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On containment and syncretism: English preterites and participles

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Abstract. This study explores Bobaljik's (2012) suggestion that in English, the feature representation of the preterite contains the representation of the past participle. While containment analyses in both Distributed Morphology (DM) and Nanosyntax capture the virtual absence of ABA patterns of syncretism for the order BASE-PARTICIPLE-PRETERITE, I demonstrate that they face empirical challenges when the exponence of the suffixes is considered. After evaluating an alternative feature decomposition, I show how a DM containment approach can derive the facts for both base and suffix alternations with the aid of impoverishment, which also helps to explain counterexamples to *ABA in this domain. Lastly, I offer cautionary discussion about the relationship between containment structures and deriving *ABA.

Keywords. ABA; containment; syncretism; Elsewhere Condition; allomorphy; Distributed Morphology; Nanosyntax; impoverishment; overlapping decomposition

1. Introduction. Recent work on morphology has investigated the absence of so-called ABA patterns of syncretism for various feature classes, including case, number, adjectival grade, and clusivity (Caha 2009, 2017; Bobaljik 2012; McFadden 2018; Smith et al. 2018; Moskal 2018, among others). In a hypothetical ABA pattern, a three-member 'paradigm' ordered by markedness sees the first and third share a form to the exclusion of the middle member.[1]

Language	POSITIVE	COMPARATIVE	SUPERLATIVE	Pattern
English	**small**	**small**-er	**small**-est	**AAA**
English	good	**be(tt)**-er	**be(tt)**-st	A**BB**
Latin	bon-us	mel-ior	opt-imus	ABC
UNATTESTED	**good**	bett-er	**good**-est	***A**B**A**

Table 1: Root Suppletion by Adjectival Grade (adapted from Bobaljik 2012)

To account for the typological absence of ABA patterns, some researchers have adopted a containment approach whereby the representation of a more marked member properly contains the representation of a less marked member, as seen in (1) for adjectival grade.

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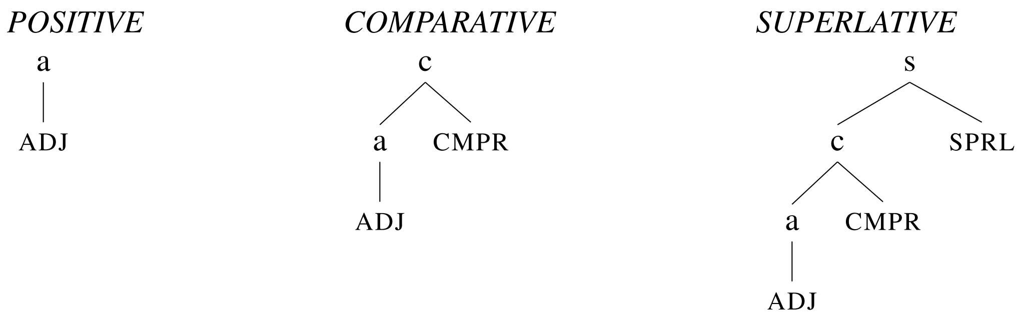
[1]Bobaljik (2012) also finds AAB to be unattested for root suppletion by adjectival grade. In contrast, AAB patterns are well-represented for the English participle and preterite patterns, as Bobaljik discusses.

(1)



(Bobaljik 2012; 32)

Bobaljik (2012) reduces the absence of ABA patterns in adjectival grade to the containment structure in (1) and the Elsewhere Condition. For example, in (2), a more specific Vocabulary Item *be(tt)-* is chosen over the default *good* in the context of CMPR. Because the superlative contains CMPR, it will also be realized with the more specific form, producing *be-st* (not **good-est*). More generally, all else being equal, the positive and the superlative bases cannot be realized with the same exponent to the exclusion of the comparative.

(2) Vocabulary Items
$\sqrt{\text{GOOD}} \leftrightarrow$ be(tt) / CMPR
$\sqrt{\text{GOOD}} \leftrightarrow$ good

Bobaljik (2012; 158-163) suggests that a containment relation may hold between preterites and past participles in German and English. In this domain, too, the ABA pattern appears to be virtually absent (Table 2).

BARE	PARTICIPLE	PRETERITE	Pattern
put	**put**	**put**	AAA
teach	**taught**	**taught**	ABB
run	**run**	ran	AAB
swim	swum	swam	ABC
			*ABA

Table 2: Patterns of Syncretism for English Participles and Preterites

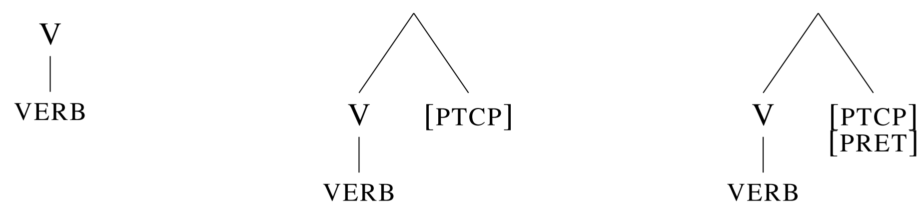
The objective of this short article is to consider challenges to containment approaches to English preterites and participles. After discussing issues with several approaches, I offer a refined containment analysis, couched within Distributed Morphology (DM), which invokes an impoverishment operation to account for facts that would otherwise be problematic for containment hypotheses, including counterexamples to *ABA.

I first address the morphological relatedness of participles and preterites in Section 2, and then discuss issues with containment approaches within both DM and Nanosyntax in Section 3, where I also consider alternative analyses with an ‘overlapping decomposition’ (cf. Caha 2017; Bobaljik & Sauerland 2018). I then provide a revised containment analysis in Section 4, and offer further remarks about deriving alternations in the base through root suppletion or morphophonological rules, and about how this fits into the discussion about deriving *ABA. Section 5 concludes.

2. Relating participles to preterites. There are several well-known reasons to suspect that English preterites and participles are morphologically related to each other. First, both use a suffix *-ed*, which is the default suffix for both the preterite and the participle.[2] Second, they share most of their suffix exponents, including *-ed*, but also *-t* and -∅ (e.g. Halle & Marantz 1993). Third, they often share alternations of their base, even when the suffixes themselves differ (e.g. *freeze*, ***froze****-n*, ***froze***). Lastly, the forms of participles and preterites have exhibited leveling both historically and in contemporary use in various dialects (e.g. Bybee & Slobin 1982). Given the extensive sharing of forms between the two, it seems unlikely that this sharing is accidental.

In underspecification approaches like DM, the sharing of forms is often taken to reflect the sharing of morphosyntactic features. For Bobaljik's (2012) containment approach, one feature is shared between participles and preterites – I will refer to this feature as [PTCP] – and one feature is present on preterites but not participles – I will refer to this one as [PRET]. In the containment structure in (3), the participle has no feature that the preterite does not also have; put differently, the preterite builds directly on the participle.

(3) *BARE* *PARTICIPLE* *PRETERITE*



There is evidence that favors (3) over the alternative containment (with participles containing preterites), namely AAB patterns such as ***blow***, ***blow****-n*, *blew*. If the order is switched, then the result produces ABA patterns, and this will run afoul of the logic of the Elsewhere Condition. The comparison between the two directions of containment is represented in Tables 3 and 4, which display the same verbs with opposite orderings of participles and preterites.

BARE	PTCP	PRET	Pattern
blow	**blow**-n	blew	**AA**B
come	**come**	came	**AA**B
grow	**grow**-n	grew	**AA**B
run	**run**	ran	**AA**B

Table 3: AAB verbs

BARE	PRET	PTCP	Pattern
blow	blew	**blow**-n	**A**B**A**
come	came	**come**	**A**B**A**
grow	grew	**grow**-n	**A**B**A**
run	ran	**run**	**A**B**A**

Table 4: Reordered AAB verbs

Other analyses in the literature that acknowledge the morphological relatedness of English participles and preterites do not involve containment. In Zwicky 1990 and related work, participles and preterites do not share features. Instead, preterites – not participles – are basic, and a default rule refers to the form of the preterite to use for the participle. However, this treats the AAB identities (Table 3) between the bare and participle forms as coincidental; it is thus an accident that e.g. *grow-n* shares the base of the bare form *grow*.

[2]For the preterite, *-ed* is both productive, applying to nonce verbs (Berko 1958), and overregularized in child speech (see Yang 2016 and references therein). While comparatively understudied, *-ed* also appears to be the default suffix for the participle: nonce participles are also suffixed with *-ed* (*have wugged*), and evidence also suggests that participial *-ed* is also overregularized (Redmond 2003).

For Halle & Marantz (1993), the preterite and participle share a feature [+PAST], but the two differ in the value of the feature [±PARTICIPLE]: this is feature overlap but not containment. This approach captures syncretisms but in principle, allows a base alternation of the participle (specified for [+PAST][+PARTICIPLE]) that does not extends to preterites, thus allowing ABA.

Turning our attention to the suffixes, we do find potential evidence suggesting participles are more *marked* than preterites. This evidence comes from morphological markedness, which is often taken to reflect featural markedness (though only tendentially). While -∅ is a suffix for both participles and preterites (Table 5), when only one is -∅ for a given verb, it is the preterite, not the participle (Table 6, which also shows the hypothetical but non-existent pattern).

PRET	PTCP	Pattern
cast-∅	cast-∅	-∅/-∅
ran–∅	run–∅	-∅/-∅
sang-∅	sung–∅	-∅/-∅
spun-∅	spun-∅	-∅/-∅
swam-∅	swum–∅	-∅/-∅

Table 5: -∅/-∅

PRET	PTCP	Pattern
broke-∅	broke-n	-∅/-en
froze-∅	froze-n	-∅/-en
hid-∅	hidd-en	-∅/-en
spoke-∅	spoke-n	-∅/-en
***zun-t**	***zun**	***-t/-∅**

Table 6: -∅/-en

This apparent markedness is the opposite of that assumed for (3), which takes the preterite to be more marked than the participle because of their containment relation. Given that the correlation between morphological and featural markedness is a tendency, this seems not to constitute strong evidence against (3). In the next section, I evaluate containment hypotheses by looking a alternations both in the bases and in the suffixes.

3. Containment approaches to *ABA. The containment representation in (3) along with the Elsewhere Condition generates AAA, AAB, ABB, and ABC – the last three shown in Table 7 – but it does not generate ABA.

ABB	AAB	ABC
VERB ↔ B / [PTCP] VERB ↔ A	VERB ↔ B / [PRET] VERB ↔ A	VERB ↔ C / [PRET][PTCP] VERB ↔ B / [PTCP] VERB ↔ A

Table 7: Deriving Alternations and Syncretisms with Containment

While the containment analysis captures *ABA in the alternations of the base, it also makes predictions for the realization of the suffix. The default suffix for both participles and preterites is *-ed*; it should therefore be the least specified exponent. When the suffix for the participle is specified as irregular, this should also imply that the preterite suffix is irregular also. This happens, for example, when the suffix (including -∅) is the same for the participle and the preterite; this can be thought of as an ABB pattern of suffix exponence.

(4) [PTCP] ↔ -t / {$\sqrt{\text{LEAVE}}$, $\sqrt{\text{BEND}}$, $\sqrt{\text{BUY}}$...}
[PTCP] ↔ -∅ / {$\sqrt{\text{HIT}}$, $\sqrt{\text{SING}}$, $\sqrt{\text{SIT}}$...}
[PTCP] ↔ -ed (produces e.g. participle *ben-**t*** and preterite *ben-**t***)

The account also captures cases in which the participle and preterite suffixes differ from each other when both are irregular; this can be thought of as an ABC pattern of suffix exponence.

(5) [PTCP][PRET] ↔ -∅ / {$\sqrt{\text{BREAK}}$,$\sqrt{\text{BEAT}}$,$\sqrt{\text{DRIVE}}$...}
[PTCP] ↔ -en / {$\sqrt{\text{BREAK}}$,$\sqrt{\text{BEAT}}$,$\sqrt{\text{DRIVE}}$...}
[PTCP] ↔ -ed (produces e.g. participle *beat-**en*** and preterite *beat-∅*)

However, the account faces problems for a subset of participial *-en* verbs, all of which should correspond to irregular preterite forms. This is not borne out, as there are some verbs with participial *-en* that nevertheless take *-ed* in the preterite; see Table 8 for a partial list. These verbs would require a homophonous entry for *-ed* to block *-en* in preterite forms (6). This can be thought of as an ABA pattern for suffix exponence.

PTCP	PRET
mow-n	mow-ed (*mow-n)
prove-n	prove-d (*prove-n)
saw-n	saw-ed (*saw-n)
shave-n	shave-d (*shave-n)
show-n	show-ed (*show-n)
strew-n	strew-ed (*strew-n)

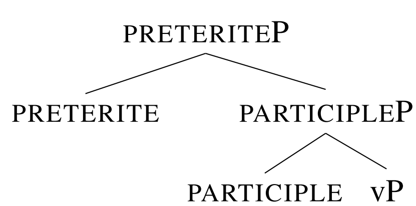
Table 8: *-en*/*-ed* Verbs

(6) [PTCP][PRET] ↔ **-ed** / {$\sqrt{\text{SHOW}}$...}
[PTCP] ↔ -en / {$\sqrt{\text{SHOW}}$...}
[PTCP] ↔ **-ed**

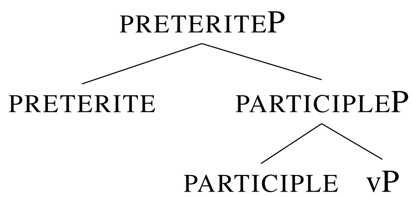
All of the exponents of the participial and preterite suffixes are shared, with the exception of *-en*, which is specific to the participle. This means that the preterite suffixes are a subset of the participle suffixes: the opposite of what we should expect. Thus while the alternations of the base point to one direction of derivation (preterites build on participles), the specificity of the *-en* suffix seems to point to the opposite direction of derivation. Most problematically, it is unexpected for a containment analysis that there should be an irregular, participle-specific suffix whose corresponding preterite suffix is default, given the logic of the Elsewhere Condition. In the next subsection, I consider a nanosyntactic account of containment, and demonstrate that it suffers from a distinct but related problem.

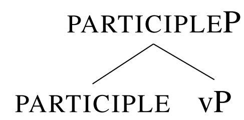
3.1 CONTAINMENT IN NANOSYNTAX. Nanosyntacticians have also adopted containment structures to account for *ABA (e.g. Caha 2009; Clercq & Wyngaerd 2017), using a combination of the Superset Principle and a correspondingly different version of the Elsewhere Condition. This type of account also allows AAB and ABB to be derived, while ABA is claimed not to be (see also Caha 2018 for discussion of syncretism in English preterites/participles from a nanosyntactic perspective). In brief, nanosyntactic accounts embrace insertion of exponents at non-terminals, and derive *ABA by making the most specific tree win. The lexical entries needed for ABB and AAB patterns are simplified in (7)-(8).

(7) ABB: B ⇔



A ⇔ vP

(8) AAB: B ⇔ 

A ⇔ 

The simplest pattern of alternation in this framework is 'whole-word' syncretisms. These exist for both AAB and ABB (Table 9). Non-terminal insertion handles such cases without reference to zero-exponence, arguably an advantage over approaches that limit realization to terminals.

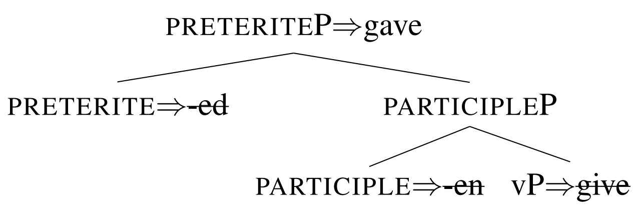
Regarding suffixes, it is not entirely clear to me how the framework best handles contextual allomorphy. If we assume *-en* is not problematic to derive, AAB patterns in which the participle is suffixed with *-en* and the preterite is -∅ are generated through cyclic override (cf. Caha 2018; 72). See Table 10 for relevant examples, and (9) for a simplified derivation.

BARE	PTCP	PRET	Pattern
come	**come**	came	**AA**B
run	**run**	ran	**AA**B
bind	**bound**	**bound**	A**BB**
fight	**fought**	**fought**	A**BB**
find	**found**	**found**	A**BB**

Table 9: 'Whole-word' Syncretisms

BARE	PTCP	PRET	Pattern
blow	**blow-n**	blew	**AA**B
fall	**fall-en**	fell	**AA**B
give	**give-n**	gave	**AA**B
know	**know-n**	knew	**AA**B
shake	**shake-n**	shook	**AA**B

Table 10: *-en*/-∅ AAB Verbs

(9) 

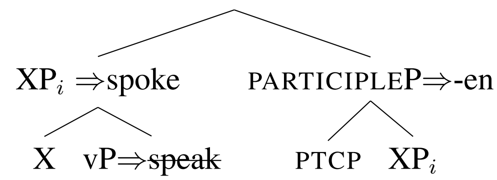
However, when we consider ABB patterns with participial *-en* (e.g.*freeze, **froze**-n, **froze***), a problem arises. First, the alternation from the base to the participle, in conjunction with the suffix *-en* should still be realized with two separate exponents: the ablauted base and the participial suffix. A solution to this type of double-marking problem is pursued by Clercq & Wyngaerd (2017), who add additional lower structure to derive a similar alternation within the domain of adjectival grade. For participles and preterites, the needed additional XP structure would not be syntactically motivated. If we set this issue to the side, the derivation of the participle could be as in (10).[3]

[3] See Baunaz & Lander 2018 for explicit discussion of lexicalization and movement in Nanosyntax.

BARE	PTCP	PRET	Pattern
bite	**bitt**-en	**bit**	A**BB**
break	**broke**-n	**broke**	A**BB**
choose	**chose**-n	**chose**	A**BB**
freeze	**froze**-n	**froze**	A**BB**
get	**gott**-en	**got**	A**BB**
hide	**hidd**-en	**hid**	A**BB**
speak	**spoke**-n	**spoke**	A**BB**

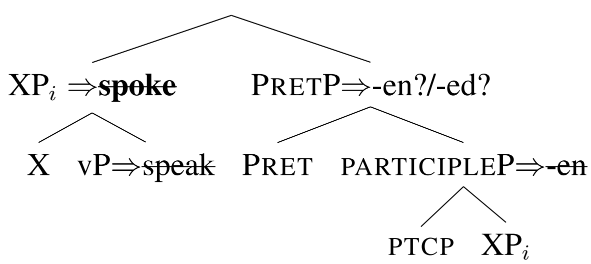
Table 11: ABB with *-en*

(10)



Now considering the preterite, we would have to posit another lexical entry to override the realization of combination of XP and the participial suffix. This entry would have to be homophonous with the XP entry for the participle in order to derive the correct result. This problem is general to ABB verbs with *-en*, so many homophonous entries would have to be posited to derive ABB. These homophonous entries treat the base syncretism as accidental; moreover, allowing them readily permits ABA patterns. Without homophonous entries, the nanosyntactic account derives an incorrect suffixed result such as **spoke-d* (11).[4]

(11)



The issues for the nanosyntactic account are thus as follows: in order to derive ABB participles with *-en*, we have to i) assume a syntactically unmotivated XP, ii) grant that the contextual allomorphy of the participle can be derived somehow, and iii) create homophonous entries for participial and preterite bases. Nanosyntactic accounts thus face challenges from both alternations in the base and the suffix allomorphy.[5] Explaining these problems away would involve analyzing the combination of the base and *-en* as monomorphemic, with separate entries for the bare form, participle, and preterite. This treats the base identities involving irregular suffixes as accidental and abandons the generalization that *-en* is a suffix, despite the fact that it applies to dozens of verbs.

To conclude this section so far, the containment approaches in both DM and Nanosyntax face challenges: in DM, the issue is with how the Elsewhere Condition interacts with the exponence of the suffix *-en*, while in Nanosyntax, the issue is with how the base alternation must be expressed in cases of double-marking with *-en* in the ABB pattern. In the next subsection, I consider an alternative analysis to containment that is also capable of capturing *ABA.

[4] Adding material to the lexical entry for *spoke* causes problems for not overriding the suffix *-en* in the participle.

[5] The example *beat, beat-en, beat* is similarly problematic, though this is the only AAA example of -en/-∅ I am aware of.

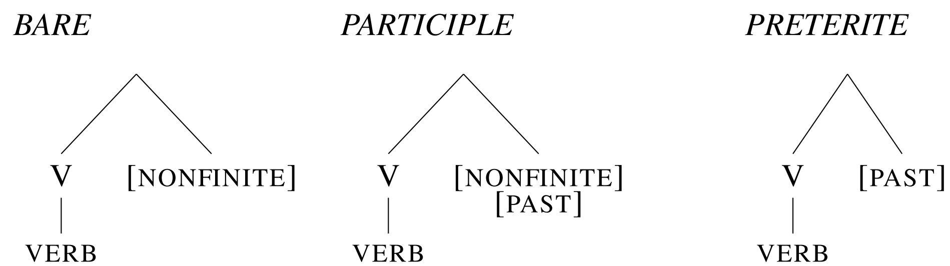
3.2 OVERLAPPING DECOMPOSITION. The shared base and suffix morphology of participles and preterites indicates that the two overlap in their feature representation. If the two stand in a subset/superset relation, then the specificity of participial *-en* seems to suggest that the participle properly contains the representation of the preterite. However, as discussed above, this runs into problems with the AAB verbs (e.g. $\sqrt{\text{BLOW}}$). If the only feature of the preterite is shared with the participle (such as [PAST]), there is no way of singling out the preterite to the exclusion of the participle in referring to its features.

(12) $\sqrt{\text{BLOW}} \leftrightarrow$ blew / [PAST]
$\sqrt{\text{BLOW}} \leftrightarrow$ blow

produces *blow*, **blew-n*, *blew* (cf. *blow, blow-n, blew*)

One possible solution to this problem involves overlapping decomposition, which has been discussed by Caha (2017) and Bobaljik & Sauerland (2018) as another way to capture *ABA. For this domain, bare verbs and their participles will share a feature, and participles and preterites will share a feature (13). We can assume that the feature on bare verbs and participles is inserted at PF; I will call it [NONFINITE].[6]

(13)



In a DM analysis, this decomposition reflects the specificity of participial *-en*, and the default realization for [PAST] can remain *-ed*.[7] One benefit of (13) is that it reflects the generalization for morphological markedness mentioned in Section 2 concerning the distribution of -∅.

To derive the patterns of formal identity of the bases, both nonfinite and past features are referred to; the set of derivable syncretisms is in (14)-(17). Note that AAB is unusual: either i) extrinsic ordering is needed (i.e. [NONFINITE] > [PAST]) or ii) the default realization is actually the base of the preterite rather than the bare form. The second option is illustrated in (17).[8]

(14) AAA (no contextual specification)
$\sqrt{\text{TRY}} \leftrightarrow$ try

(15) ABB (allomorph for [PAST])
$\sqrt{\text{TEACH}} \leftrightarrow$ taugh- / [PAST]
$\sqrt{\text{TEACH}} \leftrightarrow$ teach

(16) ABC (three allomorphs)
$\sqrt{\text{DRIVE}} \leftrightarrow$ driv / [PAST][NONFINITE]
$\sqrt{\text{DRIVE}} \leftrightarrow$ drove / [PAST]
$\sqrt{\text{DRIVE}} \leftrightarrow$ drive

(17) AAB (allomorph for [NONFINITE])
$\sqrt{\text{TAKE}} \leftrightarrow$ take / [NONFINITE]
$\sqrt{\text{TAKE}} \leftrightarrow$ took

[6] 'Nonfinite' is a suboptimal label for this feature, since finite present forms will also use this form (e.g. *sing-s*).

[7] The default realization of the node itself must be -∅ so that this occurs with bare forms like *sing-∅*.

[8] Note that this is also possible for deriving AAB patterns through morphophonological rules rather than contextual allomorphy; see Halle & Mohanan 1985 for an account in which underlying representations do not always correspond to the bare form.

One further auxiliary assumption is needed to rule out ABA with the overlapping decomposition. As noted by Caha (2017), an overlapping decomposition could technically yield ABA in a DM approach if the element that shares one feature in common with the others (in this case, the participle) is one allomorph, with the other realization being default (18). To rule this out, we could stipulate that the Vocabulary is constrained by a principle like (19), stated informally here.

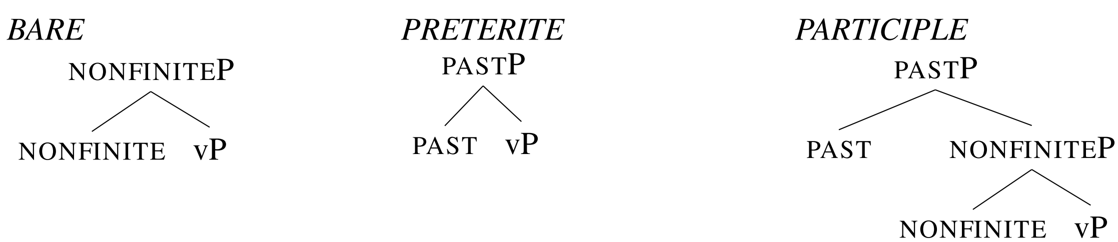
(18) $\sqrt{\text{ROOT}}$ ↔ oops / [PAST][NONFINITE]
$\sqrt{\text{ROOT}}$ ↔ root

BARE	PTCP	PRET	Pattern
root	oops	**root**	**ABA**

(19) Within a language, a Vocabulary Item with the specification [X][Y] implies the existence of a Vocabulary Item with the specification [X] or the specification [Y].

Bobaljik (2012; 150) appeals to a similar principle to rule out AAB patterns in adjectival gradation. However, I cannot confirm that (19) is true in the general case. That being said, with this assumption in place, the overlapping decomposition analysis can work mechanically. However, the insertion of the feature [NONFINITE] does not seem well-motivated. Moreover, it would have to apply in various contexts, such as the present participle. Otherwise, the Vocabulary Items in (17) would produce the incorrect **took-ing*, an unwelcome result.

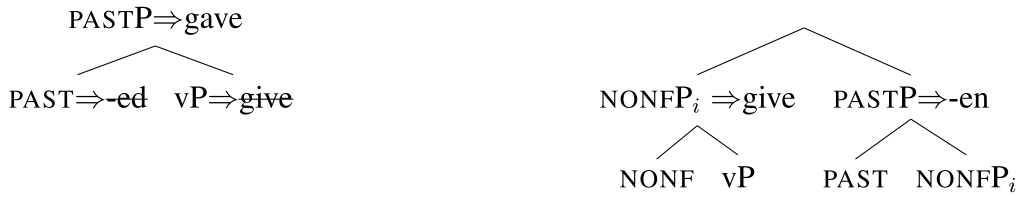
How does the nanosyntacic version of the overlapping decomposition fare? The same problem with ABB verbs arises that was discussed in the previous section (*speak*, ***spoke****-n*, ***spoke***).[9] The syntax of bare, preterite, and participle forms would be as represented in (20).

(20)


Again setting aside the non-trivial issue of contextual allomorphy, *-en* could lexicalize [PAST [NONFINITE]]. We can derive AAB straightforwardly, such as ***give***, ***give****-n*, *gave*, as shown in simplified form in (21).

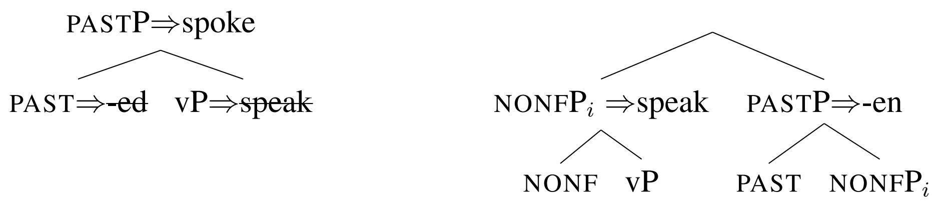
[9]See Caha (2017) on deriving *ABA in case syncretisms with an overlapping decomposition in Nanosyntax.

(21) *PRETERITE* *PARTICIPLE*



Consider now the ABB participles suffixed with *-en*, such as *spoke-n*. Here, we derive the incorrect form of the base (**speak-en*) as in (22). If the lexical entry for *spoke* is enlarged to include a phrase with both PAST and NONFINITE, then we incorrectly derive *spoke* without a suffix as the participle.

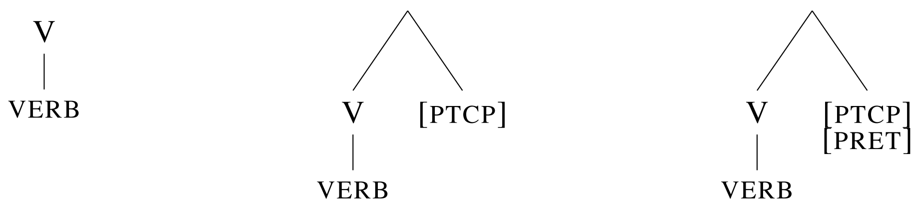
(22) *PRETERITE* *PARTICIPLE*



Among the approaches considered so far, the containment and overlapping decomposition approaches in DM fare best, while the containment and overlapping decomposition approaches in Nanosyntax do not perform as well. In the next section, I return to the containment analysis, which, with one added impoverishment rule, derives both the alternations in the base and in the suffixes, but goes further in accounting for counterexamples to *ABA in a constrained way.

4. Towards an analysis: Containment with impoverishment. In this section, I show how a DM containment analysis can derive the facts through impoverishment (Bonet 1991; Nevins 2011; among many others), a postsyntactic operation that deletes morphosyntactic features. The feature decomposition for containment is repeated in (23).

(23) *BARE* *PARTICIPLE* *PRETERITE*



I assume postsyntactic realization in the process called Vocabulary Insertion, and crucially, that impoverishment operations delete morphosyntactic features prior to Vocabulary Insertion (e.g. Embick & Noyer 2007). My proposed impoverishment rule deletes a diacritic class feature on a root (cf. Noyer 2005; Calabrese 2015): in this case, the diacritic feature [α] defines a declension class of all verbs that take the *-en* suffix. Recall that many of these verbs take -∅ in the preterite. This is reflected in the Vocabulary Items in (25), with the first two specified to be inserted in the context of [α]. If impoverishment of [α] is triggered, the default *-ed* will be chosen instead.

The impoverishment rule will apply only to a subset of *-en* verbs: namely, only those that take *-ed* in the preterite. The impoverishment rule is given in (24).

(24) **Diacritic Feature Impoverishment Rule**
For $\sqrt{\text{ROOT}}^{[\alpha]}$, delete $[\alpha]$ / [PRET] for $\sqrt{\text{ROOT}} = \{\sqrt{\text{PROVE}}, \sqrt{\text{SHOW}}, \sqrt{\text{STREW}}...\}$

(25) Relevant Vocabulary Items
[PRET][PTCP] $\leftrightarrow \varnothing$ / $\sqrt{\text{ROOT}}^{[\alpha]}$
[PTCP] $\leftrightarrow$ -en / $\sqrt{\text{ROOT}}^{[\alpha]}$
[PTCP] $\leftrightarrow$ -ed

In this analysis, *-en* is participle-specific because it belongs to a class that always requires -∅ in the preterite at Vocabulary Insertion. When (24) applies, it bleeds not only the insertion of -∅, but also *-en*, which is also specified to be inserted in the context of $[\alpha]$.

Defining the class of *-en* verbs by the alternation between *-en* and -∅ is not unreasonable; Halle & Marantz (1993; 125) report that 48 of 58 *-en* verbs take -∅ in the preterite. This correlation could in principle be treated as productive in Yang's (2016) sense, as the maximum number of exceptions to a productive generalization with 58 members according to the Tolerance Principle is 14, above the value of 10 *-en* verbs that take something other than -∅.

With this account, we maintain the containment analysis while also deriving the suffix facts using existing machinery in a limited way. The account further predicts that counterexamples to *ABA should be possible if the feature $[\alpha]$ is also relevant to the exponence of the base forms. As noted by Andersson (2018; 6), the verbs *shear* and *swell* both have surface ABA patterns in that the participial base differs from those of the bare and preterite forms (***shear***, *shor-n*, ***shear**-ed*; ***swell***, *swoll-en*, ***swell**-ed*). Strikingly, both of these verbs use participial *-en* but preterite *-ed*, which we would derive through impoverishment of the root's diacritic feature.

I would like to suggest that the application of the impoverishment rule in (24), in addition to yielding the default *-ed*, has the concomitant effect of destroying the environment that inserts *swoll-* and *shor-* instead of the respective default realizations of *swell-* and *shear-*. The impoverishment rule in (26-a) will thus bleed the use of the more specific forms in (26-b) in the preterite, thus producing an ABA pattern in the base.

(26) a. For $\sqrt{\text{ROOT}}^{[\alpha]}$, delete $[\alpha]$ / [PRET] for $\sqrt{\text{ROOT}} = \{\sqrt{\text{SHEAR}}, \sqrt{\text{SWELL}}, \sqrt{\text{SHOW}}...\}$

b. $\sqrt{\text{SHEAR}}^{[\alpha]} \leftrightarrow$ shor / [PTCP] $\sqrt{\text{SWELL}}^{[\alpha]} \leftrightarrow$ swoll / [PTCP]
$\sqrt{\text{SHEAR}} \leftrightarrow$ shear $\sqrt{\text{SWELL}} \leftrightarrow$ swell

In addition, the analysis correctly captures the fact that the marginal irregular forms of the preterite would be *shore*-∅ and *swoll*-∅, not **shore-d*/**swoll-ed* or **shor-n* and *swoll-en*. This is because in these cases, no impoverishment operation occurs, and thus $\sqrt{\text{SHEAR}}$ and $\sqrt{\text{SWELL}}$ remain in the list of roots defined by $\sqrt{\text{ROOT}}^{[\alpha]}$, whose preterite suffix is -∅ (25).

In summary, keeping the containment analysis captures the implicational relations of alternations in the base, as in the original account outlined by Bobaljik (2012), while also accounting for suffix realizations at the same time. While the addition of one impoverishment rule introduces a loophole to the prohibition on ABA, it predicts a correlation between the base and the suffix, which is borne out for *swell* and *shear*.

It is worth noting that impoverishment is a powerful mechanism that should be exercised with caution. Left unconstrained, we might expect more ABA than we actually observe. Consider the two hypothetical impoverishment rules and their corresponding vocabularies for adjectival grades, where the representation of the superlative (SPRL) contains the comparative (CMPR).[10]

(27) a. Delete [CMPR] / {$\sqrt{\text{ROOT1}}$,$\sqrt{\text{ROOT2}}$,$\sqrt{\text{ROOT3}}$...}[SPRL]
b. $\sqrt{\text{ROOT1}} \leftrightarrow$ B / [CMPR]
$\sqrt{\text{ROOT1}} \leftrightarrow$ A

(28) a. For $\sqrt{\text{ROOT}}^{[x]}$, [x]$\rightarrow \varnothing$ / [SPRL] for $\sqrt{\text{ROOT}}$ = {$\sqrt{\text{ROOT1}}$,$\sqrt{\text{ROOT2}}$,$\sqrt{\text{ROOT3}}$...}
b. $\sqrt{\text{ROOT}}^{[x]} \leftrightarrow$ B / [CMPR]
$\sqrt{\text{ROOT}} \leftrightarrow$ A

The impoverishment rules in (27) and (28) would produce an ABA pattern in root suppletion by adjectival grade, which Bobaljik (2012) does not find in his typological survey. One possibility is that the impoverishment rule in (27) is impossible because of the nature of the features involved; the current analysis deletes diacritic class features on roots in a marked environment (i.e. [PRET]), which has been argued to occur in other languages (Noyer 2005; Calabrese 2015). It is not clear why the second impoverishment rule should be impossible; I leave this for future research.

DISCUSSION: MORPHOPHONOLOGY VS. ROOT SUPPLETION. While I have discussed alter-nations in the base as contextual allomorphy, there is an ongoing debate in the literature about whether these alternations should be modeled in terms of morphophonological (MP) rules (e.g. Halle & Mohanan 1985; Embick & Halle 2005) – also known as readjustment rules – or in terms of root suppletion (e.g. Haugen & Siddiqi 2013). The analysis presented here is compatible with either.

However, like impoverishment rules, MP rules may also permit ABA patterns.[11] As an illustration of this, if we were to assume that the MP rules are triggered by suffix *exponents*, we need not expect any implicational relationships to hold between the forms of participles and preterites when they use different suffix exponents. Consider the ABB verbs with participial -*en* (e.g. *freeze, **froze**-n, **froze***). If the MP rules are specified in terms of suffix exponents, then the same vowel change would be specified for two distinct environments, as in (29).

(29) a. $V_1 \rightarrow V_2$ / $[C_1\_C_2]_{root}$ -*en* where $\sqrt{\text{ROOT}} = \sqrt{\text{FREEZE}}$, etc.
b. $V_1 \rightarrow V_2$ / $[C_1\_C_2]_{root}$ -$\varnothing$ where $\sqrt{\text{ROOT}} = \sqrt{\text{FREEZE}}$, etc.

To derive an ABA pattern, a verb could be specified to undergo the vowel change triggered as in (29-a) without undergoing the change triggered in (29-b), which would produce something akin to ***freeze**, frozen, **freeze***: an ABA pattern. That the base patterns do not include ABA would thus be a function of not only containment, but also of the MP rules being conditioned by features and not exponents. (See Harley & Tubino Blanco 2013 for evidence from Hiaki that MP rules can be sensitive to the exponents of the targets; see Embick 2013; Embick & Shwayder 2018 for further discussion of MP triggers.) Whether exponents can trigger MP rules remains an open question; it may be that that morphosyntactic features but not exponents can serve as triggers.

This does not carry over to root suppletion. Assuming Vocabulary Insertion proceeds from the root out (Bobaljik 2000; Embick 2015), the root is only sensitive to morphosyntactic features and not suffix exponents at the point of selection of the exponent of the root. It should thus be

[10]See also Bobaljik 2012 for an alternative conception of the relationship between impoverishment and *ABA.

[11]See Bobaljik 2012; 141-142 for discussion of an example from Ancient Greek in which the comparative triggers an MP change to a base while the superlative does not, resulting in a surface ABA pattern.

architecturally impossible for the exponence of roots to be affected by other exponents.

The difference in the conditions for MP and contextual allomorphy may lead us more generally to expect divergent patterns for containment structures. That is, if MP changes to a root's realization can be triggered by other exponents, but root suppletion cannot, then we expect ABA patterns to be possible with containment structures for the former but not the latter (except in the case of impoverishment). If the alternations of the base are driven by MP, the near absence of ABA patterns in English for the order BASE-PARTICIPLE-PRETERITE does not follow solely from containment and the Elsewhere Condition; the particular formulation of the MP rules as being sensitive to morphosyntactic features is also relevant.

5. Conclusion. In this paper, I have evaluated several approaches to the syncretisms and alternations of English participles and preterites. Examining the patterns of both stems and suffixes led me to adopt a DM containment analysis supplemented by one impoverishment rule.

This paper is somewhat unusual in that it examines an ABA generalization without discussing typology, focusing instead on the morphology of a single language. The utility of this type of investigation is that it can be used to compare different theories of *ABA that make predictions beyond the syncretisms and alternations of one morpheme. Future research should carry out this type of investigation on other languages and in other domains in which ABA generalizations have been observed.

I have said very little about the relationship between syntax, semantics, and feature representation. For example, while it has been convenient to refer to the past participle as a monolithic syntactic entity, this is a gross oversimplification. I have also referred to features with labels such as PRETERITE without identifying their syntacticosemantic contributions. Abstracting over such details leaves many questions open. But I hope that in looking at how feature representations map to exponents, I have moved the discussion forward on how to relate participles to preterites.

References

Andersson, Samuel. 2018. (*)ABA in Germanic verbs. *Glossa: A Journal of General Linguistics* 3(1). 119. https://doi.org/10.5334/gjgl.733.

Baunaz, Lena & Eric Lander. 2018. Nanosyntax: The basics. In Lena Baunaz, Karen De Clerq, Lilian Haegeman & Eric Lander (eds.), *Exploring Nanosyntax*. 3–56. Oxford: Oxford University Press.

Berko, Jean. 1958. The child's learning of English morphology. *Word* 14(2-3). 150–177. https://doi.org/10.1080/00437956.1958.11659661.

Bobaljik, Jonathan David. 2000. The ins and outs of contextual allomorphy. *University of Maryland Working Papers in Linguistics* 10. 35–71.

Bobaljik, Jonathan David. 2012. *Universals in comparative morphology: Suppletion, superlatives, and the structure of words*. Cambridge, MA: The MIT Press. https://doi.org/10.7551/mitpress/9069.001.0001.

Bobaljik, Jonathan David & Uli Sauerland. 2018. *ABA and the combinatorics of morphological features. *Glossa: A Journal of General Linguistics* 3(1). 15. https://doi.org/10.5334/gjgl.345.

Bonet, Eulalia. 1991. *Morphology after syntax: Pronominal clitics in Romance*: Massachusetts Institute of Technology dissertation.

Bybee, Joan L. & Dan I. Slobin. 1982. Rules and schemas in the development and use of the English past tense. *Language* 58(2). 265–289. https://doi.org/10.2307/414099.

Caha, Pavel. 2009. *The nanosyntax of case*: Universitetet i Tromsø dissertation.

Caha, Pavel. 2017. How (not) to derive a *ABA: The case of Blansitt's generalisation. *Glossa: A Journal of General Linguistics* 2(1). 84. https://doi.org/10.5334/gjgl.348.

Caha, Pavel. 2018. Notes on insertion in Distributed Morphology and Nanosyntax. In Lena Baunaz, Karen De Clerq, Lilian Haegeman & Eric Lander (eds.), *Exploring Nanosyntax*. 57–87. Oxford: Oxford University Press. https://doi.org/10.1093/oso/9780190876746.003.0002.

Calabrese, Andrea. 2015. Irregular morphology and athematic verbs in Italo-Romance. *Isogloss, Special issue on Italo-Romance syntax*. 69–102.

Clercq, Karen De & Guido Vanden Wyngaerd. 2017. *ABA revisited: Evidence from Czech and Latin degree morphology. *Glossa: A Journal of General Linguistics* 2(2). 69. https://doi.org/10.5334/gjgl.371.

Embick, David. 2013. Morphemes and morphophonological loci. In Ora Matushansky & Alec Marantz (eds.), *Distributed Morphology today: Morphemes for Morris Halle*. 151–163. Cambridge, MA: MIT Press. https://doi.org/10.7551/mitpress/9780262019675.003.0009.

Embick, David. 2015. *The morpheme: A theoretical introduction*. Berlin: De Gruyter Mouton. https://doi.org/10.1515/9781501502569.

Embick, David & Morris Halle. 2005. On the status of stems in morphological theory. In *Proceedings of Going Romance 2003*. 59–88. Amsterdam/Philadelphia: John Benjamins. https://doi.org/10.1075/cilt.270.03emb.

Embick, David & Rolf Noyer. 2007. Distributed Morphology and the syntax/morphology interface. In Gillian Ramchand & Charles Reiss (eds.), *The Oxford handbook of linguistic interfaces*. 289–324. Oxford: Oxford University Press. https://doi.org/10.1093/oxfordhb/9780199247455.013.0010.

Embick, David & Kobey Shwayder. 2018. Deriving morphophonological (mis) applications. In Roberto Petrosino, Pietro Cerrone & Harry van der Hulst (eds.), *From sounds to structures: Beyond the veil of Maya*. 193–248. Berlin, Boston: De Gruyter. https://doi.org/10.1515/9781501506734-007.

Halle, Morris & Alec Marantz. 1993. Distributed Morphology and the pieces of inflection. In Kenneth Hale & Samuel Keyser (eds.), *The view from Building 20: Essays in linguistics in honor of Sylvain Bromberger*. 111–176. Cambridge, MA: MIT Press.

Halle, Morris & Karuvannur P Mohanan. 1985. Segmental phonology of Modern English. *Linguistic Inquiry* 16(1). 57–116.

Harley, Heidi & Mercedes Tubino Blanco. 2013. Cycles, vocabulary items, and stem forms in Hiaki. In Ora Matushansky & Alec Marantz (eds.), *Distributed Morphology today: Morphemes for Morris Halle*. 117–134. Cambridge, MA: MIT Press. https://doi.org/10.7551/mitpress/9701.003.0009.

Haugen, Jason D. & Daniel Siddiqi. 2013. Roots and the derivation. *Linguistic Inquiry* 44(3). 493–517. https://doi.org/10.1162/ling_a_00136.

McFadden, Thomas. 2018. *ABA in stem-allomorphy and the emptiness of the nominative. *Glossa: A Journal of General Linguistics* 3(1). 8. https://doi.org/10.5334/gjgl.373.

Moskal, Beata. 2018. Excluding exclusively the exclusive: Suppletion patterns in clusivity. *Glossa: a journal of general linguistics* 3(1). 130. https://doi.org/10.5334/gjgl.362.

Nevins, Andrew. 2011. Marked targets versus marked triggers and impoverishment of the dual. *Linguistic Inquiry* 42(3). 413–444. https://doi.org/10.1162/ling_a_00052.

Noyer, Rolf. 2005. A constraint on interclass syncretism. In *Yearbook of Morphology 2004*, 273–315. Netherlands: Springer. https://doi.org/10.1007/1-4020-2900-4_9.

Redmond, Sean. 2003. Children's productions of the affix *-ed* in past tense and past participle contexts. *Journal of Speech, Language, and Hearing Research* 46. 1095–1109.

Smith, Peter W., Beata Moskal, Ting Xu, Jungmin Kang & Jonathan David Bobaljik. 2018. Case and number suppletion in pronouns. *Natural Language & Linguistic Theory* https://doi.org/10.1007/s11049-018-9425-0.

Yang, Charles. 2016.*The price of linguistic productivity: How children learn to break the rules of language*. Cambridge, MA: The MIT Press. https://doi.org/10.7551/mitpress/9780262035323.001.0001.

Zwicky, Arnold. 1990. Inflectional morphology as (sub)component of grammar. In Wolfgang U. Dressler, Hans C. Lusch¨utzky, Oskar E. Pfeiffer & John R. Ren-nison (eds.), *Contemporary morphology*. 217–236. Berlin: Mouton de Gruyter. https://doi.org/10.1515/9783110874082.217.