

Deriving affix ordering in polysynthesis: evidence from Adyghe

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Abstract This article deals with the order of verbal suffixes in Adyghe, a polysynthetic language of the Caucasus. Traditionally the structure of the Adyghe word form and the order of its affixes were described in terms of template morphology. However, we present new data demanding another, substantially different approach. We demonstrate that for the most part suffix ordering within the Adyghe verb follows strictly compositional rules. This feature is a manifestation of the polysynthetic nature of the language.

Keywords Polysynthesis · Caucasian languages · Adyghe · Suffix order · Scope · Compositionality

1 Introduction

Studying the order of affixes is especially fascinating in languages allowing long sequences of morphemes, since they provide us with particularly rich material. Thus it becomes extraordinarily promising when one deals with polysynthetic languages showing unusually complex morphological structures.

Polysynthetic languages appear to be somehow enigmatic linguistic objects. Numerous investigations are dedicated to them, but there are still many blank spots in the polysynthesis lore. The nature of polysynthesis is probably more complicated

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than any simple definition can suggest, yet we find a good starting point for our discussion in the conception provided by Evans and Sasse (2002, p. 3). According to them, the prototypical polysynthetic language is “one in which it is possible, in a single word, to use processes of morphological composition to encode information about both the predicate and all its arguments, for all major clause types (i.e. one-, two- and three-place predicates, basic and derived), to a level of specificity allowing this word to serve alone as a free-standing utterance without reliance on context.” Hence, and most importantly for us, polysynthetic morphology takes some functions that are traditionally ascribed to syntax.

Consider the following example from Mohawk (Iroquoian)¹:

- (1) Y-a-hi-háh-a-ra’-t-e’
 TRANS-FACT-1SG.S/M.SG.O-road-∅-reach-CAUS-PUNCT
 ‘I led him to the right road.’ (Baker 1996, p. 360)

This form can easily stand alone and constitute a complete sentence. Morphology in such examples may itself encode arguments (here, the subject and the object) and thus act similarly to free noun phrases in most non-polysynthetic languages. This view, which in the generative literature is often associated with Jelinek’s (1984) paper, is certainly explicitly or implicitly presumed in many other works on polysynthetic languages, although curiously, Baker (1996) in his general theory of polysynthesis claims that this is only partly so. Additional evidence for the syntactic functions of polysynthetic morphology comes from the fact that polysynthetic languages often make active use of morphological constructs whose semantics presupposes complex derivation, e.g., morphological causatives, applicatives, etc.

The morphology that fulfills syntactic functions is expected to be organized similarly to syntax. Still, the fact that the polysynthetic morphology demands special treatment does not itself restrict our freedom in possible models of description. There are polysynthetic languages strictly confirming to a non-syntactic template model, like some languages of Northern Australia (see Nordlinger this volume). In such languages, the stem has its finite quantity of forms, and this crucially delimits the range of complex meanings that can be expressed morphologically. On the other hand, there are polysynthetic languages which demonstrate more syntactic arrangement of affixes, hence yielding “syntactic approaches” to polysynthetic morphology (see Woodbury and Sadock (1986) for contrasting these approaches to lexicalist ones using Eskimo data). Moreover, template morphology can cooccur with non-template morphology, even within a single word form.

With this in mind, we will discuss a fragment of morphology of Adyghe, a member of the Circassian branch of the Northwest Caucasian family spoken by about 425 thousand people mostly in the North Caucasian part of Russian Federation and

¹ Abbreviations used in glosses are listed in the Appendix B. Note that zero morphemes remain un-glossed unless they are relevant.

also in the Near East (Israel, Jordan, Turkey, Syria). Adyghe is an ergative left-branching language (though its word order allows significant freedom in independent clauses). Moreover, Adyghe shows a high degree of polysynthesis, making possible remarkable morpheme chains like the following one:

- (2) sə-qə-p-f-a-r-jə-ʁe-λeκ_{wə}-ʁ²
 1SG.ABS-DIR-2SG.IO-BEN-3PL.IO-OPV-3SG.A-CAUS-see-PST
 ‘He showed them (lit., caused them to see) me for your sake.’

But it is not morphological complexity alone that makes Adyghe polysynthetic. The example just given demonstrates that Evans and Sasse’s definition cited above undoubtedly applies to Adyghe: (2) contains no free NPs, but still may serve as a complete sentence describing a situation with four participants. It also contains benefactive and causative markers expressed in the verb and this too can be taken to manifest polysynthesis.

Below we will examine the order of Adyghe verbal suffixes, which semantically serve as operators modifying a proposition expressed by their base. Several suffixes of this kind, namely -xə ‘intensive’, -ʁe ‘past’ (here in its “upgraded” form) and -xe ‘terminative’ (‘already’) are shown in (3):

- (3) məʔerəse-r a-š’ q-je-fe-xə-ʁa-x-ep
 apple-ABS that-OBL DIR-OPV-fall-INT-PST-TRM-NEG
 (Speaking of Newton:) ‘The apple has not fallen on him yet.’

The suffixes just mentioned do not bear syntactic information proper. Nonetheless, we will demonstrate that they take part in compositional combinations, which implies the relevance of affix ordering.

This paper has several goals. The first one, descriptive, is to observe closely the behaviour of Adyghe suffixes. The second one, theoretically-oriented, is to make some general conclusions concerning “syntactic morphology”, which in Adyghe may be applied even to such categories as tense.

The paper is organized in the following way. In Sect. 2, we discuss the template-based approach, which is quite popular in the descriptions of polysynthetic languages in general and of Circassian languages in particular, and propose a scope-based approach which we consider to be more convenient for Adyghe. In Sect. 3, we provide data that cannot fit into templates and require an alternative treatment. We argue that many idiosyncratic facts about Adyghe suffixes can be accounted for under the assumption that suffixes are added compositionally and their position corresponds to their scope. In Sect. 4, we demonstrate how the model proposed works for the expression of tense, aspect, and modality. In Sect. 5 we place Adyghe data in the context of the typology and standards of polysynthetic morphology. The last section includes conclusions and touches upon several directions for future investigations.

² Unless indicated otherwise, data cited here are from our field materials collected mostly during the Adyghe linguistic expeditions of Russian State University for the Humanities (2003–2008). All examples are given in a special transcription used in Caucasological studies, which is different from that of IPA (Koriakov 2006, pp. 15–16); for the correspondences between the two transcriptions see Appendix A.

2 Approaches to suffix ordering in Adyghe

2.1 The template approach

The most authoritative descriptions of Circassian morphology devoting some space to affix order, namely Kumakhov (1964), Smeets (1984) and Paris (1989), all used a template model. This model postulates a strict one-to-one correspondence between morphological slots and (classes of) morphemes. Since the order of slots is fixed, it stipulates the possible orders of morphemes. Ideally, morphemes belonging to one slot can never cooccur, albeit we will see that this is not necessarily satisfied in templates proposed for Adyghe.

Consider the following template of the Adyghe verb based on Smeets (1984):

(4) Prefixes:

1. Absolutive ('Subject') cross-reference prefix
2. The directional prefix 'hither'
3. Temporal ('when'), factive ('the fact that') or manner ('the way in which') relativization
4. Applicative complexes (an oblique object cross-reference prefix + an applicative preverb; locative preverbs function as applicatives, too and introduce their own argument)
5. Indirect object prefixes
6. Agent prefixes
7. The optative and dynamic prefixes
8. The (narrow scope) negative marker
9. Causative

Root

Suffixes:

- A. Directional suffixes: -ç'ə 'extrovert' ('away'), -hə 'introvert', -lə 'towards' etc.
- B. Specifying suffixes: -z'ə (reversive/refactive), -ŝ_wə 'to be able to' (habilitive), -pə (affirmative), -xə (terminative), and others
- C. Attitudinal suffixes: -pxə 'must' (debitive), -ɛ_wəjə 'easy', -ɛ_wəŝ_wə 'difficult' and others
- D. Tense and mood suffixes

Endings:

The plural ending, the dynamic ending, the negative ending, the interrogative ending, the additive (emphatic) and coordinative endings.

According to Smeets, the Adyghe verb template includes nine prefix slots, three suffix slots and several slots for the so-called endings.³ We will use the term *stem*

³ Smeets does not order endings, nor do we, although this might be possible. Note that below we do not always follow Smeets' treatment of Adyghe morphological structure. For example, we regard Smeets' "indirect objects" as a special kind of applicatives. These differences between Smeets' and our approaches are irrelevant for the suffixal zone we explore below.

for the part of the word that includes (or can include) causative marking, the root and suffixes. Take the verb form in (5):

- (5) waŝ_we-m ž_waκ_we qə-Ø-tje-s-xə-ŝ_wə-ŝ_wa-κ
 sky-OBL star DIR-3SG.IO-LOC-1SG.A-take-HBL-SML-PST
 ‘It seems that I can take a star from the sky.’

The template given above provides the following representation for it, where any morpheme gets its place according to its formal and functional class (the unfilled slots are eliminated):

(6)

2	4	6	Root	B	D
qə-	Ø-tjə-	s-	xə	-ŝ _w ə-ŝ _w a	-κ
DIR-	3SG.IO-LOC-	1SG.A	take	-HBL-SML	-IRR

Smeets distinguishes between suffixes and endings, using the morphophonemic vowel alternation e/a as a criterion. The placement of this alternation depends exactly on the boundary of the stem. In general, the e/a-alternation occurs when the two last syllables before this border contain the vowel /e/ in their basic form. Under this condition, the penultimate syllable upgrades its vowel to /a/. Importantly, endings never undergo this alternation. Take the following two examples:

- (7) hač'e-xe-r wa-dež' qe-κ_wa-κe-me... /qə-κ_we-κe-me/
 visitor-PL-ABS 2SG.PP-to DIR-go-PST-COND
 ‘... if you had visitors.’
- (8) ə-txə-κa-x /ə-txə-κe-xe/
 3SG.A-write-PST-TRM
 ‘He has already written this.’

Besides a directional prefix ‘hither’, the verb form in (7) includes the root, a past suffix and a conditional ending. The basic form of all these morphemes contains the vowel /e/. The alternation occurs in the root (/κ_we/ turns into /κ_wa/) because it constitutes the penultimate syllable of the stem, in spite of the fact that it is only the last syllable but two within the whole word. The verb in (8) contains no endings but two suffixes with the underlying vowel /e/ (the vowel of the last syllable of a word can be deleted). Consequently, here the e/a-alternation is found in the (underlyingly) penultimate syllable of the whole word.

Notably, there is one more, semantic, reason to distinguish between suffixes and endings. Unlike suffixes, endings tend to convey either syntactically relevant information (subordinative and coordinative endings, the dynamic suffix found predominantly in subordinated forms, the wide scope negation etc.) or pragmatic information (the “additive” particle used as a marker of emphasis). Similarly, non-stem prefixes can be divided into two zones, out of which the *argument structure zone* predominantly includes morphemes related to the argument structure and the

“*pre-stem*” zone mostly includes “prefix correlates” of endings such as the dynamic and negative prefixes. In general, we find six zones within the Adyghe verb:

- (9) Argument structure zone – “Pre-stem” zone – Causative – Root – Propositional operators–Endings

The order of the zones is fixed. The model postulating slots within the zones can be thought of as a kind of carrying over a “fixed order” representation to the level of morphemes: functionally distinct morphemes have different positions just as functionally distinct zones do. The strict variant of the template hypothesis demands that each position can be occupied by one morpheme only. But as we saw in (5)–(6), at least Smeets’ template has to allow the presence of two (and actually, even more) suffixes in a single slot: in this example, the suffix slot B is occupied simultaneously by the habitive suffix and the simulative suffix. In that case, the order of affixes associated with the same slot remains unspecified.

It is of no doubt that the template model is a convenient descriptive tool. Still, we claim that the affix ordering in Adyghe follows not a rigid template but underlying semantic rules.

2.2 The scope-based approach

The main point of this paper is that the order of Adyghe suffixes is based primarily on their semantic scope. Speaking of scope with respect to Adyghe suffixes becomes possible, since they serve as semantic operators, or functors that construct new expressions taking some other expressions and modifying (sometimes crucially) their semantics. Thus most suffixes convey aspectual, modal and temporal meanings comparable to those expressed by adverbs, auxiliaries and even matrix verbs requiring sentential complements in English; cf.:

- | | | | |
|------|----------|--------------|---|
| (10) | a-r | λaš'e-č'-jə | mə-λaš'e-č'-jə |
| | that-ABS | limp-DUB-ADD | NEG-limp-DUB-ADD |
| | njepe | ta-dež' | qə-k _w e-š _w ə-š't-ep |
| | today | IPL.PP-to | DIR-go-HBL-IRR-NEG |
| | | | 'He may limp or not limp, (but) today he will not be able to come to us.' |

This example displays three suffixes, namely the dubitative marker denoting doubt (translated with ‘may’), the habitive marker (‘to be able’) and the irrealis marker. All of them serve as functors taking their bases as their arguments. The expressions that appear to constitute an input for such modification are said to constitute the scope of an operator and are graphically reflected by brackets in translations.⁴

When the scope of an operator contains another operator, the latter is said to have narrow scope relatively to the former, and the former—to have wide scope

⁴ For reasons of simplicity, in the translations we include the lexical information about the arguments of the verb within the scope. This decision is conventional only, as it requires non-obvious assumptions concerning the interaction of syntax and morphology as well as of different morphological zones within the verb.

relatively to the latter. Consider again (5) repeated here as (11), with the verb containing the habitive suffix together with the simulative suffix ('seemingly'):

- (11) $wa\hat{s}_w e-m \quad \hat{z}_w a\kappa_w e \quad q\partial-tje-s-x\partial-\hat{s}_w\partial-\hat{s}_w e$
 sky-OBL star DIR-LOC-1SG.A-take-HBL-SML
 'It seems [that I can [take a star from the sky]].' (= (5))

The semantics of (11) dictates that the simulative operator has wide scope with respect to the habitive operator, while the habitive operator has narrow scope relatively to the simulative operator.

Theoretically, the order of modifications is not obliged to coincide with the linear order of operators. Nonetheless, we propose exactly this correspondence for the entire suffix zone and argue that the order of suffixes reflects the order of their semantic application. This implies the following principle (see also Spencer 2003):

- (12) The Scope Principle (SP)
 The semantic operator immediately follows its scope.

In other words, a suffix that functions as a semantic operator always modifies that part of the stem that precedes it. For instance, in (11) we observe the correlation between the relative order of the habitive and simulative markers and their scope: the operator standing closer to the root has narrow scope with respect to the operator standing later, in accordance with the principle just proposed.

To be sure, on the basis of these examples alone it is impossible to prefer the template model or the scope-based model. Recall that Smeets' version of the template does not say anything about combinations of suffixes belonging to the same position. Hence it might be that the SP only works within slots in a template or does not even work here at all—if, say, the scope relations between operators are fixed. But before long we will discuss a few phenomena that challenge the slot-based approach in either version and present evidence for the validity of the SP.

3 Scope-based arrangements

3.1 Variability of suffix ordering

It is commonly accepted that the position of some suffixes in Adyghe is variable (Txarkaxo 1990, pp. 58–59). The following two examples demonstrate synonymous forms which differ exclusively in the relative order of the past suffix and the assertive suffix ('definitely'):

- (13) a. a-r $s-\lambda e\kappa_w\partial-va-pe$
 that-ABS 1SG.-see-PST-AST
 b. $s-\lambda e\kappa_w\partial-pa-v$
 1SG.A-see-AST-PST
 'I really saw that.'

In (13), our consultants easily rearrange suffixes without feeling any contrast. Curiously, the two suffixes were associated with different slots by Smeets, which is shown to be incorrect by this pair of examples. At the same time, the very possibility of rearrangement unaccompanied by semantic change might suggest the irrelevance of the suffix order and disprove the SP. We argue, however, that such rearrangement is possible mainly where different orders of the operators are more or less equivalent. Indeed, for (13), the meanings ‘Definitely, [it was so [that I saw that]]’ (with the wide scope of the assertive ‘definitely’) and ‘It was so [that I definitely [saw that]]’ (with the narrow scope of the same operator) are hardly distinguishable.

Where different scope relations result in different interpretations, the order of affixes is relevant. This is shown in (14), which differs from (11) above only in the order of the simulative and habitive suffixes, yet clearly has different semantics:

- (14) waš_we-m ž_waʁ_we qə-tje-s-xə-š_we-š_wə
 sky-OBL star DIR-LOC-1SG.A-take-SML-HBL
 ‘I can [pretend (lit., seem) [as if I am taking a star from the sky]].’

Despite the fact that the operators demonstrated in (14) were said to belong to the same slot, their rearrangement obviously affects the semantics: the inversion of the suffix order evidently results in the inversion of the scope of operators.

Similar effects are observed with the refractive suffix ‘again’. This morpheme is normally found before tense suffixes (15), which apparently fits both the scope-based model and Smeets’ template model. But consider (16), where the refractive marker occurs together with the intensive suffix after the tense marking:

- (15) borš’ə-m xə-p-λha-ž’ə-š’t
 borsch-OBL LOC-2SG.A-put-RE-IRR
 ‘You will add (lit. put again) this to the borsch (a sort of beet soup).’
- (16) sə-sxe-~~ke~~-je-ž’
 1SG.ABS-eat-PST-INT-RE
 ‘I am stuffed again.’

The form (16) contradicts the template established for suffixes. Still, as the preceding stages of its derivation (17) show, it is entirely compositional:

- (17) a. sə-sxa-~~κ~~
 1SG.ABS-eat-PST
 ‘I have eaten.’
- b. sə-sxe-~~ka~~-j
 1SG.ABS-eat-PST-INT
 ‘I ate very much.’ / ‘I am stuffed.’

(17a) presents a past form of the verb ‘to eat’, in (17b) the intensive suffix leads this past form to get a stative meaning ‘to be stuffed’, and the addition of the refractive

- (20) a. a-r $\kappa_w e \check{z}' \partial - \hat{s}_w$
 that-ABS yellow-SML
 ‘It is yellowish.’
- b. a-r $\kappa_w e \check{z}' \partial - \hat{s}_w a - \hat{s}_w$
 that-ABS yellow-SML-SML
 ‘It looks yellowish. / It is paler than yellowish.’

Adding a simulative morpheme to a colour term typically has an effect similar to that of the English suffix *-ish*, as is illustrated by (20a). This is predictable, for the uncertainty in evaluation (i.e. the semantic contribution of the simulative morpheme) can be related to a weaker manifestation of the relevant property. The appearance of the second simulative affix in (20b) either further weakens the degree of being yellow or tells that the speaker is not sure in his evaluation. In both cases, the semantics of the form with two simulative suffixes can be seen as an application of a simulative operator to a construct resulted from the application of another simulative operator and hence as an instance of recursion cf. Lander and Letuchiy (2010). This kind of representation is only possible, of course, if we accept the scope-based approach and is incompatible with the template model, the more so as the latter does not seem to admit multiple occurrences of a single affix at all.

4 Composing the time reference: a tense story

In principle, the scope-based approach does not preclude the existence of fixed affix positions if their scope with respect to all other affixes does not vary. In Smeets' description of Adyghe, we find a special class of tense/modal/aspect (TMA) morphemes,⁵ which clearly seem to have a dedicated slot at the very end of the stem.

Yet several examples in the previous sections already demonstrated that other suffixes can follow TMA marking. (21) provides another illustration of this; here the simulative marker has scope over the past morpheme:

- (21) se a-š' sə-š'ə- κ_w əpše- $\mathfrak{ra} - \hat{s}_w e$
 I that-OBL 1SG.ABS-LOC-forget-PST-SML
 ‘It seems [that he has forgotten me].’

Hence the TMA markers cannot be associated with any slot whose placement with respect to all other suffixes is fixed. In this section, we will show that the TMA marking is organized in the same way as all other sorts of marking in the suffix zone.

At first glance, the Adyghe TMA system looks very complex. According to Rogava and Keraševa (1966), it includes no less than nineteen forms, let alone forms built on endings. The TMA values are opposed on the base of perfectivity ~ imperfectivity and past ~ remote past among others. Apart from “bare forms”

⁵ This label should not be taken too seriously, because many other Adyghe suffixes can be described as aspectual/modal as well.

(present tense being among them), which do not contain any overt TMA marking, the simplest forms contain exactly one of the three suffixes **-ɤe** ‘past’ (22), **-š’t** ‘irrealis’ (23) and **-n** ‘potential’ (24):

- (22) a-r psəne-m jə-wəz_wəntxa-ɤ
 that-ABS well-OBL 3SG.A-spit-PST
 ‘He spat in the well.’
- (23) we se nefšəɤ_we-m sə-qe-b-ɤe-wəš’ə-š’t
 you(SG) I dawn-OBL 1SG.ABS-DIR-2SG.A-CAUS-wake.up-IRR
 ‘You will awake me at dawn.’
- (24) a ç’ale-r a-š’ jə-mehan
 that boy-ABS that-OBL POSS-meaning
 qə-š_w-jə-ɣ_we-n-ep
 DIR-2PL.IO+OPV-3SG.A-say-POT-NEG
 ‘That guy will not be able to explain its meaning to you.’

In addition to simple TMA markers, many descriptions propose the existence of several “complex markers”, most of which represent sequences of the same morphemes, such as **-ɤe-n**, **-ɤe-š’t**, **-nə-ɤe**, **-ɤe-ɤe** etc. This view originates from a conception according to which different TMA markers form a paradigm and occupy the same slot. Below we will argue that this conception does not hold for Adyghe, but that the construction of tense marking can be explained by the SP.

Consider a pluperfect form enabling two past morphemes:

- (25) bere šəɤew zeç’e çəf-xe-r
 many long.ago all person-PL-ABS
 zə-bze-ç’e g_wəš’əɣe-ɤa-ɤe-x
 one-language-INS speak-PST-PST-PL
 ‘Long ago, all people spoke one language.’

As mentioned in Sect. 3, we treat multiple occurrences of suffixes as instances of morphological recursion (see also Lander and Letuchiy to appear). This implies that pluperfect forms do not contain complex markers but take several individual past suffixes, which is confirmed by the fact that the sequence of past suffixes in pluperfect forms can be “interrupted” by other suffixes, such as the terminative marker (‘already’) in the following example:

- (26) š’xe-ɤe-xa-ɤe
 eat-PST-TRM-PST
 ‘He had already dined.’

Further, in that case, the “double past” has an obvious semantic motivation (for details, see Korotkova 2009). The first past marker “shifts” the meaning of a word form back on the time axis turning it into preterite. The second past marker “shifts”

the meaning of the whole even further back functioning as a “retrospective shift” marker. As a result, we get a form that denotes either the remote past or the event that precedes another event (with all possible connotations). Notably, the construction of forms having such semantics by means of retrospective shift markers is found in various languages of the world (Plungian and van der Auwera 2006).

If alleged complex markers actually represent just sequences of independent suffixes, we may expect that the order of TMA morphemes (together with the SP) will be sufficient to describe the semantics of the corresponding forms. This expectation is borne out. For instance in (27), the past morpheme is followed by the irrealis marker:

- (27) $\lambda\epsilon m\check{a}\check{z}\partial-r$ $t\partial r-a-\lambda ha-\mathbf{\check{r}e-\check{s}'t}$
 bridge-ABS LOC-3PL.A-put-PST-IRR
 ‘The bridge is likely to be already constructed.’

Both of the TMA markers contribute to the semantics, the second one (irrealis) decreasing the categoricalness of the expression formed by the first suffix (past). Literally, this form can be translated as: ‘It is likely (the irrealis $-\check{s}'t$) [that there was a case (the past $-\check{r}e$) [of constructing the bridge]]’.

The next two examples constitute a minimal pair based exclusively on the differences in the arrangement of TMA morphemes and the corresponding differences in scope:

- (28) $k_w e-\mathbf{\check{r}e-n}$ (faje)
 go-PST-POT must
 ‘He probably went.’ (Lit.: ‘It should be [that he went].’)
- (29) $k_w e-\mathbf{n\check{a}-\check{r}e}$
 go-POT-PST
 ‘He would go.’ (lit.: ‘It was so [that he should go].’)

In (28) the past operator has narrow scope relatively to the modal potential operator, while (29) presents the reversed situation.

The next example demonstrates that even three TMA suffixes can occur within the same form, still with compositional semantics:

- (30) $w\partial ne-m$ $\check{s}he-r$ $tj\partial-\lambda ha-\mathbf{\check{r}e-\check{r}e-n}$ faje
 house-OBL head-ABS LOC-put-PST-PST-POT must
 ‘Presumably, the house had been covered by a roof (i.e., there are traces of a roof on a roofless house).’

Here the pluperfect involving two past morphemes falls under the scope of the potential. The literal semantics of (30) can be described in the following way ‘[Probably [it was so [that the house had been covered with a roof]]’.

Nonetheless, we find a group of forms that seem to be not so compositional. These forms are based on the morpheme $-\check{s}'t-$, which is homophonous to the irrealis

marker but has some specific morphophonemic properties (see below).⁶ This morpheme takes some TMA suffixes, but the resulted semantic contrasts are not clear. For example, the combination of *-š't-* with a past suffix marks imperfect (31a), but the addition of the second past morpheme turns the sequence into the marker of counterfactual (31b)⁷:

(31) a. Imperfect

šef westəʁe-r stolə-m tjə-t-ew stə-š'tə-ʁ
 wax lamp-ABS table-OBL LOC-stand-PRED burn-š'tə-PST
 'A candle was burning on the table.'

b. Counterfactual

xek_wəžə-m wə-z-jə-he-ʁe-m žənə ʔ_wentəkə
 ruin-OBL 2SG.ABS-REL.TMP-LOC-enter-DYN-OBL ghost wry
 g_were-m wə-ʔeç'e-fe-n-jə
 some-OBL 2SG.IO-INADV-lead-POT-ADD
 wə-ze-bl-jə-ʔ_wentə-ç'e-š'tə-ʁa-ʁe
 2SG.ABS-RECP.IO-LOC-3SG.A-distort-AWAY-š'tə-PST-PST

'If you had gone into the ruins, you would have met some crooked spirit, and it would have got the better of you.' (Rogava and Keraševa 1966, p. 197)

Curiously, this *-š't-* displays an interesting behaviour with respect to the *e/a* alternation, mentioned in the Sect. 2.1 as the main criterion distinguishing between suffixes and endings. Consider the examples in (34):

- (32) a. g_wəpš'əse-le-š't-ep /g_wəpš'əse-le-š'tə-ep/
 think-ITER-IRR-NEG
 'S/he will not think that all the time.'
- b. g_wəpš'əsa-le-š'tə-ʁ-ep /g_wəpš'əse-le-š'tə-ʁe-ep/
 think-ITER-š'tə-PST-NEG
 'S/he was not thinking that all the time.'
- c. g_wəpš'əsa-le-š'tə-ʁa-ʁ-ep /g_wəpš'əse-le-š'tə-ʁe-ʁe-ep/
 think-ITER-š'tə-PST-PST-NEG
 'S/he would not think that all the time.'

The non-upgraded form of 'think' is g_wəpš'əse-, and the irrealis suffix never contains /e/. Consequently, no alternation is observed in (32a). But in (32b)–(32c), the third vowel undergoes the *e/a*-alternation. Crucially, in addition (32c) displays the same alternation in one other place: a sequence of two past markers *-ʁe* turns into *-ʁa-ʁ(e)* before the negative ending. Hence we find two instances of the *e/a*-alternation in this example, despite the fact that the presence of a single ending

⁶ These morphemes are likely to be of the same diachronic origin diverged in the process of grammaticalization.

⁷ Note that *-ʁe* and *-š't'ə-ʁe* represent the perfective versus. imperfective contrast whereas the difference between their retrospectivized counterparts does not at all belong to the domain of aspect.

shows that (32c) constitutes a single word. This situation apparently contradicts the template model, as this model presupposes that the *e/a*-alternation can only occur once in a word, because there is only one place (the end of the stem) to which it is tied. However, the occurrence of two alternations can be explained if -š't- in (32b)–(32c) serves as the base of the second stem, which is formally independent from the preceding morphemes. This suggests that -š't- essentially functions as a kind of auxiliary, albeit within the borders of a single word. Since auxiliary constructions in general often lack compositionality, this also explains the non-compositionality of various combinations of the auxiliary morpheme with TMA morphemes. The constructs involving the auxiliary -š't- obviously must be considered separately from other kinds of suffixation.

To sum up, most TMA markers function like other suffixes discussed in the previous sections. They have no fixed positions in the wordform and can be repeated or rearranged according to their scope. Their combinations cannot be treated as single markers, since their semantics too results from the semantics of the elements and the morphological sequence of these elements can be interrupted. One consequence of this is that the range of meanings expressed by TMA morphology is in principle far less restricted than that conveyed by classical grammatical categories of tense.

5 Discussion

We have seen above that the scope-based approach can account for the morpheme order within the suffix zone of the Adyghe verb and at the same time explains phenomena contradicting the template approach. We will now discuss whether it is possible to link this to any special properties of Adyghe morphology.

Similar scope-based representations have been provided for a number of other languages showing much morphological complexity including those whose descriptions traditionally operated with templates. For example, Fortescue (1980, p. 260) notes that many Eskimo descriptions imply for some part of morphology a rule, according to which “each successive affix simply modifies what is immediately to its left, that is, is superordinate in scope to everything to its left within the word” (albeit Fortescue’s own approach is slightly different). Similarly, Muysken (1986, p. 1988) demonstrates that the order of the so-called “syntactic suffixes” in Quechuan languages is generally compositional and follows the same principle. Another study that is worth mentioning is Rice’s (2000) remarkable investigation of morpheme order in Athabascan languages, which was also shown to be based on scope.

De Reuse (2006) considers such morphology to be of a special type for which he coined the term *Productive Noninflectional Concatenation* (PNC). He proposes the following criteria for the PNC:

1. *productivity*: the absence of “idiosyncratic restrictions on the use of elements. Thus its presence is conditioned by semantic plausibility only, and not by selectional restrictions” (de Reuse 2006, p. 746);

2. *possibility of recursion*: multiple occurrences of an element;
3. *necessity of concatenation*: linear ordering of elements (as opposed to suppletion etc.);
4. *variable order of elements*: absence of strict positions for elements;
5. *interaction with syntax*;
6. *possibility of lexical category changing*.

As shown above, Adyghe perfectly fits the criteria 1–4. We will now provide evidence that the last two criteria also hold for this language. In particular, we will show that suffixes can determine the syntactic properties and distribution of the stems and word forms and hence display typical properties of morphological heads (in the sense of Zwicky 1985). We will illustrate this phenomenon by two examples.

First, consider the so-called directional suffixes, whose prototypical function is to mark the direction of an event.⁸ As (33) demonstrates, the appearance of a directional suffix sometimes requires the appearance of an additional indirect object (introduced by the general oblique preverb), which presumably specifies the direction:

- (33) a. ma- $\text{\textcircled{e}}$ _we
 DYN-go
 ‘He goes.’
- b. * $\text{\textcircled{e}}$ -j-e- $\text{\textcircled{e}}$ _we
 3SG.IO-OPV-DYN-go⁹
- c. $\text{\textcircled{e}}$ -j-e- $\text{\textcircled{e}}$ _we- $\text{\textcircled{e}}$ ’ $\text{\textcircled{e}}$
 3SG.IO-OPV-DYN-go-AWAY
 ‘He goes along that.’
- d. *me- $\text{\textcircled{e}}$ _we- $\text{\textcircled{e}}$ ’ $\text{\textcircled{e}}$
 DYN-go-AWAY

This set of examples shows that the verb ‘go’ itself is ungrammatical with an indirect object prefix introduced by the oblique preverb, whereas ‘go along’ is ungrammatical without it.

Second, there is evidence that the presence of some suffixes may change the categorial characteristics of the word. Adyghe distinguishes between major parts-of-speech rather weakly, in particular many suffixes (including TMA morphology) can appear both with nominal and verbal roots. Yet there is a criterion that seem to contrast nouns and verbs. Lander and Testelefs (2006), concerned with this very problem, noticed that at least in “accurate” speech, nouns can appear in argument

⁸ Interestingly, directional suffixes are often treated as roots that incorporate other roots (Rogava and Keraševa 1966, 282ff; Bersirov 2001). Despite the fact that some directional suffixes indeed have counterpart lexical roots, we dismiss such an interpretation, because these roots can occasionally appear together with their homonymic suffixes.

⁹ The dynamic markers *me- $\text{\textcircled{e}}$ -* and *e-* are allomorphs.

positions either with or without case markers (depending on specificity and/or definiteness), while verbs in these positions always need case markers. The examples (34) make it clear that nominal roots with TMA suffixes behave like verbs in this respect, which suggests that these suffixes can determine the category of the word:

- (34) a. $\check{c}'eleje\kappa a\check{z}e(-r)$ $qe-\kappa_{wet}$
 teacher(-ABS) DIR-find.IMP
 'Find a/the teacher!' (Lander and Testeleets 2006)
- b. $\check{c}'eleje\kappa a\check{z}e-\check{s}'t\grave{a}-r$ / $*\check{c}'eleje\kappa a\check{z}e-\check{s}'t$ $qe-\kappa_{wet}$
 teacher-FUT-ABS teacher-FUT DIR-find.IMP
 'Find (the) one who will be a teacher!' (Lander and Testeleets 2006)

We conclude that Adyghe suffixes belong to that kind of morphology that de Reuse characterized as PNC and relate the scope-based arrangement of suffixes to this fact. This poses certain questions about the status of some of the suffixes discussed above, in particular the status of the TMA morphology.

As was briefly mentioned in Sect. 4, there is a view that various TMA markers are paradigmatically contrasted and represent a sort of inflection. However, PNC in essence is distinct from both inflection and derivation in the traditional sense. This implies that if TMA suffixes instantiate PNC just like other suffixes do, they should not be treated as inflection. It can be argued that this is indeed so.

The basic notions of inflectional morphology are the notions of lexeme and paradigm, for "the full set of words realizing a particular lexeme constitute it paradigm" (Stump 1998, p. 13). Paradigms are formed according to the expressed values of various categories (see also Carstairs-McCarthy 1998). As observed by Bybee (1985), such categories as tense and mood tend to be inflectional. Hence TMA categories are expected to form paradigms. But TMA values in Adyghe are not organized in this way, since they are constructed syntagmatically and their range is determined by possible combinations of TMA suffixes rather than by cells in paradigms. As additional evidence for this we can mention the existence of forms whose functions evidently coincide; cf. (35) and (36), which have the hypothetical meaning:

- (35) $t\grave{a}\kappa-a-\lambda ha-\kappa e-\kappa e-n$ $faje$
 LOC-3PL.A-put-PST-TRM-POT must
 'Presumably, they completely covered it.'
- (36) $a-r$ $ps\grave{a}ne-m$ $j\grave{a}-w\grave{a}\hat{z}_{w\grave{a}nt}\kappa e-\kappa e-\check{s}'t$
 that-ABS well-OBL 3SG.A-spit-PST-IRR
 'Presumably, he spat in the well.'

If forms marked with a combination of the past and potential suffixes and forms marked with a combination of the past suffix with that of irrealis are paradigmatically contrasted, the fact that they have the same hypothetical meaning seems to be

synchronically unexplainable. The scope-based approach, however, accounts for this phenomenon by the reasonable assumption that different combinations of operators can sometimes yield the same result (as we have already discussed in Sect. 3.1).¹⁰

It seems that TMA forms in Adyghe do not constitute a paradigmatic system typical for inflection, which makes them particularly remarkable from the viewpoint of grammatical typology.¹¹ This brings us back to the correlation between the organization of morphology and polysynthesis, even if this correlation is not strict. The difficulties in applying the notions of inflection and derivation to some phenomena of polysynthetic languages are well-known. This is explicated by Baker (1996, p. 34), who specifically states that in these languages “[w]e do not even need to distinguish between derivational and inflectional morphology”. We thus find that Adyghe is by no means unique in the way it uses morphemes, and the behaviour of suffixes and the role of their order in this language can indeed be linked to its polysynthetic characteristics.

6 Conclusions

This article explored the order of suffixes in Adyghe, a polysynthetic language of the North Caucasus, and argued that their position directly correlates with their scope. This explains some peculiarities of the Adyghe suffixation such as its possible recursion, rearrangements of suffixes accompanied by semantic changes, and even some morphophonemic phenomena. Moreover, this makes this language compatible to some other languages with complex morphology. One interesting implication of the proposed representation is that the tense-modality-aspect meanings, which are also conveyed by suffixes in Adyghe, turn out to be expressed in a compositional way.

The principles of functioning of the Adyghe suffix morphology make it remarkably close to syntax. This poses, however, the question concerning the relations between this “polysynthetic morphology” and the syntactic level itself. Baker (1988) stipulated that morphology and syntax, while being distinct modules,

¹⁰ Besides such pairs as (35)–(36), we find a number of forms which are not synonymous but still can be interchanged in a number of contexts. In fact, this also concerns the irrealis and potential forms, so it may be that in the combinations they build together with the past suffix, the distinction between them is neutralized. Of course, some functional overlap is observed in languages with inflectional TMA markers as well, but we tentatively propose that in Adyghe (and similar languages) this overlap may be larger. This is because semantic operators as such need not be paradigmatically contrasted.

¹¹ There is still one issue to be explained if the TMA morphology is not organized paradigmatically. It is related to bare forms, which lack TMA suffixes altogether. Indeed, it is commonly accepted that a meaningful zero is only possible when a form is firmly contrasted in a paradigmatic way to other forms (see, for instance Bybee 1994). Still, Adyghe bare forms are not homogenous and show no temporal specification, for their temporal interpretation either is evoked by other elements of a construction or coincides with the reference point (independently of whether it is the moment of speech or not).

sometimes serve just as different ways of encoding the same information. Another possible view could be that this sort of morphology is only a part of syntactic derivation and need not be contrasted with it. Finally, it may be that syntax and morphology act independently, but their functions can overlap. As for Adyghe suffixes, the last option is most likely, since occasionally certain senses can be expressed twice, both morphologically and syntactically. (37) is an example:

- (37) a-r del-ew/ dela-š_w-ew qə-p-š_w-e-šə
 that-ABS fool-PRED fool-SML-PRED DIR-2SG.IO-MAL-DYN-know
 ‘It seems to you that he is a fool.’

Note the optional simulative morpheme within the embedded predicate ‘to be a fool’. Clearly, it is optional because the same sense is already expressed within the main predicate ‘it seems to you’. Presumably, if syntax and morphology interact with each other in any strict way, either the simulative marker or the main predicate in (37) would be redundant.

The functional overlap between morphology and syntax suggests that words in Adyghe cannot be conceived as something already cooked according to a given recipe containing complete information on ingredients. Rather these forms are constructed by the speaker as required by meaning that s/he intends to express. This is crucial for our understanding of this part of Adyghe morphology. Actually, the hypothesis that parts of Adyghe morphology are generated in the course of speech has supportive evidence which comes from an investigation of kinds of variation observed among Adyghe speakers (Lander and Gerasimov 2008).

Finally, let us say a few words confronting polysynthetic languages of the Adyghe type with the Standard Average European languages. As is well-known, the morpheme order in such languages as European ones is not arbitrary and there are good reasons to think that it is (at least partly) governed by scope considerations (cf. Bybee 1985). Despite this seeming similarity, we believe that there are crucial differences between such languages as Adyghe and most European languages. In the latter, scope principles are presumably secondary results of the historical development of the morphological structure. In Adyghe, on the other hand, the scope principle of morpheme ordering is inherently related to the fact that certain parts of words are built in the course of speech and hence need to be compositional. Still, further research is certainly required to determine the typological distance between polysynthetic and non-polysynthetic languages.

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Appendix A: Transcription table

Table of correspondences
between the Caucasology and
the IPA transcriptions

Adyghe	IPA	Adyghe	IPA
a	a	čʼ	tʃʼ
e	e	č̣	tʃʼ
ə	ə	čʼ	tʃʼ
p	p	c	ts
p	pʼ	c _w	ts ^w
p _w	pʼ ^w	c	tsʼ
b	b	l	l
v	v	λ	ɬ
f	f	λ̣	ɬʼ
t	t	k	k
ṭ	tʼ	k _w	k ^w
ṭ _w	tʼ ^w	ḳ	kʼ
d	d	ḳ _w	kʼ
s	s	q	q
š	ʃ	q _w	q ^w
šʼ	ʃʃ	γ	γ
ṣ̌	ʃ̣	g _w	g ^w
ṣ̌ _w	ʃ̣ ^w	ɸ	ɸ
ṣ̌ _w	ʃ̣ʼ ^w	ɸ _w	ɸ ^w
z	z	x	x
ž	ʒ	x _w	x ^w
ẓ̌	ʒ̣	h	h
ẓ̌ _w	ʒ̣ ^w	χ	χ
ʒ	dz	χ _w	χ ^w
ṣ̌	ɖ̣	ʔ	ʔ
č	tʃ	ʔ _w	ʔ ^w

Appendix B: Abbreviations

A	Agent	COND	Conditional
ABS	Absolutive (case or person marker)	DEB	Debitive
ADD	“Additive particle”	DUB	Dubitative
AST	Assertive	DIR	Directional prefix
AUX	“Auxiliary” morpheme	DYN	Dynamic
BEN	Benefactive	FACT	Factual
CAUS	Causative	HAB	Habitual

Appendix B continued

HBL	Habilitive	POSS	Possessive
INADV	Inadvertitive	POT	Potential
INS	Instrumental	PP	Object of postposition
INT	Intensive suffixes	PRED	Predicative/adverbial ending
IO	Indirect object	PST	Past
IRR	Irrealis	PUNC	Punctual
ITER	Iterative	Q	Question
LOC	Locative preverb	RE	Reversive/refactive
M	Masculine	RECP	Reciprocal
MAL	Malefactive	REL	Relative
NEG	Negation	S	Subject
O	Object	SG	Singular
OBL	Oblique case	SML	Simulative
OBJ	Direct object	TRANS	Translocative
OPV	Oblique preverb	TRM	Terminative
PL	Plural		

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