger (2021, 2022) discusses the diachrony of different types of verbalizers in Ancient Greek.[10] But if DM (and closely related frameworks like Nanosyntax) are correct in predicting that the same "mechanism" that gives rise to the reanalysis of, e.g., lexical verbs as auxiliaries (be it UR, the LMP, the MMM) during L1 acquisition also applies during the reanalysis of morphemes (because the difference between "words" and "morphemes" is epiphenomenal), then the phenomena discussed in these works are expected to be much more general than previously assumed. Specifically, we expect to see "cycles" in the development of derivational morphology just as we do in the development of elements that are traditionally treated as purely syntactic elements, such as (phrasal) negation markers and auxiliaries, whose diachrony has been studied both in the generative literature on syntactic cycles and in the grammaticalization literature. For derivational and categorizing affixes, we now expect an $n > v$ cycle, in which (certain types of) denominal verbs develop into (certain types) of unergative intransitive verbs and an $a > v$ cycle, by which (certain types of) deadjectival verbs develop into (certain types of) unaccusative verbs, schematically illustrated in (7).

10 Some of the examples discussed here are moreover treated in the functionalist literature on morphological reanalysis and resegmentation, especially "affix telescoping" (Haspelmath 1995; cf. also Rainer 2015), but without specifically treating the question of directionality of reanalysis or the functional types of new derivational morphemes that arise. Haspelmath (1995) argues that the motivation for the types of reanalysis he discusses (including the Greek verbs in *-euō* discussed in section 3.1) is ultimately "compensation of phonological reduction", but two of the three case studies discussed here are not tied to the loss of phonological material (though the notion of "opacity of analysis" could be argued to apply in case study III). We will briefly return to the role of phonology in triggering these changes at the end of each case study and in section 4.

(7) $n \rightarrow v$ and $a \rightarrow v$ reanalysis



We also expect verbalizers themselves to grammaticalize "upwards" and become reanalyzed as Voice and/or aspectual markers (not illustrated here, but see case study II). In particular, we expect to observe these developments in the diachrony of highly synthetic, "fusional" languages with a wide variety of derivational and categorizing morphemes, like Greek, Sanskrit, and many other older Indo-European languages. The following section therefore concentrates on case studies from these languages.

3 Case studies

3.1 Case study I: Greek -eu-ō

Ancient Greek (AG) inherited a verbalizing suffix *-*je*/*o*- that became extremely productive in deriving verbs from different types of nouns and adjectives. The combination of this suffix with different stem-final vowels and consonants gave rise to a variety of new verbal stem-forming suffixes in Ancient Greek, and all the way to Modern Greek (MG). One such class are the AG verbs in *-eú-ō* (MG *-evo*), which were originally derived from agent nouns in *-eú-* /ɛw/ by means of the *-*je*/*o*- verbalizer, illustrated in Table 3 (the citation form is the 1sg. *-eú-ō* from *-*eú-jō*).

AG verb in *-eúō*		base	
*basil-**eú**-ō*	'am king; rule'	*basil-**eú**-s*	'king'
*khalk-**eú**-ō*	'am a coppersmith'	*khalk-**eú**-s*	'coppersmith'
*hipp-**eú**-ō*	'am a horserider'	*hipp-**eú**-s*	'horserider, knight'
*hier-**eú**-ō*	'sacrifice'	*hier-**eú**-s*	'sacrificer, priest'
*nom-**eú**-ō*	'am a herdsman; herd'	*nom-**eú**-s*	'herdsman, shepherd'

Table 3 AG verbs in *-eú-ō*

There is some variation in the argument structure of these verbs already at the earliest stage of attestation (Homeric Greek), but examples like the following

indicate that these were initially verbs expressing a state:

(8) *hós pot' en humĩn toídessin* ***basíleue***
who once among you.DAT.PL. DEM.PRON.DAT.PL be.king.3SG.IPF
"who once was king among you here." (*Od*. 2.46–7)

(9) *... hoúneka boulẽi* ***aristeú-esk-en*** *hapánt-ōn.*
because counsel.DAT be.best-IPFV-3SG all-GEN.PL
"... because with respect to counsel he was always best of all."
(*Il*. 11.627)

But other verbs in *-eúō* are transitive-agentive already in Homer:

(10) *kaì ennéa boũs* ***hiéreusen***
and nine oxen.ACC sacrifice.3SG.AOR
"and he sacrificed nine oxen." (*Il*. 6.174)

(11) *hespérios d' ẽlthen kallítrikha mẽla*
evening PTCL come3SG.AOR beautiful.hair.ACC sheep.ACC
nomeú-ōn.
herd-PTCP.NOM.SG.M
"He came in the evening, herding his fairfleeced sheep."
(*Od*. 9.336)

Moreover, already at the earliest stage there are a number of verbs in *-eúō* formed to nominal bases that do not contain nominal *-eú-s*, and not all of which are agent nouns (Fraenkel 1906: 177ff.; Schwyzer 1939: 732; Chantraine 1948: 367f.):

AG verb in *-eúō*		base	
*arkh-**eú**-ō*	'command'	*arkhós*	'commander, leader'
*aethl-**eú**-ō*	'contend for a prize'	*aethlós*	'contest for a prize'
*hēgemon-**eú**-ō*	'lead the way'	*hēgemṓn*	'leader'
*aletr-**eú**-ō*	'grind corn'	*aletrís* f.	'corn-grinder'
*khōl-**eú**-ō*	'am lame, limp'	*khōlós*	'lame'

Table 4 AG verbs in *-eúō*, II

For some of these, one could postulate unattested intermediate forms in *-*eús*, but in other cases this is unlikely for morphological, semantic and/or chronological reasons.[11] Cases like in Table 4 thus suggest that the originally nomi-

11 E.g., in the first two examples, the unattested intermediate steps **arkheús* and **aethleús* would

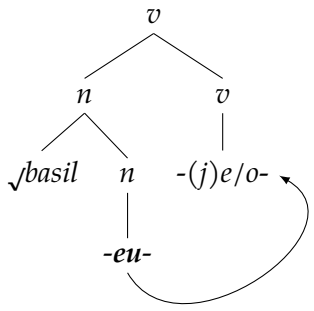
nal, agent noun-forming suffix *-eu-* was being reanalyzed as part of the verbal domain already in the 1st millenium BCE. It eventually became a productive verbalizer on the way to Modern Greek, where it can select nouns, adjectives, adverbs and loanwords, cf. Table 5, (ex. from Panagiotidis et al. 2017).

MG *-ev-o*		base	
*stox-**év**-o*	'I aim at'	*stóx-os*	'target'
*fronim-**év**-o*	'I become prudent'	*frónim-os*	'prudent'
*kont-**év**-o*	'I approach'	*kontá*	'near'
*xak-**év**-o*	'I hack'	Engl. *hack*	

Table 5 Modern Greek verbs in *-ev-*

Panagiotidis et al. (2017) discuss a number of diagnostics in favor of analyzing MG *-ev-* and the functionally similar MG affixes *-iz-*, *-(i)az-*, *-on-*, *-ar-*, and *-en-* as verbalizers. This suggests that Upwards Reanalysis has taken place in denominal verbs like those in Table 3, the structure of which is given in (12). Assuming (12) is the structure built by head movement and adjunction (and excluding higher functional projections like Voice, Aspect and Tense for now, though we will return to these in section 3.2), descriptively the nominalizer *-eu-* has been reanalyzed as a *v*-element.

(12) "Upwards reanalysis" of AG nominal *-eu-*



be well-formed, but are morphologically unlikely due to the existing agent nouns *arkhós* and *a(e)thlētés* that might be expected to "block" such formations (where "blocking" is used in the sense of Embick & Marantz 2008). For the third example, a (morphologically overcharacterized) form *hēgemoneús* and its Doric variant *āgemoneús* are actually attested, but only in much later inscriptions (4th century BCE+), so these forms are very unlikely to have been the derivational basis of the verb *hēgemoneúō* in table 4, which is attested in Homer. In the case of the fourth example, the masculine variant of the agent noun *aletrís* would have been **aletḗr* rather than **aletreús*, and so on. Needless to say, the derivational direction has to be decided on a case-by-case basis relying on the philological evidence, but the point is that taken together, there is evidence for non-nominal uses of the suffix *-eu-* already in the 8th century BCE.

Given early examples of "verbal" *-eu-* as in Table 4, it seems that this reanalysis took place at the same time or shortly after the palatal glide /j/ of the original verbalizing suffix was lost through regular sound change via palatalization of a preceding consonant.[12] The same type of reanalyis also gave rise to a number of other MG verbalizers that Panagiotidis et al. (2017) discuss, all of which developed from the same combination of *nominal suffix* + **-je/o-* verbalizer, with loss of the glide (e.g., *-aíne/o-* < **-án-je/o-*, *-íze/o-* < **-íd-je/o*, etc.). Whether the loss of the glide, i.e., a prior sound change, was a necessary condition for this reanalysis to take place is less clear, as we will see in the next section that there are also cases of $n \rightarrow v$ reanalysis that do not seem to depend on a prior sound change.

3.2 *Case study II: PIE *-eh$_1$-*

Almost all branches of the IE family have a verbal stem-forming suffix **-ē-* (< **-eh$_1$-*) with (broadly) stative or inchoative ("fientive") semantics, but its distribution differs widely: It can form denominal and deadjectival verbs and/or act as a primary (root-derived) verbalizer, and it can form imperfective (present) or perfective (aorist) stems depending on the language. The latter property is especially remarkable as the reconstructable verbal stem-forming affixes are generally either perfective or imperfective, but not both.[13] An overview of the basic distributional facts can be found in Jasanoff (1978, 2004); Harðarson (1998). (13) gives some examples from languages in which the suffix **-ē-* is found in the present/imperfective stem, (14) gives examples for the aorist/perfective stem. Both show variation in whether the suffix is deadjectival, primary (here: root-derived), or both.

12 The phonologically regular development of **-eu-je/o-* > **-ej-je/o-* > **-eje/o-* is preserved in the Elic dialect, where the suffix has the shape *-eíe/o-* (1Sg. *-eíō*). The other dialects have restituted the shape *-eu-* based on the nominal basis in *-eus* and the aorist and future forms in *-eu-s-* which were unaffected by this palatalization, see Fraenkel (1906: 172f.); Chantraine (1948: 367). This is also true for the later cases of intervocalic *-w-*loss, which gave the suffix the shape 1Sg. *-eō* and resulted in "contract forms". In these cases, too, the shape *-eu-* was often restituted in analogy with the nominal suffix. See Fraenkel (1906: 205ff.); Schwyzer (1939: 728, 732).

13 Setting aside the reduplicated perfect stem, which was a category of its own. This restriction of verbal stem-forming morphology is usually explained as having arisen because older Aktionsart/lexical aspect morphology was reanalyzed as (syntactic) aspectual morphology, e.g., Rix (1986) – thus essentially as Upwards Reanalysis.

(13) *-*ē*-: present/imperfective stem (ex. from Jasanoff 2004: 127f.)

a. Hittite (Anatolian): Deadjectival presents in 3sg. -*ē*(*š*)-*zi*, e.g.,
   (i) *maršē*-*zi* 'becomes false' (*marša*(*nt*)- 'false, deceitful')
   (ii) *šallēš*-*zi* 'becomes great' (*šalli*- 'great'),
   (iii) *tannattē*-*zi* 'is desolate' (*tannata*- 'desolate'), etc.

b. Latin (Italic):
   (i) Primary/(de)verbal: *manēre* 'stay', *tacēre* 'be silent', etc.
   (ii) Denominal/deadjectival: *ārēre* 'be dry', *rubēre* 'be red' , *senēre* 'be old', *albēre* 'be white', etc.

c. Germanic:
   (i) Primary: Goth. *hab**ai**þ*, OHG *habēt* 'has'; Goth. *mun**ai**þ* 'has in mind'; Goth. *þah**ai**þ*, OHG *dagēt* 'is silent', etc.
   (ii) Deadjectival: Goth. *fast**ai**þ*, OHG *fastēt* 'fasts' (**fasta*- 'firm, fast'); Goth. *arm**ai**þ*, OHG (*bi*-)*armēt* 'has pity' (**arma*- 'miserable'), etc.

(14) *-*ē*-: aorist/perfective stem (ex. from Jasanoff 2004: 127f.)

a. Greek: Primary (deverbal) "passive" aorists, e.g.,
   (i) *emán**ē**n* 'went mad'
   (ii) *eág**ē**n* 'broke' (itr.)
   (iii) *edám**ē**n* 'was tamed, subjugated'

b. Slavic:
   (i) Primary (deverbal) infinitives/aorists in -*ě*- (< *-*ē*-), e.g., OCS *bŭděti* 'be awake', *mĭněti* 'think', etc.
   (ii) Deadjectival: *starěti* 'become old' (*starŭ* 'old'), *cělěti* 'become healthy' (*cělŭ* 'healthy'), *bogatěti* 'become rich' (*bogatŭ* 'rich'), etc.

c. Baltic:
   (i) Primary: Lith. *budėti* 'be awake', *minėti* 'mention', *turėti* 'have', etc.
   (ii) Deadjectival: *senėti* 'grow old' (*sẽnas* 'old'), *jaunėti* 'get younger' (*jáunas* 'young'), *storėti* 'get fat' (*stóras* 'fat'), etc.

In Latin, the suffix *-*ē*- gave rise to a subclass of the Latin 2nd conjugation presents in the form of the stative(/inchoative) verbs in -*ēre* (column b. in Table 6), which have long been known to be associated with deadjectival verb formation (e.g., Watkins 1971), with a synchronic alternation with 1st conjugation factitive presents in Old Latin, illustrated in Table 6.

The alternation in Table 6 suggests that -*ē*- (and its factitive "alternant" -*ā*-) is a particular verbalizer or "flavor" of *v* in the sense of Folli & Harley (2005, 2007); Harley (2013a, 2017) associated with stative/inchoative *Aktion-*

a. Factitive	b. Stative	c. Inchoative	d. Base
*clār-**ā**-re*	*clār-**ē**-re*	*clār-**ē-sce**-re*	*clār-us, -a, -um*
‘make clear’	‘be clear’	‘become clear’	‘clear’
*-alb-**ā**-re*	*alb-**ē**-re*	*alb-**ē-sce**-re*	*alb-us, -a, -um*
‘make white’	‘be white’	‘become white’	‘bright, white’
*-nigr-**ā**-re*	*nigr-**ē**-re*	*nigr-**ē-sce**-re*	*niger, -ra, -rum*
‘make black’	‘be black’	‘become black’	‘dark, black’
*liqu-**ā**-re*	*liqu-**ē**-re*	*liqu-**ē-sce**-re*	*liqu-idus, -a, -um*; *l̆iqu-ēns*
‘make fluid’	‘be fluid’	‘become fluid’	‘fluid, liquid’

Table 6 “Stative *-ē-*” in Latin (Watkins 1971: 47)

sart. In Ancient Greek, the corresponding suffix *-ē-* (-η-) and its allomorph *-thē-* (-θη-; whence the MG perfective passive marker *-th(i)-*) are usually referred to as “passive aorist” suffixes, but at least at the earliest attested stage, this is a bit of a misnomer, as the original use is for the most part that of a stative/inchoative verbal stem-forming suffix (similar to the Latin examples in column b. in Table 6) rather than a Voice marker. However, unlike in Latin, in AG the suffix is restricted to the *perfective* stem and forms primary verbs (that is, it is not specifically associated with roots that form primary adjectives). Examples are given in Table 7.

a.	*e-rrú-**ē**-Ø*	‘flowed, streamed’
	A-flow-**V.PFV**-3SG.PAST.ACT	
b.	*e-pág-**ē**-Ø*	‘became fixed, coagulated’
	A-become.fixed-**V.PFV**-3SG.PAST.ACT	
c.	*e-mán-**ē**-Ø*	‘went mad, became enraged’
	A-rage-**V.PFV**-3SG.PAST.ACT	
d.	*e-ág-**ē**-Ø*	‘broke’ (itr.)
	A-break-**V.PFV**-3SG.PAST.ACT	
e.	*e-tárp-**ē**-Ø*	‘enjoyed, delighted in’
	A-enjoy-**V.PFV**-3SG.PAST.ACT	
f.	*e-phán-**ē**-Ø*	‘appeared’
	A-appear-**V.PFV**-3SG.PAST.ACT	

Table 7 Homeric non-passive *ē*-aorists

Examples such as these can be multiplied and suggest that the *ē*-suffix of the "passive aorist" originally spelled out lexical aspect/*Aktionsart* (hence *v*) rather than Voice. Tronci (2005) compares the distribution of passive vs. non-passive (anticausative/inchoative) (*th*)*ē*-aorists in Homer (8th century BCE) with that in Herodotus (5th century BCE) and shows that the passive use gradually gained ground on the way to Classical Greek. Nevertheless, there are good reasons to assume that AG -(*th*)*ē*- does not realize Voice, but *v* in the context of Asp[+pfv], as argued in Grestenberger (2016, 2021) and summarized here:

- -(*th*)*ē*- obligatorily co-occurs with *active* endings.[14] Even assuming these are the Elsewhere endings (see below), this is incompatible with a Voice head with a [nonact] or [-ext.arg.] feature, as standardly assumed for passive verbs in Ancient (and Modern) Greek, e.g., Alexiadou & Doron (2012); Alexiadou (2013); Alexiadou et al. (2015); Grestenberger (2018, 2021).
- -(*th*)*ē*- is in complementary distribution with other verbal stem-forming morphemes (= verbalizers), cf. Table 8. Even if these were to be analyzed as exponents of Asp, this distribution would not be predicted if it realized Voice.
- -(*th*)*ē*- is only licensed in a particular aspectual environment (+PFV), like other verbalizers, but *unlike* Voice morphology on the endings which is compatible with all "tense-aspect" stems (that is, it is not restricted to imperfective/perfective aspect).
- If structures with -(*th*)*ē*- lack Voice, we automatically derive the obligatory active endings as Elsewhere endings, parallel to other morphologically active unaccusatives (i.e., unmarked anticausatives, cf. Alexiadou & Anagnostopoulou 2004; Schäfer 2008; Alexiadou et al. 2015).
- This analysis is also suggested by the diachrony of -(*th*)*ē*- and its comparison with cognates in other IE languages: Homeric -(*th*)*ē*-aorists are mostly non-passive, usually stative or inchoative, aorists (Table 7), and languages like Latin, Hittite, etc., show only the stative/ inchoative use and not the passive one (cf. Table 6 and ex. (13)–(14)).

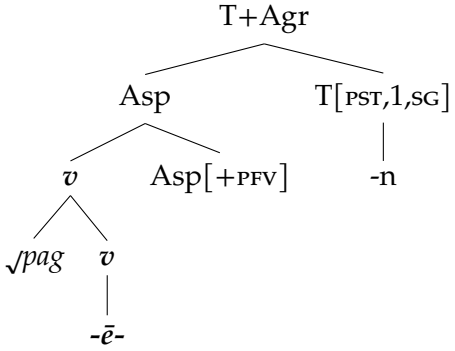
Taken together, this suggests that -(*th*)*ē*- is a contextual allomorph of *v* in the context of Asp[+pfv], as in (15) (from Grestenberger 2021).[16]

14 Except in the vexed future passive, on which see Grestenberger (2016).
16 Modified from the proposal of Merchant (2015) for Modern Greek; on MG cf. also Christopou-

Pres. act.	Aor. act.	Aor. "pass" -(*th*)*ē*-
*rhḗg-**nu**-men*[15]	*e-rrḗk-**sa**-men*	*e-rrág-**e**-men*
break-**v**-1PL.PRS.ACT	A-break-**v**-1PL.PST.ACT	A-break-**v?**-1PL.PST.ACT
'break' (tr.)	'broke' (tr.)	'broke' (itr.)
*dú́-**no**-men*	*e-dú́-**s**a-men*	*e-dú-**the**-men*
sink-**v**-1PL.PRS.ACT	A-sink-**v**-1PL.PST.ACT	A-sink-**v?**-1PL.PST.ACT
'sink' (tr.)	'sank' (tr.)	'were sunk'
*tréph-**o**-men*	*e-thrép-**sa**-men*	*e-tréph-**the**-men*; *e-tráph-**e**-men*
nourish-**v**-1PL.PRS.ACT	A-nourish-**v**-1PL.PST.ACT	A-nourish-**v?**-1PL.PST.ACT
'nourish'	'nourished'	'were nourished; grew'

Table 8 -(*th*)*ē*- in complementary distribution with other *v*'s

(15) Structure of AG 1sg. passive aor. *(e-)pág-ē-n* 'became fixed, coagulated'



Note that there is no Voice head in this structure. The obligatory active endings follow from the assumption that the "active" allomorphs of the endings are really Elsewhere allomorphs that are selected when the following Spell-Out condition on nonactive morphology does not hold:

(16) Spell-Out condition on nonactive morphology
(e.g., Embick 2004, Alexiadou et al. 2015)
Voice → Voice[Nonact]/_No DP specifier]

More precisely, this can be formulated as a Spell-Out condition on T:

los & Petrosino (2018) and Alexiadou (2021). On possible stem-derived -*thē*-aorists like *e-klí-n-thē-n* 'sloped, leaned' besides *e-klí-thē-n* cf. Grestenberger (2021: 233f.).

(17) Spell-Out condition on nonactive morphology in (Ancient) Greek:
T[ϕ,±past,Q] ↔ T[ϕ,±past,NONACT]/Voice[-D](...)⌢_]

(17) states that the ϕ and tense features on T are spelled out with their nonactive allomorphs in contexts in which finite T is concatenated with (= linearly adjacent to) a span that consists minimally of Voice[-D]. Q is used as a placeholder for the phonological exponent that is chosen at Vocabulary Insertion (Embick 2015: 89). The active allomorphs of (finite) T are thus selected whenever (17) does *not* hold, including when there is no Voice head.

With this structure in place, we can now turn to the diachrony of (*)-*ē*-.[17] There are essentially two competing proposals: 1) *-*ē*- was an inherited primary verbal stem-forming suffix that formed "fientive" (change-of-state) verbs (Harðarson 1998, LIV^2) and 2) *-*ē*- originated as a *nominal* suffix and was reanalyzed as a verbal stem-forming suffix at a stage that is still accessible to reconstruction (Schindler 1980; Jasanoff 2004; García Ramón 2014). The second scenario is, of course, a version of the $n \rightarrow v$ reanalysis that we are interested in. There are a number of arguments in favor of 2):

- Attested *-*ē*-verbs at the oldest stages of the IE languages that have them are often formed to stative or "adjectival" roots associated with the "Caland system", a term for a group of roots and primary adjectives expressing *property concepts* (in the sense of Dixon 1982; see Rau 2009, 2013; Bozzone 2016 specifically on property concept adjectives in IE), for example *h_1reud^h 'red', *$peh_2\hat{g}$ '(become) fixed', *h_2eh_1s 'dry', **ters* 'dry, thirsty', etc.

- There is a concrete, identifiable analogue in the nominal system, i.e., the instrumental singular ending *-*ē*- (< *-*eh*$_1$-) found, among other contexts, as the instrumental singular ending of adjectival abstract nouns (specifically, so-called "root nouns" without overt nominal stem-forming morphology).

- There are analytic constructions in the older IE languages that consist of just such a nominal instrumental in *-*ē* plus a light verb or auxiliary that could plausibly have become the input for reanalysis as synthetic verbs, and arguably did at least in Latin, e.g., the Vedic *guhā bhū-/kr̥-* ('become/make hidden/with hiding') construction, the Latin type *ārĕ-faciō* 'make hot/with heat' (also non-univerbated *facit*

17 The following discussion focuses on the allomorph *-ē*-, which is older than *-thē*- and has direct formal correspondences in other IE languages. See Peters (2004) and García Ramón (2014) on the possible origins of the *-thē*-variant.

arē, see Hahn 1947; Weiss 2020: 138, fn. 18 on Latin and Schindler 1980; Jasanoff 2004; Balles 2006, 2009 on the PIE construction).

- A denominal origin could explain why the verbalizer *-*ē*- is not restricted to a particular tense-aspect stem like the inherited (P)IE verbal stem-forming suffixes: The grammaticalization into a verbalizer licensed by imperfective (present stem) or perfective (aorist stem) aspect would have taken place only at the stage of the individual daughter languages/branches.

The specifically Greek development of the suffix could be explained if a reanalysis of the originally nominal, instrumental ending *-*ē*- took place in pre-Greek in the context of periphrastic constructions or, more likely, "decasuative" (= case-derived) adjectives derived by adding an adjectival or nominal derivational suffix directly to a case-marked nominal form, as tentatively proposed in Jasanoff (2004) and illustrated in (18) with decasuative adjectives formed with the denominal (later participial) suffix *-*nt*-.[18]

(18) a. *$man\text{-}\bar{e}_{\text{INSTR}}$-*nt*- 'with anger, angry' > *manent-[19] > Gk. *manént-* (aor. ptcp. nom. sg. m. μανείς, gen. μανέντ-ος 'raging')
b. *$mig\text{-}\bar{e}_{\text{INSTR}}$-*nt*- 'with mixture, mixing' > *migent- > Gk. *migént-* (aor. ptcp. nom. sg. m. μιγείς, gen. μιγέντ-ος 'mingling, mixing')
c. *$pag\text{-}\bar{e}_{\text{INSTR}}$-*nt*- 'with firmness; firm, stuck' > *pagent- > Gk. *pagent-* (aor. ptcp. nom. sg. m. παγείς, gen. παγέντ-ος 'fixed, stuck, firm')

Alternatively, the reanalysis could have taken place in the context of predicatively used instrumental nouns themselves. The status of these in the older IE languages is controversial (see Balles 2006, 2009 and for a recent critical survey Fortson 2020), but there is at least one undisputed case involving the suffix *-*ē*- in Greek itself: The impersonal verb *khrḗ* (χρή) 'it is necessary', which according to the standard etymology reflects a predicatively used instrumental noun *$\hat{g}^h r\text{-}eh_1$ 'with need > it/one needs' (Balles 2000: 31f., 2006: 258ff.; Fortson 2020: 72). If the instrumental forms in (18) (e.g., *man-ē*, *pag-ē*, etc.) were also used as predicates in this way, they may have contributed to the reanalyis of -*ē*- as (originally third person singular) verbal form.

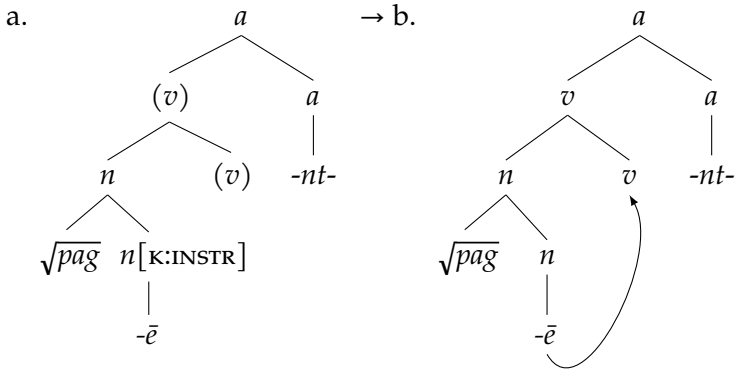
In these forms and the ones in (18), which originally would have described derived properties ("with noun", "noun-y"), the marker *-*ē*- was then reanalyzed as a stative/inchoative verbal stem-forming suffix, i.e., v_{BE} and/or

18 See Grestenberger (2020) with refs. on the reanalysis of *-*nt*- as participial suffix and Fortson (2020) for a recent survey of decasuative derivation in Indo-European.

19 In this context, -*ē*- was regularly shortened to -*e*- by Osthoff's Law, but note that it would have remained long in the predicatively used instrumental forms discussed immediately below.

v_{BECOME}. The proposed Upwards Reanalysis of *-*ē*- is illustrated in (19). (19-a) illustrates the structure of decasuative (de-instrumental) adjectives in -*nt*- before reanalysis, with an optional intermediate verbal projection. (19-b) illustrates the structure after reanalysis of *-*ē*- as spelling out that intermediate verbal projection.

(19) "Upwards reanalysis" of nominal instr. *-*ē*- → stative/inchoative *v* (cf. AG (*e*)*págē* 'became fixed'; *pagént*- 'fixed, stuck')



In predicative instrumentals, the same reanalysis would have taken place without the topmost adjectival projection in (19). Since the third person ending in Greek was ø in past tense contexts (aorist, imperfect, pluperfect), these structures would have been initially reanalyzed as zero-marked third person singular forms (cp. Greek *khré* above) of a new "stem" in -*ē*- to which other person/number endings could then be added.

This proposed instance of *n* → *v* reanalysis differs from the one discussed in section 3.1 in a number of ways: While the reanalysis of Greek -*eú*- is arguably that of a nominalizer to a verbalizer, in (19) it is a nominal *inflectional* suffix that is reanalyzed in a very specific structural configuration. Moreover, at least in the development of (*)-*ē*- in Greek, there was no concomitant sound change that led to the loss or reduction of the original verbalizer – this seems to have been zero from the start. Additionally, the suffix then seems to have undergone further movement "upwards", from stative to eventive *v*, and quite probably further from *v* to Voice (or Voice/Asp[pfv], see again Christopoulos & Petrosino 2018; Alexiadou 2021) on the way to Modern Greek.

The association of *-*ē*- with (de)adjectival derivation and stative and/or inchoative Aktionsart in Latin, Hittite, and many other branches follows if the nominal forms in question were originally *deadjectival* nouns made from property concept adjectives, as outlined above. This case study can thus ten-

tatively be classified as an instance of the $a \rightarrow v$ reanalysis outlined in section 2.2.4, albeit with an intermediate nominal, inflectional layer that underwent the actual reanalysis to give rise to a new verbalizer.

3.3 Case study III: German diminutive verbs

The final case study concerns the rise of so-called diminutive verbs in German (and beyond). Standard German forms "verbal diminutives" using the suffix *-(e)l-*, which triggers umlaut of the base vowel. Synchronically, it seems to act as a deadjectival (Table 9, row a.), deverbal (Table 9, row b.), and denominal (Table 9, row c.) verbalizer (examples from Grestenberger & Kallulli 2019: 75f.).

	Base			Dim. verb	
a.	A	*schwach*	'weak'	*schwäch-**el**-n*	'to be/act a little weak'
				weak-DIM-INF	
		blöd	'silly'	*blöd-**el**-n*	'to be/act a little silly'
				silly-DIM-INF	
b.	V	*koch-en*	'to boil'	*köch-**el**-n*	'to simmer'
		boil-INF		boil-DIM-INF	
		dräng-en	'to urge, push'	*dräng-**el**-n*	'to jostle, push a little'
		urge-INF		urge-DIM-INF	
c.	N	*Frost*	'frost'	*fröst-**el**-n*	'to shiver, be cold'
				frost-DIM-INF	
		Herbst	'fall, autumn'	*herbst-**el**-n*	'be fall-like'
				fall-DIM-INF	

Table 9 Standard German verbal diminutives

While the synchronic analysis of *-(e)l-* as a verbalizer is uncontroversial for the deadjectival and denominal verbs above, it may not be as obvious in the case of the "deverbal" diminutive verbs in the b. rows of Table 9. However, Grestenberger & Kallulli (2019) argue that in these cases, the argument structure of the derived verbal diminutive is apparently not "inherited" from the base. Thus, the verbal diminutive of the causative alternation verb *kochen* does not alternate and can only be used intransitively (at least in Viennese German). Moreover, these verbal diminutives differ from their putative verbal base in their compatibility with preverbs and preverbal particles, and tend to be activity verbs and/or "iteratives" irrespective of the Aktionsart of the base. This latter property has been described for verbal diminutives in other

languages as well (e.g., Italian, Tovena 2010; for a cross-linguistic survey see Audring, Leufkens & van Lier 2021). Thus the -(*e*)*l*- in the "deverbal" type can also reasonably be analyzed as verbalizer, albeit to (verbal) roots rather than to nouns or adjectives.

The same umlauting suffix *-el-* also acts as nominal, though mostly "lexicalized" diminutive in Standard German,[20] whereas the Viennese (Austro-Bavarian) variant <-(er)l> /-(ɐ)l/ is productive and compositional. Examples are given in Table 10 (from Grestenberger & Kallulli 2019: 63f.).

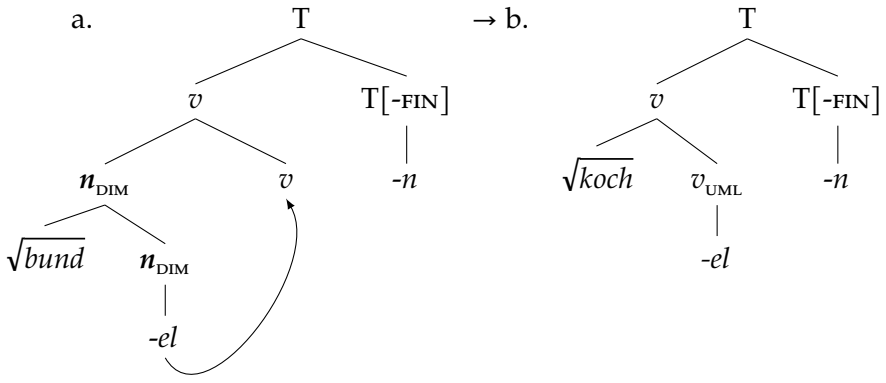
Standard German		Viennese	
Base	Dim	Base	Dim
Busch m.	*Büsch-**el*** n.	*Sack* m.	*Sack-**erl*** n.
bush	bush-DIM	sack	sack-DIM
'bush	'bunch, tuft'	'sack, bag'	'little sack, bag'
Bund m.	*Bünd-**el*** n.	*Suppe* f.	*Supp-**erl*** n.
bunch	bunch-DIM	soup	soup-DIM
'bunch'	'bundle'	'soup'	'a little (bit of) soup'

Table 10 German nominal diminutives

It seems obvious to relate the nominal diminutive suffix in Table 10 to the verbal one in Table 9 and treat it as yet another case of Upwards Reanalysis, by which the nominal suffix became reanalyzed as a verbalizer in the context of denominal derivation. This is illustrated in (20). (20-a) illustrates the proposed reanalysis of *-el-* in the context of denominal verbal derivation (with a phonologically null verbalizer), (20-b) the proposed structure of "deverbal" verbal diminutives like *köcheln* in Table 9 after this reanalysis.

20 In this use, it can be identified with the "LexP" or "low diminutive" of De Belder, Faust & Lampitelli (2014), who argue that lexical(ized) diminutive morphology spells out a functional projection *below* categorizing morphology.

(20) UR of denominal verbs in *-el-*
(*bünd-el-n* 'to bundle'; *köch-el-n* 'to simmer')



There are two potential problems with this analysis that have to be discussed. The first one is a potential confound: Nominal *-(e)l-* is historically not only a diminutive-forming suffix, but also forms instrument nouns (and originally also nouns of appurtenance). These differ from nominal diminutives in gender (they are mostly masculine, diminutives are famously always neuter in German) and umlaut (instrument nouns tend not to umlaut, though some do, and not all of them have a synchronic verbal base to which this property could be compared). Some examples are given in (21).

(21) SG masculine instrument nouns in *-el-*: *Nagel* 'nail', *Hobel* 'plane', *Sattel* 'saddle', *Dübel* 'pleg', *Schlegel* 'mallet', *Hebel* 'lever', *Deckel* 'lid', *Zügel* 'rein', *Riegel* 'bolt', *Kübel* 'bucket', *Säbel* 'saber', *Knebel* 'gag', *Wedel* 'frond', *Stiefel* 'boot', *Löffel* 'spoon', *Spiegel* 'mirror', etc.

These nouns are historically deverbal,[21] but synchronically they can and do become the basis for productive denominal derivation of manner-of-motion and instrument verbs, as illustrated in (22).

(22) a. *Spiegel* m. 'mirror' — *spiegel-n* 'to mirror'
b. *Kurbel* f. 'crank' — *kurbel-n* 'to crank'
c. *Segel* n. 'sail' — *segel-n* 'to sail'

21 Because of their diachrony and their uniform semantics, one could consider segmenting this class into root + *-el*-suffix, but this analysis is less obvious for semantically and derivationally less uniform feminine and neuter nouns in *-el-* like *Gabel* 'fork', *Nadel* 'needle', *Tafel* 'table, board', *Zwiebel* 'onion', *Eichel* 'acorn', *Regel* 'rule', *Rassel* 'rattle', *Raspel* 'rasp', *Kugel* 'sphere, ball', *Semmel* 'bread roll', *Kurbel* 'crank', *Spindel* 'spindle', *Gondel* 'gondola', *Nudel* 'noodle', etc. (all feminine) and *Kabel* 'cable', *Übel* 'evil', *Seidel* 'pint', *Pendel* 'pendulum', *Rudel* 'herd, pack', *Segel* 'sail', etc. (all neuter), which include loanwords and are probably best analyzed as monomorphemic.

In other words, instrument nouns like in (22) productively form denominal verbs that are formally indistinguishable from verbal diminutives and semantically similar in that they also tend to be unergative activities, though without the iterative, intensive, pejorative, affective, etc., semantics that are usually associated with (verbal) diminutives (on the semantics and pragmatics of nominal diminutives cf. Jurafsky 1993, 1996; Dressler & Merlini Barbaresi 1994; on verbal diminutives Audring et al. 2021). Importantly, some previous studies (e.g., Weidhaas & Schmid 2015; Audring, Booij & Jackendoff 2017) fail to make this distinction because they treat iterativity as a semantic property of verbal diminution and therefore include verbs like those in (22) in their treatment of verbal diminutives. But this makes it difficult to pin down what exactly the semantic contribution of *-el-* is in verbs like those in Table 9 and hampers the analysis of both these diminutive verbs and the (denominal?) instrumental verbs such as those in (22), in which the matter of derivational directionality becomes relevant. The reanalysis illustrated in (20) is therefore only intended for those diminutive verbs that cannot be analyzed as synchronically denominal verbs in which *-el-* is part of the nominal base.

The second problem concerns the relationship between verbal diminutive *-el*-forms as in Table 9 and nominal diminutive *-el*-forms as in Table 10. As an anonymous reviewer points out, we need to be sure that this is not just accidental homophony and that there is indeed a case to be made for derivational directionality of the $n \rightarrow v$ type. In other words, in cases in which we have both a diminutive *-el*-verb and an *-el*-noun, as in *bünd-el-n* 'to bundle' besides *Bünd-el* 'a bundle', how can we be sure that the verb is derived from the noun, and not vice versa, or both from the root/stem *Bund*, or even from a verbal stem such as the one found in, e.g., *ver-bünd-en* 'to join with, form a bond'? And, more to the point, how can we be sure that the verbal use of the suffix is diachronically younger than and derived from the nominal use? Since the problem of derivational directionality and its diagnostics is too complex to be discussed here in detail, I will focus on the second part of the question, namely arguments for establishing that there is a *diachronic* directionality of the $n \rightarrow v$ type, since this is what's at stake. For a detailed discussion of *synchronic* derivational directionality in cross-categorial derivation see Grestenberger & Kastner (2022).

The problem of accidental homophony can be debunked fairly quickly: There is widespread agreement that the equivalent of diminutive semantics in the verbal domain is iterative/intensive Aktionsart or "attenuative" semantics (e.g., Tovena 2010; Tovena & Kihm 2008; Audring et al. 2017; Audring et al. 2021; Wiltschko 2006; Weidhaas & Schmid 2015; for differing formal accounts of this Aktionsart behavior see Oltra-Massuet & Castroviejo 2014;

Grestenberger & Kallulli 2019), which is what the German diminutive verbs consistently display once denominal instrument verbs as in (22) are excluded (see the discussion above). Together with the shared phonological and morphophonological properties (umlaut), this makes it rather unlikely that nominal and verbal *-el-* are accidentally homophonous suffixes.

The second point concerns the diachrony of *-el-*. While its Old High German (OHG) ancestors *-il(a)* (< **-elo-*, **-ilo-*) and *-al(a)-* (**-ol(o)-*) productively formed diminutive nouns (from nouns), instrument nouns (from verbs), and nouns of appurtenance (from nouns), the handbooks also discuss a *verbal* iterative suffix *-il-ōn*/*-al-ōn* (e.g., Wilmanns 1896: 96ff.; Wissmann 1932: 27ff.; Krahe & Meid 1969: 263f.), illustrated in Table 11. This has led some scholars to actually posit two diminutive suffixes for OHG (and thus possibly for Proto-Germanic), a nominal and a verbal one.

kling-an	'to sound out, ring'	*kling-**il**-ōn*	'to ring repeatedly'
tūm-ōn	'to turn'	*tūm-**il**-ōn*, *-al-ōn*	'to roar; to turn, roll'
grab-an	'to dig'	*grub-**il**-ōn*	'to dig at; to ponder'
want-ōn	'to turn, change'	*want-**al**-ōn*	'change; walk, stroll'

Table 11 OHG deverbal *-il-ōn*/*-al-ōn* verbs (Grestenberger & Kallulli 2019: 82)

However, the deverbal iterative use of this suffix is not attested in Gothic, and hence should not be reconstructed for Proto-Germanic. In fact, the only reconstructable function of the PIE suffix **-lo-* (the remote ancestor of Gm. *-el-*) is that of a *nominal* suffix, forming nominal diminutives from nouns and adjectives as well as deverbal nouns and adjectives (Fortson 2010: 130–1). These functions of the suffix are attested in the Greek, Italic, Germanic, and Balto-Slavic branches (including cognate lexemes formed with this suffix) and can therefore be considered to be inherited from the proto-language. The verbal use, on the other hand, arose independently in some of these branches (specifically, Germanic and Italic) and cannot be reconstructed for their common ancestor. Early deverbal forms like those in Table 11 in which *-il-* and *-al-* are verbalizers should therefore be interpreted as an early instance of the $n \rightarrow v$ reanalysis that took place several times in the history of this suffix. Interestingly, an entirely parallel development of this suffix took place independently in the history of Latin and some of its Romance descendents: The Latin reflex of the inherited PIE adjectival suffix **-lo-*, the remote ancestor of nominal SG *-(e)l-*, forms deverbal adjectives and instrument nouns as well as nominal and adjectival diminutives (Weiss 2020: 298ff.), some of which then become the basis for deadjectival/denominal verbs, as illustrated in Table 12.

a. Base	b. Dim./instr. noun	c. Derived verb
ōs n. 'mouth'	*ōs-cul-um* 'kiss'	*ōs-cul-āri* 'to kiss'
iācere 'to throw'	*iac-ul-um* 'spear, javelin'	*iac-ul-āri* 'to spear-throw'
gestus m. 'gesture'	[*gesti-cul-us*[22]]	*gesti-cul-āri* 'to gesticulate'
vincīre 'to bind'	*vinc-ul-um* 'rope, fetter'	*vinc-ul-āre* 'to fetter'

Table 12 Latin diminutive & instrument nouns in *-(c)ul-us, -a, -um*

Verbs like the ones in column c. seem to have been reanalyzed in the same way as the German denominal *-el*-verbs in ex. (20) on the way to French, where they gave rise to deverbal iterative/diminutive verbs in *-iller* (< **-iculāre/i*) and *-ailler* (< **-āculāre/i*) according to Flobert (1998: 871), e.g., *sauter* 'to jump' – *sautiller* 'to jump around, hop'; *mordre* 'to bite' – *mordiller* 'to nibble' (It. *mordicchiare*); *boiter* 'to limp' – *boitiller* 'to limp a little'; *fendre* 'to split, cleave' – *fendiller* 'to crack'; *crier* 'to cry out, yell' – *criailler* 'to whine'; *philosopher* 'to philosophize' – *philosophailler* 'to philosophize badly/pretentiously' (obsolete), etc.

To conclude, the semantic similarity in the development of these verbs suggests that there is a regular path of development by which verbs derived from diminutive nouns develop into iterative, pluractional, intensive, or more broadly "attenuative" verbs via Upwards Reanalysis of the diminutive feature as part of the verbal(izing) domain (see Grestenberger & Kallulli 2019 for a preliminary formal analysis of this feature). Verbal diminutives that arise in this fashion[23] thus instantiate a subtype of the $n \rightarrow v$ reanalysis, which gives rise to a very specific "flavor" of v associated (broadly) with (iterative) activity verbs.[24]

4 Conclusion and implications

The case studies discussed in the previous section illustrate the proposed diachronic pathway by which new verbalizers arise from different types of de-

23 Though it must be emphasized that this is not the only diachronic pathway that leads to verbal diminutives: Of the 112 languages with verbal diminutives in the survey of Audring et al. (2021), "it turned out that most verbal diminutives had no nominal counterpart of the same form. This could of course be due to a lack of historical data and the fact that we only looked at (synchronic) grammars: maybe there used to be a nominal homophone, but it has disappeared over time." (Sterre Leufkens, p.c.).

24 Grestenberger & Kallulli (2019) tentatively identify this with the verbal projection that introduces an ACTOR theta role in Doron (2003), i.e., v_{ACT}.

nominal and deadjectival verbs through Upwards Reanalysis. The first case, the development of the AG agent noun-forming suffix *-eu-* to the MG all-purpose verbalizer *-ev-*, shows $n \rightarrow v$ with an originally stative "flavor". The second case, the development of the stative/inchoative suffix *-$\bar{e}$- in AG shows reanalysis of an originally nominal inflectional suffix to a verbalizer (and further to a Voice and/or aspectual marker). In this case, the fact the resulting verbs are change-of-state verbs is due to the semantics of the roots in whose context the suffix was reanalyzed (property concepts/primary adjectives). The last case, the development of the verbal diminutive suffix *-(e)l-* in German, shows once more that the specific morphosyntactic features of the base (in this case, [DIM]) give rise to specific and predictable types of v (in this case, verbal diminutives/iteratives/pluractional verbs). These case studies therefore suggest that there are indeed regularities in the diachronic pathways of nominal and verbal derivational morphology that lead to the rise of new verbalizers. Moreover, there is evidence that the same type of reanalysis also gives rise to other types of categorizing and derivational morphology, for instance in the development of adjectival into participial morphology, of stative into eventive participles (Haspelmath 1994; Grestenberger 2020), of intransitive unergative verbs into transitive verbs (van Gelderen 2018a, 2019), and of verbalizing morphology into higher verbal functional projections, e.g., the development of inchoative/anticausative morphology into passive morphology (Haspelmath 1990, 1994; Alexiadou 2005; Wanner 2013; Grestenberger 2021, etc.).

The generalization and formalization of the morphosyntactic features of these formations and the contexts in which they become reanalyzed thus makes it possible to identify regularities in the diachrony of verbal (and other categorizing) morphology and constrain the space of possible diachronic reanalyses. This is the case even for developments that do not display traditional "grammaticalization" characteristics such as the loss of functional structure, semantic bleaching, and in particular phonological erosion, which as we saw in the last two case studies is not a necessary precondition for reanalysis.

Some open questions remain, especially concerning the role of phonological change as a possible 'cue' for reanalysis. Even in those cases in which there is no evidence of a prior or concomitant phonological change (as in case study II), the question remains whether reanalysis depends on the availability of zero categorizers in a given language. Moreover, more needs to be said about the argument structure changes associated with UR, especially with respect to the stative/agentive alternation in, e.g., case study I, or the development of transitive agentives from unergatives (see van Gelderen 2018a, 2019

on these types of argument structure changes). Finally, for reasons of space I have not discussed possible counterexamples in which reanalysis appears to proceed in the opposite direction ("downwards"). One such case is spurious and concerns the loss of intermediate functional projections, as in the reanalysis of biclausal as monoclausal structures (cf. the analysis of the development of the MG future in Roberts & Roussou 2003) or the development of the AG middle participle *-menos* on the way to Modern Greek (Grestenberger 2020). In these cases, the "downwards" movement of morphological material is only apparent, as intermediate (silent) projections are lost – and, accordingly, the morphosyntactic features associated with them.

A more difficult case that will have to be treated elsewhere is the reanalysis of categorizing morphology as part of the root, that is "root extensions" or "neo-roots". Such cases have been reported and even concern groups of roots rather than individual lexical items, e.g., the Tocharian roots in final *-tk* (see Malzahn 2010: 460f. with refs.), though further work is needed to determine whether all such cases can be explained as conjugational class or "theme" markers, and hence adjoined to rather than part of the root.[25]

To conclude, I want to once again emphasize the advantage of treating these "morphological" developments as essentially parallel to what we see in the domain of diachronic syntax proper, including the interaction of linear order with hierarchical structure. That is, L1-acquiring children are faced with the same challenge of mapping linear input to hierarchical structure, independent of whether they are acquiring auxiliaries, light verbs, or complex synthetic verb forms, and it is during this mapping process that reanalysis ("change events") can take place. Adding categorizing morphology to our repertoire of categories that can undergo regular "cyclic" changes requires no additional assumptions, comes for free in non-lexicalist, syntacticocentric approaches to word-formation (like Distributed Morphology), and has the potential to expand our understanding of the morphosyntactic features involved in argument and event structure change.

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25 Cf. Koller (2008: 25ff.) for an analysis of Tocharian *-tk-* (and *-Cw-*) roots as "morphologically complex structures" (p. 27); see also Anagnostopoulou & Samioti (2014), Bertocci (2017), Calabrese (2019), Grestenberger (2022) and Grestenberger & Kastner (2022) for further possible examples of (reanalyzed) "root augments" in Latin, (Ancient and Modern) Greek, and Hebrew.

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