Zero morphology and change-of-state verbs

Pavel Caha, Karen De Clercq, Guido Vanden Wyngaerd

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Abstract

This paper discusses a theory of conversion (zero derivation) in terms of phrasal spellout. In this approach, there are no zero morphemes. Instead, the 'silent' meaning components are pronounced cumulatively within overt morphemes. As an empirical case, we discuss adjective/verb ambiguity as in *narrow*. As verbs, these roots have both an inchoative and a causative sense. Following Ramchand (2008), we assume that such deadjectival causatives contain three parts: the adjective denoting a state, a change-of-state component PROC, and a causative component INIT. Adopting a Nanosyntax approach, we propose that verbs like *narrow* spell out a complex node with all these abstract heads. The ambiguity between the inchoative, causative and adjective falls out as a consequence of the Superset Principle (Starke 2009), which states that a lexical entry can spell out any subtree it contains. Since both the inchoative sense and the adjective sense correspond to proper parts of the causative one, we derive these readings without the need to postulate zeroes. We show how these assumptions allow us to capture a broad range of patterns, focussing mainly on English and Czech.

1 Introduction

This article proposes an analysis of adjective-verb conversion. The phenomenon is illustrated in (1).

(1) a. The road is **narrow**.
b. The road **narrow**-ed.
c. The workers **narrow**-ed the road.

Conversion refers to the fact that the adjective *narrow* in (1a) has the exact same form as the verb *narrow* in (1b-c). The verb can have either an inchoative (change-of-state) reading (1b), or a causative one (1c).

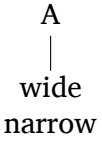
Alongside the conversion cases in (1), deadjectival verbs in English sometimes require an overt suffix, as in (2).

(2) a. The road is wide.
b. The road wide-**n**-ed.
c. The workers wide-**n**-ed the road.

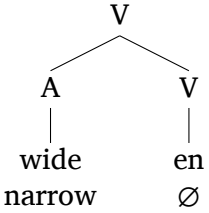
Interestingly, the verbs show the same ambiguity between an inchoative and a causative reading as the unsuffixed verbs.

The standard approach to deadjectival verbs attributes to the examples (1) and (2) the exact same bimorphemic structure, (3a,b), where the verb is derived from the adjective. The two classes differ only in whether the verbalising suffix is overt or not.

(3) a.

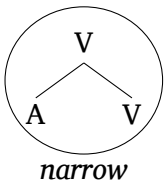


b.



The idea that we pursue in this paper is that in a case like *narrow*, the apparent zero marking of the verb arises as a consequence of phrasal spellout, where the relevant phonology is associated to a complex syntactic object, as indicated by the circle in (4). In developing the analysis, we also show how it accounts for the inchoative-causative ambiguity of the derived verbs, which we can observe in both types, the unsuffixed and the suffixed ones.

(4)



The paper is organised as follows. In section 2, we present some of the data that motivate the approach. Section 3 introduces the prerequisites for our analysis. The main proposal is described in section 4. Section 5 discusses suffixal marking, and ends with some predictions regarding the typology of morphological marking in the triplet adjective-inchoative-causative. Section 6 examines how these predicted patterns are realised in Czech deadjectival verbs. Section 7 briefly touches upon the topic of anticausatives.

2 The data

We start by presenting a representative selection of English deadjectival verbs in Table 1. In the first column, the table contains verbs that are zero-derived from adjectives. The other columns contain suffixed deadjectival verbs and one group of prefixed deadjectival verbs, as indicated in the column headings.

Table 1: Deadjectival verbs in English

∅	*-en*	*-ify*	*-ise*	*en-*
cool	tighten	solidify	generalise	enlarge
narrow	widen	prettify	formalise	enfeeble
open	shorten	simplify	americanise	enrich
thin	sharpen	humidify	sexualise	
dim	slacken	acidify	christianise	
tame	brighten	fluidify	commercialise	
blind	cheapen	falsify	conceptualise	
warm	coarsen	Frenchify	actualise	
clean	dampen	intensify	annualise	
empty	darken	uglify	grammaticalise	
clear	deaden	diversify	brutalise	
dry	deafen	greenify	centralise	

Our main point is that it is to a large extent an arbitrary property of the adjective whether it forms a zero-derived verb, or whether it requires a suffix, and if it requires an affix, which affix.

Let us start by noting that there are a couple of phonological restrictions to be observed. For instance, the suffix *-en* normally attaches to monosyllabic adjectives ending in a plosive, fricative or affricate (Plag 2003: 117-118, Carstairs-McCarthy 2002: 55-56). However, as Carstairs-McCarthy (2002: 87) noted, there are adjectives that have the right phonology and nevertheless do not take *-en*. The adjective *wet* is an example, because **wetten* does not exist, but the zero-derived *wet* does. In sum, while the phonological rule can explain why **greenen* will never be formed (*green* does not end in a plosive or fricative), additional factors are at play for adjectives that do satisfy the condition.

Something similar applies to the suffix *-ify*: this suffix attaches only to bases that are either monosyllabic, stressed on the final syllable or end in unstressed /ɪ/. However, this does not mean that *-ify* can attach to all adjectives that obey these phonological conditions. A case in point is the adjective *empty*, which allows for a zero-derived verb, contrasting with *pretty*, which does not.[1]

In sum, even though there are some phonological conditions that restrict the formation of deadjectival verbs in English, it is impossible to predict which adjective allows for zero marking and which one requires an affix. As a result, we conclude that which class an adjective belongs to is to some extent arbitrary, and this information therefore needs to be learned and stored for each adjective in the lexicon.

Similarly, it is not predictable which suffix will appear on a suffixed deadjectival verb. For instance, it is not clear why *-ify* can derive *falsify*, while *-en* cannot derive **falsen*, even though the phonological conditions would allow for either of these suffixes (compare *coarsen*).[2]

[1]The base alternations of adjectives to which *-ise* attaches are complex and beyond the space of this paper (see Plag 2003: 117-118, Plag 1999). There is also a fourth potential verbalising suffix *-ate*, which we leave out of consideration here. This suffix often attaches to truncated roots, especially if the base ends in two unstressed syllables (Carstairs-McCarthy 2002: 55, Plag 2003: 117).

[2]*-ise/-ify/en-* can also turn nouns into verbs, as in *terrorise*, *beautify* and *empower*, respectively (Carstairs-McCarthy 2002: 55). The conceptual basis involved in these verbs can, in certain cases at least, generalise

The next point we want to bring out is that all the affixes shown in the table show the inchoative–causative ambiguity. For reasons of space, we only illustrate this for the suffix *-en*, (5):

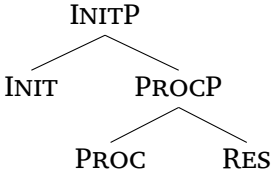
(5) a. Her stomach tightened.
b. She tightened the lid.

In this paper, we present a Nanosyntactic account of how the difference between zero derivation and suffixation is encoded in the lexicon. Our main aim is to show that the Nanosyntactic framework, where zero-derivation is modeled by means of phrasal spell-out, has the right properties to model this distinction in a way that allows us to provide an explanatory account not only for English, but also for other languages. Moreover, the very same type of account will allow us to explain the causative-inchoative ambiguity, which is found in English, but largely absent in Czech, as we discuss in Section 6.[3]

3 Prerequisites

In this section, we lay out the prerequisites for our analysis. Specifically, we adopt here the structure of deadjectival verbs as proposed in Ramchand (2008). In Ramchand's work, verbs in general are decomposed into a series of heads which she refers to as Initiaton, Process, and Result. They are organised hierarchically as in (6):

(6)



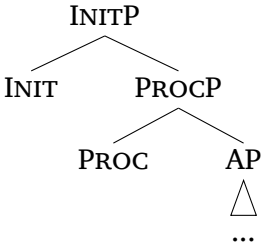
The INIT head introduces the causation event. The PROC head specifies the nature of the change or process, whereas RES gives the result of the event. Each of these heads may license a specifier (not shown in (6)): the specifier of the causation event is the initiator, the specifier of the process is the undergoer, and the specifier of the result is the resultee (Ramchand 2008: 40). For example, in the sentence *Mary gave the book to Bill*, *Mary* is the initiator who brings the event about, *the book* is the undergoer of the Process (it changes possession) and 'Bill having the book' is the Result. The INIT and RES heads are optional in that some verbs lack them. For instance, the verb *get* in *Bill got the book* lacks the INIT component.

Against this background, Ramchand (2008: 90,108) analyses deadjectival verbs as in (7). The trees depict the structure of the causative, the inchoative and the adjective, respectively. Recall that each of PROC and INIT brings along an argument position, which accounts for the argument-structure alternations.

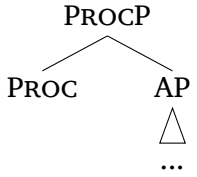
over the noun/adjective distinction, e.g. both the noun *beauty* and the adjective *beautiful* involve the same scale. Francez and Koontz-Garboden (2015) refer to this shared conceptual basis as a *property concept*.

[3]Since the main focus of this paper is on zero-derivation, we only want to capture the distinction between zero-derived adjectives and the rest. The allomorphy of derivational affixes won't be addressed here for reasons of space (see Caha et al. 2019 and De Clercq and Vanden Wyngaerd 2019 for two different types of approaches compatible with our proposal).

(7) a. Causative



b. Inchoative



c. Adjective

Building on Hay et al. (1999), Ramchand (2008: 90) proposes that verbs like *dry* are "a special kind of process verb where the degree of verbal change is mapped onto a property scale of some sort (derived from a basic adjectival meaning). Thus, in their intransitive use, they are classic *proc* verbs, with the single argument being an UNDERGOER." This is shown in (7b), which is just a special instance of the generally adopted structure (3b). Note that like Ramchand, we understand the AP in the complement of PROC as representing not directly the positive-degree adjective, but rather a scale on which both the inchoative and the positive adjective are based.[4]

In Ramchand's system, the causative in (7a) has an additional zero-marked INIT head, which introduces the Initiator argument. Verbs such as *narrow* in their causative use thus contain minimally two components of meaning that apparently receive no overt marking (i.e., INIT and PROC).

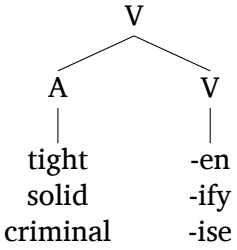
In sum, the syntactic structures in (7) are based on the two assumptions given in (8):

(8) a. The verb contains the adjective.
b. The causative contains the inchoative.

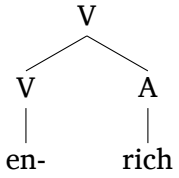
The evidence in support of these assumptions is both morphological and semantic.

We start with morphological evidence in support of (8a). We have already discussed some of the evidence in Table 1, which shows how verbs are derived from adjectives by various affixes. The structural representation of these cases in (9) clearly shows how the verb is more complex than the adjective.

(9) a.



b.



This type of evidence can be replicated for many languages, where verbs related to adjectives are typically morphologically more complex than the adjectives.

Semantically as well, the meaning of the verb contains that of the adjective. For example, the verb 'to open' means 'to become open', or 'to cause to become open.' This type of paraphrase generally works quite well for the verbs in Table 1. In some cases, a paraphrase containing a comparative of the adjective is more appropriate. For instance, atelic sentences such *The soup cooled for hours* do not entail that the soup ultimately became cool, but they nevertheless entail a change along the relevant scale. As we have

[4]We refer the reader to Vanden Wyngaerd et al. (2020) for a discussion of some relevant facts concerning the relationship between scales and positive degree adjectives based on that scale.

made it clear above, this is compatible with our proposal, since the AP at the bottom of the tree does not necessarily correspond to the positive degree, but rather to the scale along which the change proceeds.

Let us now turn to the second assumption in (8b). This is also supported by semantic evidence. Intuitively, *to open* in its causative sense means 'to cause to open', with the second occurrence of *open* being the inchoative one (but see Harley 2012 for a different view). Lundquist et al. (2016: 2) put this more formally in what they call the *Causational Entailment*:[5]

(10) Causational Entailment
$\forall x \forall y$[CAUSE (x, INCH(Pred(y))) → INCH(Pred(y))]

This entailment is what accounts for the (semantic) deviance of (11).

(11) #John broke the glass, but the glass didn't break.

As far as the morphology is concerned, the picture is more complex. There are languages where the morphology supports the claim that the causative contains the inchoative. We reproduce some empirical evidence from Haspelmath (1993: 91) in (12). The table shows cases where the causative is morphologically more complex than the inchoative. We refer to this as the transparant pattern.

(12)	a.	Georgian	duγ-s	'cook'	(INCH)
			a-duγ-**ebs**	'cook'	(CAUS)
	b.	French	fondre	'melt'	(INCH)
			faire fondre	'melt'	(CAUS)
	c.	Arabic	darasa	'learn'	(INCH)
			dar**r**asa	'teach'	(CAUS)

As the discussion unfolds, we will also get to see an inverse pattern, which is traditionally referred to as the *anticausative*, where the inchoative is morphologically more complex than the causative. We come back to anticausatives in section 7. For now, we focus on the causative-inchoative entailment and the transparent morphological pattern as support for the structures in (7).

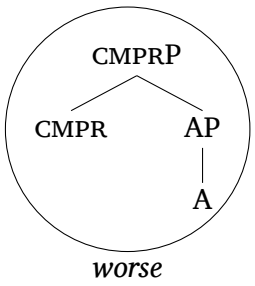
4 Zero-marking as phrasal spellout

As highlighted in the introduction, our main goal is to explore the idea that there are no zero morphemes used in the derivation of deadjectival verbs. Our claim is that zero morphemes are an illusion, arising when grammatical meanings expressed by the purported zeroes are actually realized (in a portmanteau fashion) by the root and/or other morphemes.

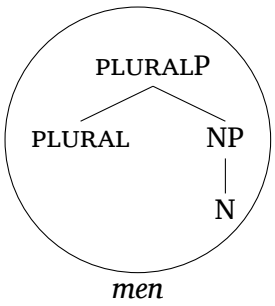
The idea that roots can (in addition to the conceptual meaning) also express adjacent grammatical categories is perhaps best seen in cases of root suppletion (*bad–worse; man–men*). These cases can be understood as instances of a scenario where the suppletive root realizes both the lexical category (A or N) and the relevant grammatical category (CMPR or PLURAL). We show this in (13) and (14).

[5]We slightly changed the formulation, with a universal rather than an existential quantifier taking scope over the entire conditional, to match what we take to be the intention of the entailment.

(13)



(14)

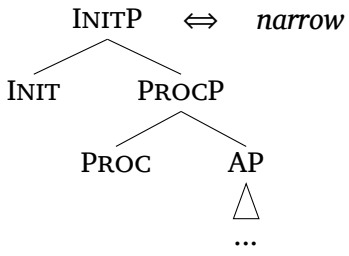


An alternative analysis could (of course) conclude that the relevant grammatical categories in these forms have a "zero allomorph." While we are aware of the fact that there is no direct link between suppletion and the absence of regular morphology (e.g., *bett-er*), we think that the frequent absence of regular morphology with irregular roots such as *worse* or *men* is not accidental. Therefore, the intuition we shall follow is that whenever regular markers are absent with particular roots (such as in (13) and (14)), this is because the root already realises the relevant meanings, thereby blocking the appearance of regular morphology.[6]

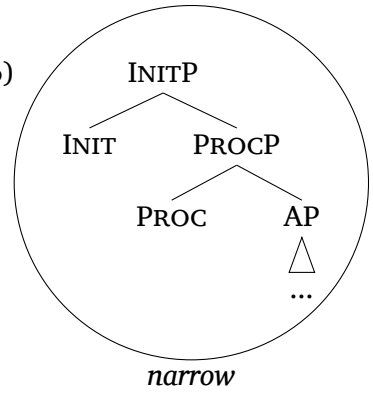
In the remainder of this paper, we extend the type of analysis in (13) and (14) to deadjectival verbs. In the technical implementation of this idea, we follow the Nanosyntax approach (Starke 2009, 2018). Nanosyntax is a Late-Insertion theory of morphology, where the syntactic structure is assembled first, and then it is spelled out using lexical entries. In this conception, lexical entries are understood as stored links between syntactic representations on the one hand, and a phonology and/or a concept on the other hand. Crucially, the syntax part of the lexical entry consists of a full syntactic tree (rather than a terminal), similarly to what we saw in (13) and (14).

With this background in place, consider now the lexical entry for *narrow* in (15), which links the phonology /ˈnæɹəʊ/ (represented by means of plain spelling) with a particular syntactic tree:[7]

(15)



(16)



When syntax builds the structure of a causative verb, as in (16), the lexical tree in (15) is identical to it, and spellout is successful. We represent this by placing a circle around the syntactic structure in (16). Phrasal spellout thus obviates the need for zero morphemes: the INIT and PROC heads do not dominate zero morphemes, but the lexical entry of *narrow* is such that it may cumulatively realise several heads, including INIT and PROC.

[6]The issue of why suppletive roots are sometimes compatible with regular morphology, as in *better*, is addressed in Caha et al. (2019). We do not discuss this here for reasons of space, our main point being to motivate the idea that roots can (at least sometimes) realise grammatical meanings.

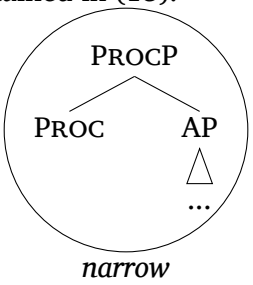
[7]Our entries in this paper systematically ignore the concept associated with the entry for *narrow*, since these are not relevant to the current discussion.

The next question is how the lexical entry of *narrow* can also realise the structure of an inchoative verb and an adjective. The phrasal-spellout model treats this as an instance of syncretism, i.e., different meanings expressed by the same form. Technically, this is achieved by proposing that lexical entries may lexicalise various different syntactic trees – under the condition that the syntactic tree is contained in the lexical entry. This condition is known as the Superset Principle:

(17) *Superset Principle* (Starke 2009)
A lexically stored tree L matches a syntactic node S iff L contains the syntactic tree dominated by S as a subtree

The result of adopting the Superset Principle is that the entry for *narrow* in (15) can also spell out the inchoative structure (18a) and the adjective structure (18b), because these trees are contained in (15).

(18) a.



b.

In sum, the mechanism of phrasal spellout gives us an elegant way of representing two related phenomena: on the one hand, the zero marking of certain types of deadjectival verbs, and on the other hand the syncretism between the inchoative and the causative verb.

5 Suffixal marking

As we saw in Table 1, only a subset of adjectives allows for zero marking of the corresponding verb. A lexical item like *wide* contrasts with *narrow* in that *wide* is only an adjective and not a verb. The contrast is illustrated in (19).

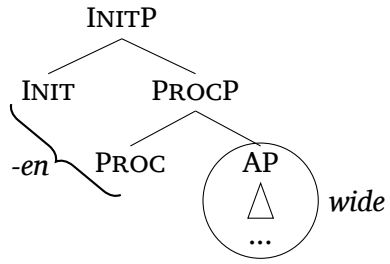
(19) a. The workers narrowed/*wided the road.
b. The road narrowed/*wided.

Recall that whether an adjective behaves like *narrow* or *wide* is a matter of lexical idiosyncrasy, i.e., it has to be learned (and stored) for each relevant lexical item. In the phrasal-spellout model, this is achieved simply by associating an adjective like *wide* to an AP only:

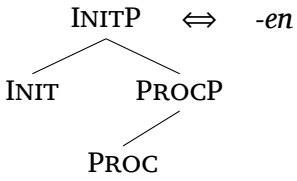
(20) AP ⇔ *wide*

Since the lexical tree (20) does not contain the syntactic tree of a verb, such a lexical item will not be able to function as a verb: the root *wide* will need help from an additional morpheme to realise all meaning components, as informally shown in (21).

(21)



(22)

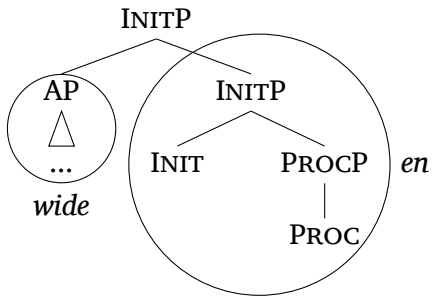


What is the lexical entry for *-en*? Recall that in Nanosyntax, lexical entries are understood as memorized links between syntactic structures (constituents) and phonology. Therefore, by proposing that the suffix *-en* spells out the heads PROC and INIT, as shown informally in (21), we are led to assign to it the lexical entry (22), which corresponds to a constituent containing these two features.

The geometry of the lexical entry reflects the structure (21): specifically, the entry (22) is identical to (21) minus the part of the structure that is spelled out as *wide*. In effect, the structure (21) literally divides into two parts, where one part is spelled out by *wide* and the other by *-en*.

But now a problem arises. Specifically, the lexical tree in (22) does not contain the syntactic tree (21), nor any subpart of it, as a subtree. Therefore, the Superset Principle is not met, and the heads PROC and INIT cannot be spelled out by (22) as long as the structure is as given in (21). This problem is resolved by moving the AP node to the specifier of the INITP, yielding (23). This movement is driven by the need to lexicalise the features INIT and PROC.

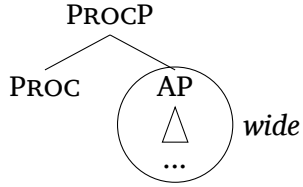
(23)



The INITP in (23) is now an exact match for the lexical entry of the suffix, and spellout is successful. Moreover, the affix *-en* now appears where we want it, namely as a suffix following the root.[8]

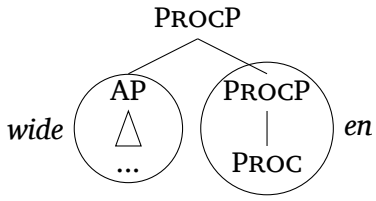
The inchoative version of *widen* works analogously, except that the syntactic derivation lacks the INIT head, (24a). Movement of the AP to the left yields (24b). Since the remnant PROCP is a subtree of (22), *-en* can spell out the PROCP in (24b).

(24) a.



[8]In Nanosyntax, such movements are enforced by the so-called spellout algorithm, i.e. they are spellout-driven. We presuppose the algorithm, but we can't go into its details for reasons of space, see Starke (2018), Caha et al. (2019).

b.



It is relevant to note that if there was a suffix in the English lexicon that would only be specified for the circled PROCP, this suffix would also qualify as a match for (24b), and it would, in fact, take precedence over the ambiguous causative/inchoative *-en*, on the grounds that it is more specific. There is no such suffix in English, but we will be led to propose such a suffix in Czech in the next section.

To close off this section, we consider some implications of our theory for the typology of marking in the triplet adjective – inchoative – causative. So far, we have discussed two cases, instantiated by the English adjectives *narrow* and *wide*, respectively. However, the scenarios allowed for by the system just developed are wider. We show some of the predicted scenarios in Table 2.

Table 2: Five scenarios

	A	PROC	INIT	(typological pattern)
1a.	root			labile Eng. *wid-en*
1b.		suffix		
1c.				
2a.	root			equipollent
2b.		suffix1		
2c.		suffix2		
3a.	root			causative
3b.		suffix1		
3c.		suffix1	suffix2	
4a.	root			causative
4b.				
4c.			suffix	
5a.	root			labile Eng. *narrow*
5b.				
5c.				

This table should be read as follows. The top row represents the features found in various forms. The scenario where the root is a syntactic adjective is defined by the feature A. This scenario is represented on the lines marked by (a) (i.e. 1a, 2a, etc.). The grey cells stand for heads which are not present in the derivation, namely PROC and INIT. To derive an inchoative verb, we add PROC to the adjectival structure, as shown on lines (b). The causative verbs add INIT (lines (c)).

The horizontal sections in the table (numbered 1-5) represent various root and suffix types predicted by our analysis, ordered according to root size, from the smallest (AP-size) roots in the top section to the largest (INITP-size) roots in the bottom one. A lexically small root like *wide* is shown in section 1. It can realise no more than the adjective feature A. When it functions as a verb, it needs a suffix, as shown on lines 1b and 1c, which correspond to the derivations we have just seen. The suffix is the same for the causative

and for the inchoative verb, giving rise to syncretism between the causative and the inchoative.

We show an INITP-size root, like *narrow*, in section 5 of the table. As explained above, the Superset Principle ensures that such roots are three-way syncretic: they can realise each member of the triplet adjective-inchoative-causative, as shown on the lines 5a, 5b, and 5c, respectively.

In the final column, the table contains the names given in Haspelmath (1993) to different types of morphological marking of the causative-inchoative alternation. The two English patterns (given in section 1 and 5 of the table) are called 'labile,' showing syncretism between the causative and the inchoative. The reason why we have two different labile patterns is that Haspelmath does not consider the derivational relation to the adjective. As a result, his classification slightly deviates from ours, but we include Haspelmath's terminology here to show that we are dealing with well-established typological patterns.

At least three additional patterns of marking are predicted by our system, shown in sections 2, 3, and 4 of the table. The first of these (section 2) is one where we have different suffixes for the inchoative and the causative, a possibility already pointed out in the discussion surrounding (24). This is a scenario where one suffix (suffix1) lexicalises just PROC, whereas a different suffix (suffix2) lexicalises both INIT and PROC, such that suffix1 (marking the inchoative) is replaced by suffix2 in the causative. This pattern is labelled the equipollent pattern in Haspelmath (1993), since it involves a common stem, to which different markers are added in the inchoative and the causative.

The second predicted pattern is in section 3 of the table. In this scenario, the causative suffix lexicalises only INIT and not PROC. Therefore, a causative verb is derived by stacking a causative suffix on top of an inchoative one, as shown on line 3c of the table.

The third additional pattern (section 4) is one where the root is of size PROCP, i.e. larger than a mere adjective, but smaller than a causative verb. Such roots are predicted to have a zero-derived inchoative, but a suffixed causative. Both patterns 3 and 4 are called causative in Haspelmath (1993), since they involve a causative that is derived from the inchoative.[9]

In the remainder of this paper, we provide evidence for some of the additional patterns by discussing deadjectival verbs in Czech. Specifically, we argue that Czech instantiates Patterns 1, 2, and 4 of Table 2. Before we turn to this detailed discussion, we want to briefly consider evidence for the existence of all three of the predicted additional patterns in Turkish. The relevant patterns are shown in Table 3.[10]

Table 3: Turkish patterns of causative-inchoative marking

	adj	inch	caus	
Pattern 2	kir-li	kir-le-**n**-(mek)	kir-le-**t**-(mek)	'dirty'
Pattern 3	iyi	iyi-**leş**-(mek)	iyi-**leş**-**tir**-(mek)	'good'
Pattern 4	kuru	kuru-(mak)	kuru-**t**-(mak)	'dry'

The numbering of the patterns links them to the relevant sections in Table 2. The relevant suffixes (which we discuss below) are in bold; the bracketed suffix is the infinitival

[9]Haspelmath distinguishes two further patterns: an anticausative pattern, to which we return in section 7, and a suppletive pattern (e.g., *fall-drop* and *kill-die*), which we take to be a subtype of the *narrow* pattern.

[10]We are grateful to Ömer Demirok for pointing this out to us. Turkish also has an anticausative pattern, which is not shown in the table (see section 7).

ending.

Starting with Pattern-2 roots, we can see that they have different suffixes for the inchoative and the causative, with the causative *-t* replacing the inchoative *-n*.[11] Pattern 3 roots have a causative suffix *-tir* that stacks on top of the inchoative *-leş*. Pattern 4 roots have a zero-marked inchoative and the causative suffix *-t*. The particular interest of Turkish resides in the evidence it provides for Pattern 3, which is one that Czech (to be discussed in detail in the next section) does not have. Pattern 3 is also interesting in that we consider it to be one that faithfully reflects the underlying meaning composition, with the inchoative derived from the adjective, and the causative further derived from the inchoative.

6 Three INCH/CAUS scenarios in Czech

We start by describing causative verbs in Czech, because the picture here is rather simple: there is a single suffix *-i*, which derives causative verbs. We turn to inchoatives in Section 6.2.

6.1 The causative

Causatives are a relatively productive category in Czech. Using the Czech National Corpus (`https://www.korpus.cz`), where all our examples come from, we have collected causatives of about 250 different adjectival roots. An example of a causative is given in (25). (25a) is an adjective, (25b) a verb.

(25) a. *tup* *-ý*
blunt -AGR
b. *tup* *-i* *-l*
blunt -CAUSE -PST

(26) a. *ti**ch*** *-ý*
silent -AGR
b. ***tiš*** *-i* *-l*
silent -CAUSE -PST

The causative suffix triggers palatalisations, as illustrated in (26), where (in IPA notation) *x* goes to ʃ.[12]

An interesting fact is that many adjectives require an aspectual (perfectivising) prefix in the causative. We illustrate this in (27). (27a) is the adjective *snadn-ý* 'easy.' (27b) is an unprefixed causative (which does not exist), (27c) is a prefixed causative. Building on previous work, Ramchand (2008: 140-1) proposes that such prefixes are analogous to English particles and occupy the (generally optional) RES head. We do not know why a prefix is obligatory with some verbs, but we agree with Ramchand that their presence (while sometimes required) is orthogonal to the patterns of causative/inchoative formation. In order for the prefixes not to influence our data, we illustrate each class with an unprefixed verb whenever possible. When we use prefixed verbs, we keep the prefix constant across the causative and the inchoative. That way, the role of unpredictable obligatory prefixes is kept to the necessary minimum.

[11] The adjective 'dirt-y' is denominal, i.e. the root *kir* 'dirt' takes an adjectivising suffix *-li* in the ADJ column, and a general verbalising suffix *-le* in the two verbal columns. What is crucial is that the difference between the inchoative and the causative resides in the different suffixes *-n* vs. *-t*. We are grateful to Utku Türk for a useful discussion.

[12] Palatalisation is a regular process in Czech. For example, the NOM.PL.MASC.ANIM of the adjective ***ti**ch*-ý* 'silent' is ***tiš*-í**, the comparative adverb is ***tiš*-eji** 'more silently.'

(27) a. *snadn -ý*
easy -AGR
b. **snadn -i -l*
easy CAUSE -PST
c. *u- snadn -i -l*
UP easy -CAUSE -PST

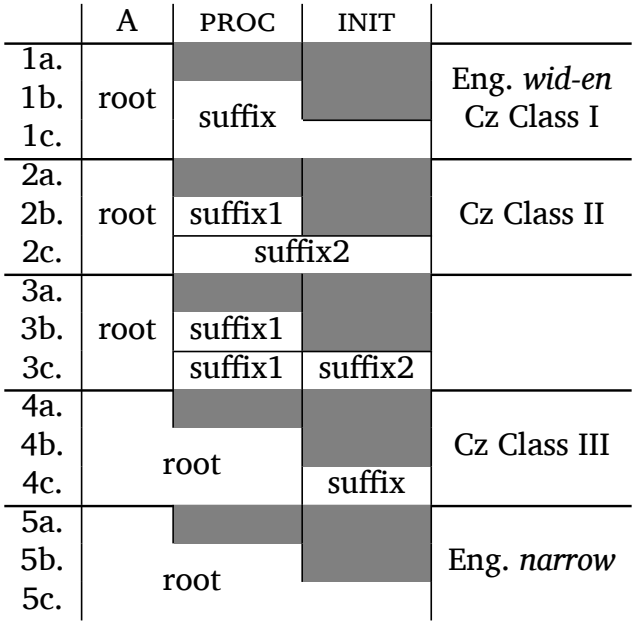
(28) a. *tup* ***-i*** *-l*
blunt -CAUSE -PST
b. *tup* ***-í*** *-m*
blunt -CAUSE -1.SG
c. *tup* ***-e*** *-ní*
blunt -CAUSE -NMLZ

Another property of the causative suffix is that it shows allomorphy, as shown in (28). In the present tense, the vowel lengthens (28b), and in nominalisations, it is replaced by *-e* (28c). We note the variation for completeness' sake, and we will only look at the past participle (28a) as the relevant form from now on. The reason is that the past participle is the most informative form from the perspective of verb-class identification. For example, some inchoative deadjectival verbs have an inchoative *-ě* in the past participle, so they clearly differ from the causatives which have an *-i*, see (28a). However, such inchoatives have the same present tense *-í* as causatives, see (28b). Therefore, looking at the past participle makes most sense.[13]

6.2 The inchoative

Having discussed the formation of causatives, we turn to their inchoative counterparts. Here, the situation is more complex, in that at least four different classes may be distinguished. In this section, we focus on three classes, which instantiate the predicted patterns in Table 2. We repeat the table here as Table 4, but with the three Czech verb classes added.

Table 4: Three verb classes in Czech



The Czech Class I is characterised by the fact that both the causative and the inchoative are marked by the same suffix (namely *-i-*), which is analogous to the English

[13]The allomorphy of the post-root causative/inchoative marker can be accounted for by assuming that in addition to the causative/inchoative meaning, these morphemes may also realise tense and aspect.

wid-en class. An example is the verb derived from the adjective *levn-ý* 'cheap'. In (29a), we give a causative sentence based on this verb, and in (29b) we present the inchoative counterpart. The verb is the same in both sentences.

(29) a. *Škoda Auto* ***z-*** ***levn*** ***-i*** ***-la*** *své dva hlavní modely.*
Škoda auto PFX- cheap -CAUS -PST its two main models
'Škoda Auto has made its two main models cheaper.'

b. *Vodka* ***z-*** ***levn*** ***-i*** ***-la.***
vodka PFX- cheap -INCH -PST
'Vodka got cheaper.'

Table 5 lists the roots in our database showing this inchoative-causative syncretism. This is a relatively minor class and we could therefore only illustrate it using a prefixed verb in (29).

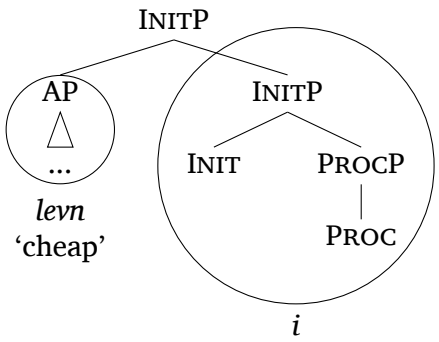
Table 5: Class I verbs

gloss	adj	inch/caus
expensive	drah-ý	z-draž-**i**-l
cheap	levn-ý	z-levn-**i**-l
firm	pevn-ý	z-pevn-**i**-l
slow	pomal-ý	z-pomal-**i**-l
fast	rychl-ý	z-rychl-**i**-l
weak	slab-ý	o-slab-**i**-l
calm	mírn-ý	z-mírn-**i**-l
intensive	intenzivn-í	z-intenzívn-**i**-l

The analysis of this class is analogous to English *wide*. The lexical entry of the root is of the smallest size (AP), see (30a). The suffix *-i* is then specified for the heads INIT and PROC as indicated in (30b). The (partial) derivation of the causative verb is shown in (31).

(30) a. AP ⇔ *levn*
△
...

b. INITP ⇔ *i*
INIT PROCP
PROC

(31)


Class II differs from Class I in that it has a dedicated suffix *-ě* for the inchoative. A case in point is the adjective *hutn-ý* 'dense,' illustrated in (32). Specifically, (32a) contains the causative verb with *-i*. Interestingly, the inchoative in (32b) no longer has *-i*, but *-ě*:

(32) a. *Půdu jsem* ***hutn*** ***-i*** ***-l*** *dostatečně.*
soil.ACC AUX.1.SG dense -CAUS -PST sufficiently
'I made the soil sufficiently dense.'

b. *Zvuk* ***hutn*** ***-ě*** ***-l*** *a koncert ostře gradoval.*
sound dense -INCH -PST and concert sharply grew.in.intensity
'The sound was getting denser and the concert was growing in intensity.'

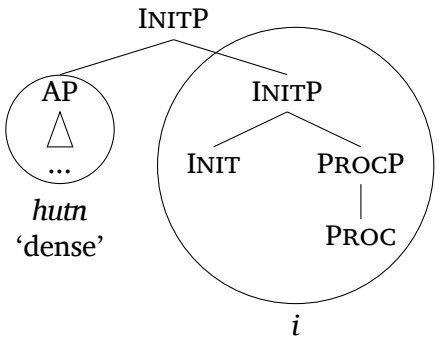
Table 6 lists all the roots that show the *-ě* suffix in the inchoative.

Table 6: Class II verbs

gloss	adj	inch	caus
coarse	drsn-ý	z-drsn-**ě**-l	z-drsn-**i**-l
clear	jasn-ý	z-jasn-**ě**-l	z-jasn-**i**-l
smooth	jemn-ý	z-jemn-**ě**-l	z-jemn-**i**-l
compact	hutn-ý	z-hutn-**ě**-l	z-hutn-**i**-l
liquid	kapaln-ý	z-kapaln-**ě**-l	z-kapaln-**i**-l
calm	klidn-ý	z-klidn-**ě**-l	z-klidn-**i**-l
beautiful	krásn-ý	z-krásn-**ě**-l	z-krásn-**i**-l
cultural	kulturn-í	z-kulturn-**ě**-l	z-kulturn-**i**-l
mighty	mohutn-ý	z-mohutn-**ě**-l	z-mohutn-**i**-l
dead	mrtv-ý	z-mrtv-**ě**-l	z-mrtv-**i**-l
national	národn-í	z-národn-**ě**-l	z-národn**i**-l
nervous	nervózn-í	z-nervózn-**ě**-l	z-nervózn-**i**-l
affectionate	něžn-ý	z-něžn-**ě**-l	z-něžn-**i**-l
ugly	oškliv-ý	z-oškliv-**ě**-l	z-oškliv-**i**-l
transparent	průhledn-ý	z-průhledn-**ě**-l	z-průhledn-**i**-l
exact	přesn-ý	z-přesn-**ě**-l	z-přesn-**i**-l
strict	přísn-ý	z-přísn-**ě**-l	z-přísn-**i**-l
dark	temn-ý	z-temn-**ě**-l	z-temn-**i**-l
immobile	nehybn-ý	z-nehybn-**ě**-l	z-nehybn-**i**-l
unsure	nejist-ý	z-nejist-**ě**-l	z-nejist-**i**-l
uncalm	neklidn-ý	z-neklidn-**ě**-l	z-neklidn-**i**-l

We analyse these roots as being of the same size as the Class I roots, i.e. they can realise an AP, see (33). As a result, they need the suffix *-i* to spell out the verbal heads PROC and INIT, see (34).

(33) AP ⇔ *hutn*
△
...

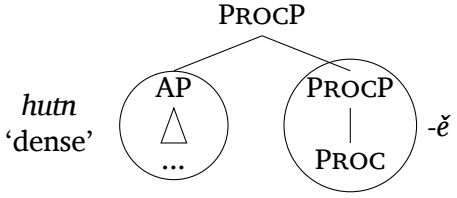
(34)


Different from the Class I verbs, however, these verbs make use of a specialised inchoative marker spelling out just PROC. We show the lexical entry of this marker in (35).

(35) PROCP ⇔ *-ě*

PROC

(36)



In the inchoative structure (see (36)), the marker *-ě* wins in competition against *-i*. The competition is regulated by the Elsewhere Principle, which favours the more specific marker over the more general one. Since *-ě* only applies in inchoative environments, and *-i* both in inchoative and causative ones, *ě* is more specific and wins the competition. The representation for the adjective-inchoative-causative triplet for the Class II roots is therefore as shown in section 2 of table 2.

Finally, the Czech Class III is illustrated in (37) by verbs based on the adjective *tich-ý* 'silent.' This class is characterised by the fact that the past participle has no marker for the inchoative at all, see (37b).

(37) a. *Ššš, **tiš** **-i** **-l** mě otec.*
psst silent CAUSE -PST me.ACC father.NOM
'Psst, my father was making me silent.'

b. *Posměšný křik skřetů **tich** **-Ø** **-l**.*
mocking shouting goblins.GEN silent -INCH -PST
'The goblins' mocking shouting was getting silent.'

Table 7 lists the roots that have an unmarked inchoative.[14]

Table 7: Class III verbs

gloss	adj	inch	caus
deaf	hluch-ý	o-hluch-l	o-hluš-**i**-l
brown	hněd-ý	za-hněd-l	za-hněd-**i**-l
weak	chab-ý	o-chab-l	o-chab-**i**-l
lame	chrom-ý	z-chrom-l	z-chrom-**i**-l
blind	slep-ý	o-slep-l	o-slep-**i**-l
silent	tich-ý	z-tich-l	z-tiš-**i**-l
dark	tmav-ý	z-tmav-l	z-tmav-**i**-l
bitter	trpk-ý	z-trpk-l	z-trpč-**i**-l
tough	tuh-ý	z-tuh-l	z-tuž-**i**-l
alive	živ-ý	o-živ-l	o-živ-**i**-l

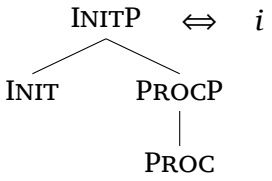
Given the zero marking in the inchoative, we analyze the roots in this class as capable of spelling out PROCP. The table (38) shows that roots of this size can realise both an adjective and an inchoative structure without any additional marker, see lines (38a) and (38b). The INIT projection of the causative needs an additional morpheme, see line (38c′).

[14]In current Czech, there exist (diachronically newer) alternative forms of the past participle with *-nu-* in between the root and the past participle *-l*, see Taraldsen Medová and Wiland (2019).

(38)

	A	PROC	INIT
a.	root		
b.	root		
c'.	root		-i
c''.	root	-i	

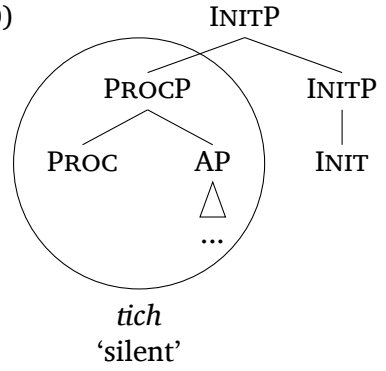
(39)



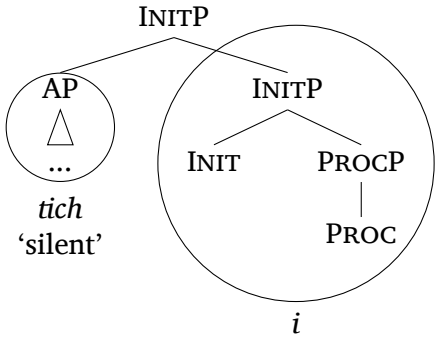
However, recall that the causative marker *-i* can potentially realise both PROC and INIT features. This offers another possibility of lexicalising the causative structure, namely as (38c″).

We shall now argue that only the analysis in (38c″) is compatible with insertion based on the Superset Principle. Our starting point is precisely the observation that the causative suffix in Class III verbs (namely *-i*) is identical to the one in Classes I and II. This means that the same lexical item is involved, namely the one given in (30b) above, and repeated in (39). Such an entry cannot spell out a remnant INITP that only contains INIT but not PROC. Such a constituent is in (40), but it cannot be spelled out by *-i*, because the INITP is not a subtree in the lexical entry (39). This makes the analysis in (38c′) impossible.

(40)



(41)



Since the INIT feature fails to be lexicalised in a derivation like (40), the causative must be derived in such a manner that the root does not reach its full lexicalisation potential, stopping at AP, just as it does in the simple adjective. This is shown in (41). The suffix *-i* then lexicalises the same constituent INITP as with the Class I and Class II roots (see (31) above).

Technically, this derivation involves backtracking, the details of which we do not address here for lack of space. We refer the reader interested in the details of backtracking to Vanden Wyngaerd et al. (2020). What we do want to point out, however, is that there is some interesting empirical evidence for the analysis in (41). Note first that if (41) is correct, the root spells out the same features when used in the causative (namely A) as when used as an adjective. This is different from the inchoative, where it spells out a bigger constituent, A + PROC.

This has consequences for root suppletion. Following Caha et al. (2019), we assume that suppletive roots are differentiated by the number of features they realize. If that is so, we expect suppletive adjectival roots to differentiate between the inchoative environment on the one hand (the root spells out AP + PROC) and, on the other hand, the adjective and the causative environment (the root spells out AP). Interestingly, there is a set of roots in Czech with exactly this type of root distribution, see Table 8.[15]

[15]The roots are mildly suppletive. In some cases, the difference is only vowel length, as indicated by the accent sign.

Table 8: Adjectives with mildly suppletive forms in the inchoative

gloss	adj	inch	caus
dense	hust-ý	z-houst-l	z-hust-**i**-l
dry	such-ý	u-sch-l	u-suš-**i**-l
young	mlad-ý	o-mlád-l	o-mlad-**i**-l
weak	slab-ý	ze-sláb-l	ze-slab-**i**-l
golden	zlat-ý	zlát-l	zlat-**i**-l
yellow	žlut-ý	za-žlout-l	za-žlut-**i**-l

Summarising, Czech provides two reasons for analysing zero marking as an instance of phrasal spellout. The first reason is that Czech fills two gaps in the predicted typology of marking. Most notably, it features a set of roots, which are of PROCP size, with an overt causative, but a zero inchoative (Class III).

The second reason has to do with the pattern of root suppletion exemplified in Table 8. The pattern shows that the suppletive root is found where the regular marking is absent, much as in the *bad-worse* case. Specifically, what we see is that when PROC and INIT are spelled out by suffixes, we get no suppletion (The final column in Table 8). Suppletion only arises when the root spells out PROC. Such roots, then, clearly reveal that zero marking does not come for free, and the root must do a part of the job.

7 The inverse pattern: anticausatives

As we have already noted, there is also a pattern where the inchoative is formed on the basis of the causative through the addition of a marker, often a reflexive.

(42) The inverse pattern
  a. caus: V
  b. inch: V + **aff**

Haspelmath calls this the anticausative pattern. This type of pattern is also found in Czech and it instantiates the fourth class of verbs, which was left undiscussed in section 6.2. In (43), we give an example of a causative derived from the adjective *tup-ý* 'blunt.' In order to express the inchoative reading ('get blunt'), Czech must add a reflexive marker *se* to the causative, see (43b). There is no non-reflexive form that would be able to express this meaning.

(43) a. *Já mu před zápasem vždycky* ***tup -i -l*** *brusle*
  I.NOM him.DAT before match always blunt -CAUSE -PST skates.ACC
  'I have always made his skates blunter before the match.'
  b. *Hráčům se* ***tup -i -ly*** *brusle*
  players.DAT REFL blunt -INCH -PST skates.NOM
  'The player's skates were getting blunt.'

This pattern is apparently problematic in that a structure with fewer features (the inchoative) requires more markers than the semantically richer structure (the causative). In this section, we highlight two possible solutions. The choice between them is left for future research.

The first possible line of attack would capitalize on the fact that this type of anticausative marking involves a marker of reflexivity. Koontz-Garboden (2009: 80) observes that also cross-linguistically, reflexivisation and anticausativisation 'seem almost always to be marked in a morphologically identical fashion'. Following Chierchia (2004), Koontz-Garboden (2009), Beavers and Koontz-Garboden (2011), one could then analyse the reflexive-marked verb, like *prodloužil se* 'lengthened' in (43b), as a reflexivized version of the causative verb. We represent this schematically as in (44).

(44) $V_{\text{ANTICAUS}} = \text{CAUSE}\ (x, \text{INCH}(\text{Pred}(x)))$

This is different from a true inchoative verb, which we take to have a representation as in (45):

(45) $V_{\text{INCH}} = \text{INCH}(\text{Pred}(x))$

Under this analysis, anticausatives like the one in (43b) are structurally different from English-type inchoatives like *widen*, in the sense that they are based on the causative structure. The reflexive marker *se* is, then, not a derivational affix on the verb, but a particular way in which the external or internal argument is realised. Koontz-Garboden (2009) supports this by pointing to potential meaning differences between anticausatives and true inchoatives. Specifically, the reflexivisation operation yields a predicate that is true if the single argument is both the Effector and the Theme. That is, the single argument is not simply undergoing some change (as a Theme), but it is at the same time also responsible for its own undergoing of the change. A consequence of this is that for anticausatives, the Causational Entailment (10) is predicted to not always be valid, as schematically shown in (46).

(46) No Causational Entailment with Anticausatives
$\neg(\forall x \forall y\,[\text{CAUSE}\ (x, \text{INCH}(\text{Pred}(y))) \rightarrow \text{CAUSE}\ (y, \text{INCH}(\text{Pred}(y)))])$

The example (47) (Koontz-Garboden 2009: 117) may clarify this. Spanish has both inchoative verbs like *empeorar* 'worsen', and anticausative ones like *romperse* 'to break' (with the reflexive *se*). With the inchoative, the Causational Entailment is valid, as shown by the deviance of (47a). But with the anticausative, speakers accept sentences like (47b), suggesting that the Causational Entailment is not always valid.

(47) a. *#No empeoró ningún paciente. Los empeoró el tratamiento.*
not worsened any patient them worsened the treatment
'No patient worsened. The treatment worsened them.'
b. *No se rompió ningún vaso; los rompió Andrés.*
not REFL broke any glass them broke Andrew
'No glass broke; Andrew broke them.'

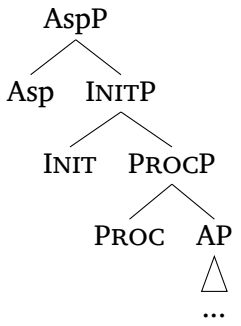
However, there has been a debate as to whether this kind of approach is correct (see Schäfer and Vivanco 2015).[16] Even if it were, the question remains how it can be extended to languages where the anticausative marker differs from the reflexive marker. This is notably the case in such languages as Turkish (Key 2013), Hungarian (Márkus 2015), and Korean (Jeong 2018). Let us therefore sketch here an alternative approach

[16] A reviewer points out that the English example in (11) is different from the ones in (47) in that the order of the causative and the negative sentence is reversed, and that this fact may be responsible for the judgments, rather than any difference between unmarked or reflexive-marked inchoatives.

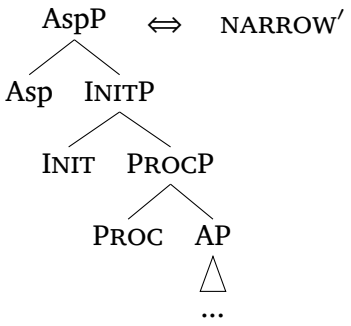
to the anticausative conundrum, explored in work by Márkus (2015).

The main idea of the alternative approach is that causative and inchoative structures do not live in a vacuum, so to speak. In syntax, argument structure projections are always embedded under aspectual and temporal projections, as shown in a simplified form in (48).

(48)

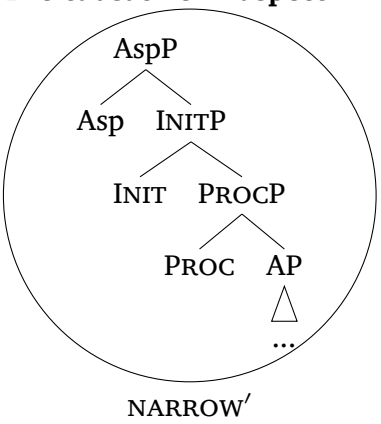


(49)

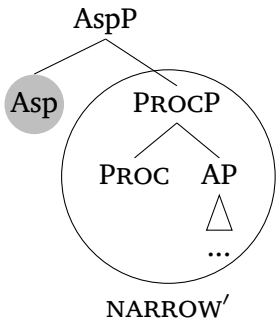


Suppose now that a language has a lexical entry like the one in (49). The lexically stored tree of this hypothetical entry does not only contain the argument structure projections, but also the aspectual projection ASP. This lexical entry can spell out all the projections in (48), see (50). However, the entry (49) cannot be used to spell out all the projections of the inchoative structure, as shown in (51). The reason is that the AspP given in (51) is not contained (as a constituent) inside the lexical entry (49). The lexical entry does contain the PROCP, so that PROCP can successfully lexicalise, as indicated by the circle in (51). But this leaves the ASP head without lexicalisation, which is marked by the grey circle in (51).

(50) **The causative + aspect**



(51) **The inchoative + aspect**



As a result, an additional morpheme must be used to spell out Asp, and the inchoative ends up needing more morphemes than the causative. The reason for the extra morpheme is that the missing INIT head prevents constituent matching between the lexical tree of (49) and the syntactic structure.

The consequence of this proposal is that the reflexive is not associated to an argument-structure projection, but to an aspectual layer higher up in the structure. A piece of data suggesting that this may be correct is that in nominalisations (which presumably have less structure than verbs), the inchoative form loses the reflexive marker seen in (43b). We show this in (52), where the nominalisation in (52a) is derived from a causative verb (as the translation suggests), while (52b) is inchoative. What is remark-

able is that including the reflexive marker in (52b) leads to ungrammaticality.[17]

(52) a. *... o Llywelynově krutém tup-e-ní rohů případné*
about Llywelyn's cruel blunt-CAUS-ING corners.GEN potential
konkurence
competition
'... about Llywelyn's cruel way of making the edges of his potential competition blunt'

b. *Při častém používání by docházelo k jejich tup-e-ní (??se).*
with frequent use would lead to their blunt-CAUS-ING REFL
'A frequent use would lead to them getting blunt.'

It is worth pointing out that the corpus does contain the string *tupení se* 'blunting REFL,' but this is attested only in a reflexive/reciprocal meaning, not in the anticausative one. While we find this evidence suggestive, we shall not elaborate on any detail here, merely noting that the anticausative pattern of marking may receive an explanation even under the view (argued for here) that the structure of the causative always contains the structure of the inchoative.

8 Conclusion

The main idea of this paper is that derivational 'zero affixes' do not exist, and that conversion arises as an effect of cumulative exponence, where the root realizes the relevant meaning ingredients. We have implemented this idea in Nanosyntax, a framework with phrasal lexicalisation with matching governed by the Superset Principle. In addition, we adopted a relatively widespread idea that causatives contain inchoatives, and that inchoatives contain adjectives. Combining the Superset Principle and the two independent ideas allowed us to account for the following set of facts. (i) Not all adjectival roots function as verbs, and which roots may do so is largely unpredictable. We achieved this by relying on arbitrary lexical storage: only roots that spell out PROC and/or INIT function as verbs. (ii) Some zero-derived verbs are ambiguous between the causative and the inchoative reading. We encoded this by saying that these verbs spell out both PROC and INIT (as in English). (iii) Czech zero-derived verbs are only inchoative (but not causative). This is because they only spell out PROC, but not INIT. (iv) Zero-derived verbs in Czech may be (mildly) suppletive, while non-zero-derived causatives are not. This is because the adjectival root in zero-derived inchoatives pronounces the PROC component, which may be reflected via suppletion. (v) Finally, our assumptions allowed us to capture the different patterns of the inchoative/causative alternation that are known from the typological literature, including the superficially problematic anticausative pattern.

9 Acknowledgements

For useful comments and feedback, we thank the two anonymous reviewers and the editors, as well as the audiences at the 2020 SLE workshop on zero morphology, the 2020 Linguists' Day of the Linguistic Society of Belgium, the 2021 Grote Taaldag of the

[17]The examples come from the Czech National Corpus, the judgement on the reflexive is that of the first author.

AVT, the online nanolab, the LingLunch at the Laboratoire de Linguistique Formelle, the Slavic Linguistics Colloquium at the Humboldt University and the CRISSP Research Discussion.

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