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Nanosyntax and syncretism in multidimensional paradigms

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Abstract: This article discusses certain problems that arise when the basic tenets of Nansyntax are employed in an analysis of syncretism patterns in multidimensional paradigms and presents and evaluate different solutions to these problems. The article is intended as a follow-up to my article an introduction to Nanosyntax.

Keywords: syncretism; multidimensional paradigms; Nanosyntax

1 Introduction

This article is a follow-up on Taraldsen (2019), which introduces some of the basic ideas of Nanosyntax (henceforth: NS), a theory of the syntax/lexicon interface built around ideas by Michal Starke which can be read by anyone with a basic knowledge of that framework. The focus is on certain issues that arise when one applies the basic principles of NS to account for syncretism patterns in multidimensional paradigms.

2 Multidimensional paradigms and the gap problem

Often the way Nanosyntax NS accounts for syncretism is illustrated with one-dimensional paradigms as when case-features are spelled out in isolation from other features. If features are associated one-to-one with syntactic heads, the Superset Principle (henceforth: the SP) makes this straightforward:

(1) The Superset Principle
A morpheme A with the entre A $\leftrightarrow$ T can lexicalize a syntactic structure S if and only if S is identical to a subtree of T.

To show how this works, let us adopt Caha's (2009) decomposition of case-features into structured sets of more primitive features:

(2) Dative = $[_{WP}\ W\ [_{XP}\ X\ [_{YP}\ Y\ [_{ZP}\ Z\ ]]]]$
Genitive = $[_{XP}\ X\ [_{YP}\ Y\ [_{ZP}\ Z\ ]]]$
Accusative = $[_{YP}\ Y\ [_{ZP}\ Z\ ]]$
Nominative = $[_{ZP}\ Z\ ]$

Imagine also that the feature structures in (2) are lexicalized in isolation from other features. Then, the SP allows a morpheme with the entry A $\leftrightarrow$ $[_{WP}\ W\ [_{XP}\ X\ [_{YP}\ Y\ [_{ZP}\ Z\ ]]]]$ to be the exponent of all four cases in (2) creating the syncretism pattern AAAA. If we add an entry B $\leftrightarrow$ $[_{XP}\ X\ [_{YP}\ Y\ [_{ZP}\ Z\ ]]]$ (but no other ones), we get

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ABBB by the Elsewhere Principle (henceforth: the EP) and so on:

(3) The Elsewhere Principle
If two morphemes A and B are both able to lexicalize a syntactic structure S, but the distribution of B predicted by the SP is properly included in the distribution of A, B wins.

As desired in view of Bobaljik (2012) and others, an ABA pattern cannot be generated this way. Using (2) for illustration and using the entries A $\leftrightarrow$ $[_{WP}$ W $[_{XP}$ X $[_{YP}$ Y $[_{ZP}$ Z]]]] and B $\leftrightarrow$ $[_{XP}$ X $[_{YP}$ Y $[_{ZP}$ Z]]] to provide the first two elements of an ABA pattern, we see that the EP prevents A from coming back as the exponent of accusative case.

But the choice of exponent for a given case may also be influenced by number, gender and person features. This is seen in (4) for example, a paradigm displaying the different case forms in Czech for masculine and feminine nouns in the singular and in the plural:[1,2]

(4)

		masculine	feminine
sg.	nominative	*kluk-Ø* ‘boy’	*holk-a* ‘girl’
	vocative	*kluk-u*	*holk-o*
	accusative	*kluk-a*	*holk-u*
	genitive	*kluk-a*	*holk-y*
	dative	*kluk-ovi*	*holc-e*
	locative	*kluk-ovi*	*holc-e*
	instrumental	*kluk-em*	*holk-ou*
pl.	nominative	*kluc-i*	*holk-y*
	vocative	*kluc-i*	*holk-y*
	accusative	*kluk-y*	*holk-y*
	genitive	*kluk-ů*	*holek-Ø*
	dative	*kluk-ům*	*holk-ám*
	locative	*kluc-ích*	*holk-ách*
	instrumental	*kluk-y*	*holk-ami*

The paradigm in (4) is three-dimensional and the exponents are portmanteau morphemes spelling out case features together with number and gender features. From a NS perspective, this means that there must minimally be lexical entries like (5)a-d (with some number of Case-heads/features on top of SgP and PlP):

(5)a A $\leftrightarrow$ $[_{KP} \ldots [_{SgP}$ Sg $[_{GenderP}$ feminine]]]
b B $\leftrightarrow$ $[_{KP} \ldots [_{SgP}$ Sg $[_{GenderP}$ masculine]]]
c C $\leftrightarrow$ $[_{KP} \ldots [_{PlP}$ Pl $[_{GenderP}$ feminine]]]
d D $\leftrightarrow$ $[_{KP} \ldots [_{PlP}$ Pl $[_{GenderP}$ masculine]]]

But the number features Sg and Pl used in (5) cannot be seen as two primitive features. The reason is that the same morpheme may occur in both the singular and the plural form for the same case and gender. Disregarding for the moment the presence of case-features on top of the number features, we can only capture this syncretism by saying that Pl is the only number feature and is privative, i.e. there is no number feature in the singular forms, or Pl corresponds to the structure [Pl [Sg]] on analogy with the decomposition

1 Declension class membership may be more important than gender. A masculine noun like *hrdina* ‘hero’ inflects like the feminine *holka* except that it has the dative and locative *hrdin-ovi* because it is masculine and animate. This complication seems irrelevant to the text discussion.
2 The alternation between *k* and *c* is a result of palatalization and the *-e-* in *holek* is epenthetic.

of case-features introduced above. On the second option, a morpheme A occurring both in the singular and the plural form in some gender X would have the entry in (6)a, and on the first option, we would have (6)b:

(6)a A ↔ $[_{\text{PlP}}$ Pl $[_{\text{SgP}}$ Sg $[_{\text{GenderP}}$ X]]]
b A ↔ $[_{\text{PlP}}$ Pl $[_{\text{GenderP}}$ X]]

Either way, A will be able to occur in both the plural and the singular of gender X as a consequence of the SP as long as case-features are kept out of the picture.

However, a problem arises when case-features are added. Suppose, for example, that A appears in the accusative and nominative forms. We cannot actually capture a syncretism between plural and singular forms in these cases just by positing one of the entries in (7) (where Y and Z are case-features):

(7)a A ↔ $[_{\text{YP}}$ Y $[_{\text{ZP}}$ Z $[_{\text{PlP}}$ Pl $[_{\text{SgP}}$ Sg $[_{\text{GenderP}}$ X]]]]]
b A ↔ $[_{\text{YP}}$ Y $[_{\text{ZP}}$ Z $[_{\text{PlP}}$ Pl $[_{\text{GenderP}}$ X]]]]

Both of these entries will allow A to occur in the plural forms of the accusative and the nominative, but neither of them also allows it to appear in the singular.

The reason is that if we assume a privative Pl, the singular form will have the syntactic structure in (8), but this is not identical to a subtree of the structure associated with A in (7)b:

(8) $[_{\text{YP}}$ Y $[_{\text{ZP}}$ Z $[_{\text{GenderP}}$ X]]]

If the correct representation of a singular noun is as in (9), the lexical entry for the syncretic A is (7)a, but (9) is not a subtree of the tree in (7)a:

(9) $[_{\text{YP}}$ Y $[_{\text{ZP}}$ Z $[_{\text{SgP}}$ Sg $[_{\text{GenderP}}$ X]]]]

Therefore, the SP doesn't actually allow us to capture a syncretism between a singular and plural form in portmanteau morphemes that also lexicalize case-features.

The problem is more general, though. It arises for any multidimensional paradigm emerging from the lexicalization by portmanteau morphemes of structures of the form in (10), where the B-layer corresponds to a separate functional sequence which need not project to include its top elements:

(10) $[_{\text{A}}$ X [Y … $[_{\text{B}}$ 1 [2 …

As things stand, there is no way the system can generate a syncretism between two forms that differ with respect to how many features are merged in one of the embedded layers in structures giving rise to multidimensional paradigms. This is the gap problem.

3 Pointers

In (9)/(10), the absence of the highest/only terminal in the number layer creates a gap between the case-feature Z and SgP/GenderP compared to the structures in (7)a-b. Caha and Pantcheva (2012) proposed a way around the gap problem by taking advantage of the assumption that lexicalization proceeds bottom-up. Consider again the case-dependent syncretism between plural and singular case forms already discussed. At each of the nodes GenderP and PlP, a lexical item will be inserted, if the lexicon provides one, e.g. the B with the entry in (11) (assuming no Sg, similar reasoning will apply if there is one):

(11) $B \leftrightarrow [_{PlP}\ Pl\ [_{GenderP}\ X\ ]]$

If there is no entry $C \leftrightarrow [_{GenderP}\ X\ ]$, both of the syntactic structures (12)a-b will be lexicalized by B:

(12)a $[_{PlP}\ Pl\ [_{GenderP}\ X\ ]]$
b $[_{GenderP}\ X\ ]$

There is no gap problem at this point. This problem arose in connection with the applicability of A with the entry in (7)b to the structure in (8) (the singular form):

(7)b $A \leftrightarrow [_{YP}\ Y\ [_{ZP}\ Z\ [_{PlP}\ Pl\ [_{GenderP}\ X\ ]]]]$

(8) $[_{YP}\ Y\ [_{ZP}\ Z\ [_{GenderP}\ X\ ]]]$

As we have seen, the B in (11) will already have been chosen as the exponent of both $[_{PlP}\ Pl\ [_{GenderP}\ X\ ]]$ and $[_{GenderP}\ X\ ]$ before the lexicalization procedure reaches the ZP node in (8). We can represent this by including a pointer to B inside the structures to indicate that B has been chosen to spell out the complement of Z:[3]

(13)a $[_{ZP}\ Z\ [_{PlP}\ Pl\ [_{GenderP}\ X\ ]]] = [_{ZP}\ Z\ [_{PlP} \rightarrow B\ ]]$
b $[_{ZP}\ Z\ [_{GenderP}\ X\ ]] = [_{ZP}\ Z\ [_{GenderP} \rightarrow B\ ]]$

Caha and Pantcheva's innovation was to allow lexical entries to make reference to such pointers. Thus, (7)b would be replaced with (14):

(14) $A \leftrightarrow [_{YP}\ Y\ [_{ZP}\ Z \rightarrow B\ ]]$

This is intended to mean that A can lexicalize ZP (and YP) as long as the complement of Z has been lexicalized by B.

Since B is syncretic over the plural and singular forms, so is the A in (14). Pointers bridge gaps.

Notice also that allowing lexical entries to contain pointers may be necessary independently of the gap problem. The relevant discussion will be found in Section 7.

4 Pointers give rise to ABA patterns

However, as pointed out by Taraldsen (2012), the use of pointers in lexical entries also allows certain ABA patterns to be generated, i.e. patterns where an A occurs in two or more cells that don't share a side. But it is widely held that such patterns, e.g. **good – better – goodest*, are apparently not documented in natural languages (see Caha 2009; Bobaljik 2012; Bobaljik and Sauerland (2018); among others).

Consider, for example, a two-dimensional paradigm with the structures in (15)a in one dimension and those in (15)b in the other:

(15)a $[_{\alpha}\ X\ [\ Y\ [\ Z\ ]]] – [_{\alpha}\ Y\ [\ Z\ ]] – [_{\alpha}\ Z\ ]$
b $[_{\beta}\ 1\ [\ 2\ [3\ ]]] – [_{\beta}\ 2\ [3\ ]] – [_{\beta}\ 3\ ]$

3 Technically, each lexical entry is associated with a unique address, a number, and the pointer is that address. The syntactic structure of the constituent that the pointer is assigned to remains visible till the lexicalization procedure has reached the top node of the whole tree, and a pointer can be erased when lexicalization applies again on a higher cycle ("cyclic override").

The structures formed by embedding a structure in (15)b under a structure in (15)a are the following:

(16)a [$_\alpha$ X [Y [Z [$_\beta$ 1 [2 [3]]]]]]
b [$_\alpha$ Y [Z [$_\beta$ 1 [2 [3]]]]]
c [$_\alpha$ Z [$_\beta$ 1 [2 [3]]]]
d [$_\alpha$ X [Y [Z [$_\beta$ 2 [3]]]]]
e [$_\alpha$ Y [Z [$_\beta$ 2 [3]]]]
f [$_\alpha$ Z [$_\beta$ 2 [3]]]
g [$_\alpha$ X [Y [Z [$_\beta$ 3]]]]
h [$_\alpha$ Y [Z [$_\beta$ 3]]]
i [$_\alpha$ Z [$_\beta$ 3]]

Suppose now that we have the following lexical entries:

(17)a C $\leftrightarrow$ [$_\beta$ 1 [2 [3]]]
b A $\leftrightarrow$ [$_\alpha$ X [Y [Z $\rightarrow$ C]]]
c B $\leftrightarrow$ [$_\alpha$ X [Y [Z [$_\beta$ 2 [3]]]]]

The structures (16)a-c must be lexicalized by A rather than B, since the 1 in the β-layer has no counterpart in the tree associated with B as would be required by the SP. So, the cells in the first column of the paradigm will all be filled by A:

(18)

	[$_\beta$ 1 [2 [3]]]	[$_\beta$ 2 [3]]	[$_\beta$ 3]
[$_\alpha$ X [Y [Z	A		
[$_\alpha$ Y [Z	A		
[$_a$ Z	A		

The structures (16)g-i must also be lexicalized by A. Again, B is not a candidate because of the SP: [$_\alpha$ . . . Z [$_\beta$ 3]] is not a subtree of the tree associated with B. But this is not a problem for A since its lexical entry contains a pointer to C, which will lexicalize the β-layer in these structures before the lexicalization procedure reaches Z. Hence, all the cells in the rightmost column will also contain A:

(19)

	[$_\beta$ 1 [2 [3]]]	[$_\beta$ 2 [3]]	[$_\beta$ 3]
[$_\alpha$ X [Y [Z	A		A
[$_\alpha$ Y [Z	A		A
[$_\alpha$ Z	A		A

Now, consider what will happen when the structures in (16)d-f are lexicalized. Both A and B are candidates according to the SP. A is again a candidate because C can lexicalize the β-layer. B is a candidate because there is now no gap in the β-layer with respect to the tree associated with B. Therefore, the choice of exponent for (16)d-f is determined by the EP:

(3) The Elsewhere Principle
If two morphemes A and B are both able to lexicalize a syntactic structure S, but the distribution of B predicted by the SP is properly included in the distribution of A, B wins.

Since the distribution of A as determined by the SP, i.e. all the cells of the paradigm, properly includes that of B, the EP selects B. Therefore, each cell in the middle column will be filled by B:

(20)

	[$_\beta$ 1 [2 [3]]]	[$_\beta$ 2 [3]]	[$_\beta$ 3]
[$_\alpha$ X [Y [Z	A	**B**	A
[$_\alpha$ Y [Z	A	**B**	A
[$_\alpha$ Z	A	**B**	A

But in the resulting paradigm, the As in the first column are not connected to the As in the third column. The entries in (17) generate an ABA pattern.

Extrapolating from this example, we see that the use of pointers in lexical entries gives rise to ABA patterns, because a morpheme whose lexical entry contains a pointer may compete with another morpheme whose entry does not contain a pointer when there is no gap in the lower layer, and then, the EP will select the latter.

5 The empirical issue

The fact that the use of pointers allows for the generation of ABA-paradigms like (20) is bad news if ABA-paradigms do not in fact exist. But is the descriptive *ABA generalization actually entirely correct?

In approaching this empirical question, we should note that the use of pointers in lexical entries predicts that ABA-patterns should arise in multidimensional paradigms, but ABA-patterns will still be excluded from one-dimensional paradigms, e.g. when case-features are spelled out separately from number-features or gender-features, even if the relevant lexical entries make reference to pointers (for no good reason). This is because the projection of a single functional sequence doesn't contain internal gaps at which a lexical entry with a pointer could compete with a lexical entry without a pointer as A and B do when the structures in (16) are lexicalized. Therefore, the conclusion reached in the preceding section is good news, if it turns out that that ABA-patterns are in fact documented in multidimensional paradigms, but not in one-dimensional paradigms.

We are not in a position to say with any degree of certainty that this is actually the case. Vanden Wyngaerd (2014), Vanden Wyngaerd (2018) offers some examples of ABA-patterns in pronominal paradigms, which are multidimensional since personal pronouns can be decomposed into person features and number features. Here is an example:

(21) Bagirmi pronouns (Cysow 2003; Vanden Wyngaerd 2018: 289, footnote 6):

	pl	sg
1.	*d'e*	*ma*
2.	*se*	*i*
3.	***d'e***	*ne*

The paradigm with cells ordered by increasing feature sets (with 3 = person, 2 = discourse participant and 1 = speaker) looks like (22):

(22)

	[$_\beta$ 1 [2 [3]]]	[$_\beta$ 2 [3]]	[$_\beta$ 3]	
[$_\alpha$ Pl [Sg	***d'e***	*se*	***d'e***	= we – you (pl.) – they
[$_a$ Sg	*ma*	*i*	*ne*	= I – you (sg.) – he/she

This paradigm is generated by a set of lexical entries containing (23)a-c, where (23)b contains a pointer to P, but (23)c does not:

(23)a $P \leftrightarrow [_{\beta}\ 1\ [\ 2\ [3\ ]]]$
b *d'e* $\leftrightarrow [_{\alpha}\ \mathrm{Pl}\ [\ \mathrm{Sg}\ [_{\beta} \rightarrow P\ ]]]$
c *se* $\leftrightarrow [_{\alpha}\ \mathrm{Pl}\ [\ \mathrm{Sg}\ [_{\beta}\ 2\ [3\ ]]]]$

When the structures in (24) are lexicalized, *d'e* is the only candidate given the SP:

(24)a $[_{\alpha}\ \mathrm{Pl}\ [\ \mathrm{Sg}\ [_{\beta} 1\ [\ 2\ [3\ ]]]]]$
b $[_{\alpha}\ \mathrm{Pl}\ [\ \mathrm{Sg}\ [_{\beta}\ 3\ ]]]$

When (25) is lexicalized, *d'e* and *se* are both candidates, but the EP prefers *se*:

(25) $[_{\alpha}\ \mathrm{Pl}\ [\ \mathrm{Sg}\ [_{\beta}\ 2\ [3]]]]$

But the strength of the Bagirmi paradigm as support for the use of pointers in lexical entries is weakened by the fact that some documented ABA-patterns cannot even be derived by using pointers. Unlike Vanden Wyngaerd, I don't think the diagonal ABA-pattern in (26), for example, can be derived by using pointers:[4]

(26) Suki pronouns (Vanden Wyngaerd 2014: 13, Vanden Wyngaerd 2018: 295):

	$[_{\beta}\ 1\ [\ 2\ [3\ ]]]$	$[_{\beta}\ 2\ [3\ ]]$	$[_{\beta}\ 3\ ]$	
$[_{\alpha}\ \mathrm{Pl}\ [\ \mathrm{Sg}$	***e***	*de*	*i*	= we – you (pl). – they
$[_{\alpha}\ \mathrm{Sg}$	*ne*	***e***	*u*	= I – you (sg) – he/she

To enable *e* to occur both in the 1st person plural and in the 2nd person singular, we put a pointer in its entry:

(27)a $E \leftrightarrow [_{\beta}\ 1\ [\ 2\ [3\ ]]]$
b *e* $\leftrightarrow [_{\alpha}\ \mathrm{Pl}\ [\ \mathrm{Sg}\ [_{\beta} \rightarrow E\ ]]]$

But to get the 2nd person plural *de* in place we need the entry in (28):

(28) *de* $\leftrightarrow [_{\alpha}\ \mathrm{Pl}\ [\ \mathrm{Sg}\ [_{\beta}\ 2\ [3\ ]]]]$

By the SP, *e* and *de* can both lexicalize the structure for the 2nd person singular pronoun:

(29) $[_{\alpha}\ \mathrm{Sg}\ [_{\beta}\ 2\ [3\ ]]]$

But the distribution of *de* predicted by the SP is properly included in the distribution of *e*, because the entry for *e* contains the pointer to E:

(30) The distribution of *de* and *e* predicted by the SP :

	$[_{\beta}\ 1\ [\ 2\ [3\ ]]]$	$[_{\beta}\ 2\ [3\ ]]$	$[_{\beta}\ 3\ ]$	
$[_{\alpha}\ \mathrm{Pl}\ [\ \mathrm{Sg}$	***e***	***e*** /*de*	***e***	= we – you (pl). – they
$[_{\alpha}\ \mathrm{Sg}$	***e***	***e*** / *de*	***e***	= I – you (sg) – he/she

This is why the EP selects *de* rather than *e* for the 2nd person plural, i.e. for the structure in (31):

(31) $[_{\alpha}\ \mathrm{Pl}\ [\ \mathrm{Sg}\ [_{\beta}\ 2\ [3\ ]]]]$

4 The diagonal pattern is an ABA-pattern, because A occurs in two cells that don't share a side.

But by the same token, *de* should also block *e* for (29), and therefore only the paradigm in (32) should be derivable:

(32) Suki pronouns as predicted by current assumptions:

	$[_\beta$ 1 [2 [3]]]	$[_\beta$ 2 [3]]	$[_\beta$ 3]	
$[_\alpha$ Pl [Sg	*e*	***de***	*i*	= we – you (pl). – they
$[_\alpha$ Sg	*ne*	***de***	*u*	= I – you (sg) – he/she

Thus, the available evidence that ABA-patterns actually occur in multidimensional paradigms only as predicted by the use of pointers seems fairly weak.

6 Eliminating pointers

If we fail to find solid evidence that the ABA-patterns exist exactly as predicted by the use of pointers rather than as sporadic results of accidental homonymy, we have a problem we need to fix. The problem arises because morphemes with pointers in their entries compete with morphemes without pointers and the EP favors the latter. So, we can eliminate the problem by eliminating pointers or by eliminating/modifying the EP or by making pointers obligatory in the relevant cases.

The most obvious way to proceed is perhaps to do without pointers. But then we will have to loosen the subtree requirement in the SP to get around the gap problem:

(4) The Superset Principle
A morpheme A with the entre A ↔ T can lexicalize a syntactic structure S if and only if S is identical to a subtree of T.

Saying that S is identical to a subtree of T is equivalent to saying that S matches a subtree of T:

(33) Matching
Two trees T and S match if and only if (i) the root node X of T has the same label as the root node Y of S, (ii) every daughter of X matches a daughter of Y, and (iii) every daughter of Y matches a daughter of X.

In order to decide whether the two trees in (34) match, we may start at the bottom looking at the terminals C and Z:

(34)a $[_{AP}$ A $[_{BP}$ B $[_{CP}$ C]]]
b $[_{XP}$ X $[_{YP}$ Y $[_{ZP}$ Z]]]

Since the terminals C and Z have no daughters, clauses (ii) and (iii) don't come into play, and C and Z match if they have the same label. Since C and Z match, clauses (ii) and (iii) are satisfied for CP and ZP, and these match too, if they have the same label (which they do, if the label of a phrase is determined by its head). Then, BP and YP also satisfy clauses (ii) and (iii) if the terminals B and Y have the same label. Finally, AP and XP now match in accordance with (8) provided the terminals A and X have the same label.

Since the gap problem discussed in Section 2 arises from the conjunction of clauses (ii) and (iii) in (33), we may eliminate it by removing one of the two conjuncts. Thus, the new definition of 'matching' characterizes an asymmetric relation between trees:

(35) Matching (asymmetric)
The tree S matches the tree T if and only if (i) the root node X of T has the same label as the root node Y of S and (ii) every daughter of Y matches a descendant of X.

The SP will then be as in (36), with 'matching' defined as in (35):

(36) The Superset Principle
A lexical item A with the lexical entry A ↔ T can replace all and only the syntactic structures S matching (asymmetrically) a subtree of T.

Now, there is no gap problem and therefore, no need for pointers (except perhaps for reasons discussed in the next section). For example, the structure in (37) matches the tree associated with A in (7)a under the revised definition of Matching, since it is no longer required that the node PlP in (7)a find a match in (37):

(7)a A ↔ $[_{YP}$ Y $[_{ZP}$ Z $[_{PlP}$ Pl $[_{SgP}$ Sg $[_{GenderP}$ X]]]]]
(37) $[_{YP}$ Y $[_{ZP}$ Z $[_{SgP}$ Sg $[_{GenderP}$ X]]]]

This revision of the definition of Matching was first proposed by Pavel Caha (2014). A similar proposal is presented in Vanden Wyngaerd (2018).

7 Eliminating the EP

A different way of forcing lexical entries to include pointers in a range of cases is proposed by Caha et al. (2018). They discuss two problems leading up to the proposal. The first of these arises because of the EP:

(3) The Elsewhere Principle
If two morphemes A and B are both able to lexicalize a syntactic structure S, but the distribution of B predicted by the SP is properly included in the distribution of A, B wins.

There are nouns that have the same form in the singular and the plural, e.g. *sheep* which would have the lexical entry in (38):

(38) *sheep* ↔ $[_{PlP}$ Pl $[_{NP}$ N]]

By the SP, *sheep* can lexicalize both of the two structures in (39):

(39)a $[_{PlP}$ Pl $[_{NP}$ N]] (plural)
b $[_{NP}$ N] (singular)

But by the EP, *sheep* should be blocked for (39)b by nouns that can only occur in the singular (without -*s*), e.g. *goat*:

(40) *goat* ↔ $[_{NP}$ N]

For this reason, Caha et al. propose abandoning the EP. But the EP played an important role in the account of the *ABA generalization presented in Section 5. The reason the entries in (41) cannot create an ABA-pattern from the structures in (42) has been taken to be that once B has been selected over A by the EP, B continues to block A because of the EP:

(41)a A ↔ $[_{WP}$ W $[_{XP}$ X $[_{YP}$ Y $[_{ZP}$ Z]]]]
b B ↔ $[_{XP}$ X $[_{YP}$ Y $[_{ZP}$ Z]]]

(42) Dative = $[_{WP}$ W $[_{XP}$ X $[_{YP}$ Y $[_{ZP}$ Z]]]]: **A**
Genitive = $[_{XP}$ X $[_{YP}$ Y $[_{ZP}$ Z]]]: **B**
Accusative = $[_{YP}$ Y $[_{ZP}$ Z]]
Nominative = $[_{ZP}$ Z]

So, if the EP is abandoned, we need something new to prevent ABA-patterns from arising.

The second problem Caha et al. address has to do with "cyclic override": When a phrase FP is formed by merging a new head F to a pre-existing phrase XP, and there is an entry M ↔ $[_{FP}$ F XP], the newly formed $[_{FP}$ F XP] will be lexicalized in its entirety by M overriding previous lexicalization of XP by some possibly distinct morpheme N. This is illustrated in (43) assuming entries *man* ↔ $[_{NP}$ N] and *men* ↔ $[_{PlP}$ Pl $[_{NP}$ N]]:

(43) $[_{NP}$ N] = *man* → $[_{PlP}$ Pl $[_{NP}$ N]] = *men*

But then, what keeps *men* from blocking *boys* under cyclic override?:[5]

(44) $[_{NP}$ N] = *boy* → $[_{PlP}$ Pl $[_{NP}$ N]] = *men*

Caha et al. (2018: 53) give the following answer:[6]

(45) The Faithfulness Restriction
A spell-out /α/ may override an earlier spell-out /β/ iff
(a) /α/ = /β/
(b) or /α/ contains a pointer to /β/

Clause (b) still allows *men* to override *man* as in (43) provided the entry for *men* contains a pointer to *man*:

(46) *men* ↔ $[_{PlP}$ Pl → *man*]

Similarly for other morphemes that can lexicalize $[_{PlP}$ Pl $[_{NP}$ N]] as a whole, e.g. *mice*:

(47) *mice* ↔ $[_{PlP}$ Pl → *mouse*]

5 Spell-out driven movement turns $[_{PlP}$ Pl $[_{NP}$ N]] into $[_{PlP}$ $[_{NP}$ N] $[_{PlP}$ Pl]] only if there is no lexical item that can lexicalize $[_{PlP}$ Pl $[_{NP}$ N]]; cf. Pantcheva (2011), Starke (2018) and Caha et al. (2018).

6 Clause (a) handles derivations like $[_{NP}$ N] = *sheep* → $[_{PlP}$ Pl $[_{NP}$ *sheep*]] = *sheep* with the entry *sheep* ↔ $[_{PlP}$ Pl $[_{NP}$ N]]. In the final version of the Faithfulness Restriction, Caha et al. also adds a third clause which need not concern us here.

The Faithfulness Restriction also precludes the derivation of ABA-patterns even without the EP. Consider for example the possible continuations of the partial paradigm in (42):

(42)	Dative =	$[_{WP}$ W $[_{XP}$ X $[_{YP}$ Y $[_{ZP}$ Z]]]]:	**A**
	Genitive =	$[_{XP}$ X $[_{YP}$ Y $[_{ZP}$ Z]]]:	**B**
	Accusative =	$[_{YP}$ Y $[_{ZP}$ Z]]	
	Nominative =	$[_{ZP}$ Z]	

To get B in the second line, we must assume the entry B $\leftrightarrow$ $[_{XP}$ X $[_{YP}$ Y $[_{ZP}$ Z]]], but then, the derivation leading to the A in the first line must be as in (48), where A overrides B:

(48) $[_{XP}$ X $[_{YP}$ Y $[_{ZP}$ Z]]] = B $\rightarrow$ $[_{WP}$ W $[_{XP}$ B]] = A

Therefore, by the Faithfulness Restriction, the entry for A must point to B:

(49) A $\leftrightarrow$ $[_{WP}$ W $\rightarrow$ B]

But then, A can only spell out a WP (where the complement of W has been lexicalized by B), and therefore, A cannot reappear in the third or the fourth line of (42).

This extends to multidimensional paradigms. In Section 4, I pointed out that the ABA-paradigm in (20) can be derived with the lexical entries in (17) assuming the EP:

(20)	$[_\beta$ 1 [2 [3]]]	$[_\beta$ 2 [3]]	$[_\beta$ 3]
$[_\alpha$ X [Y [Z	A	**B**	A
$[_\alpha$ Y [Z	A	**B**	A
$[_\alpha$ Z	A	**B**	A

(17)a C $\leftrightarrow$ $[_\beta$ 1 [2 [3]]]
b A $\leftrightarrow$ $[_\alpha$ X [Y [Z $\rightarrow$ C]]]
c B $\leftrightarrow$ $[_\alpha$ X [Y [Z $[_\beta$ 2 [3]]]]]]

This is because B is inapplicable to the structures corresponding to the cells in the first and the last column, but is applicable to the cells in the mid column and blocks A because of the EP.

But now the EP has been abandoned, and moreover, given the Faithfulness Restriction, B never gets a chance to apply. Since A appears in the first and the last column in (20), C must be inserted at $[_\beta$ 3] and continue upward all the way through the β-layer, and therefore, getting B in the middle column requires B overriding C at $[_\alpha$ Z $[_\beta$ 2 [3]]]:

(50) $[_\beta$ 2 [3]] = C $\rightarrow$ $[_\alpha$ Z $[_\beta$ C]] = B

But the Faithfulness Condition disallows this, since (17)c doesn't point to C.[7]

8 Making pointers obligatory

Since ABA patterns like (20) arise from competition between entries with pointers, like (17)b, and entries without pointers, like (17)c, we can also keep them from arising by making the use of pointers obligatory when a

7 If we include a pointer to C in the entry for B replacing [2 [3]] in (17)c, i.e. B $\leftrightarrow$ [X [Y [Z [(C]]]], we get the same entry as for A predicting free variation.

lexical entry spans different structural layers. The two structural layers labeled α and β in (20) correspond to (partial) projections of two distinct functional sequences, e.g. one for number and another for gender:

(20)	[$_{\beta}$ 1 [2 [3]]]	[$_{\beta}$ 2 [3]]	[$_{\beta}$ 3]
[$_{\alpha}$ X [Y [Z	A	**B**	A
[$_{\alpha}$ Y [Z	A	**B**	A
[$_{\alpha}$ Z	A	**B**	A

Suppose now that such projections act like phases in the sense that their internal structure becomes inaccessible to further processing, including lexicalization, when the top node of the (partial) projection is reached. Then, the only way an entry can make the distribution of a morpheme dependent on properties of a lower structural layer is by including a pointer to the morpheme that has lexicalized that layer. Accordingly, the entry in (17)c is ruled out, and so, (17)b no longer competes with an entry without a pointer:

(17)a C ↔ [$_{\beta}$ 1 [2 [3]]]
b A ↔ [$_{\alpha}$ X [Y [Z [$_{\beta}$→ C]]]]
c B ↔ [$_{\alpha}$ X [Y [Z [$_{\beta}$ 2 [3]]]]]]

9 Summary

We have identified a special problem, the gap problem, that arises on an NS-based analysis of syncretism in multidimensional paradigms – a problem that doesn't arise for one-dimensional paradigms. We have also looked at different solutions to this problem, but have not made any decision as to which one is the optimal one. This is because each of these proposals involves further issues which are still under debate in the NS-community. The reader is hereby invited to make a contribution.

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