A Hybrid Account of Affix Order

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Abstract

Most syntactic accounts of affix order in inflection are actually "hybrid": Closeness of affixes to stems reflects syntax, but the position of affixes w.r.t stems is determined by morphological stipulation. In this paper I argue that affix order is in fact subject to two different sets of principles, but the borderline is quite different: Affix order of contentful items like Tense and Aspect is computed in syntax, while the order of agreement heads is the result of of universal alignment constraints, applying in a postsyntactic morphology module according to the Principles of Optimality Theory.

1 Data

The basic observation that leads to this model is that crosslinguistically the order of agreement markers patterns quite differently from that of other inflectional affixes. For example, Julien (2000) observes that Aspect affixes always follow Tense markers in linear order, as long as Tense is not a suffix, in which case the order is reversed:

(1)

	both prefixes	Mixed	both suffixes
T > A	Tense Aspect Verb	Tense Verb Aspect	*Verb Tense Aspect
A > T	*Aspect Tense Verb	*Aspect Verb Tense	Verb Aspect Tense

To the contrary, in languages where subject agreement is split in affixes marking Person and Number, a typological survey shows that the Number marker always follows the Person affix, regardless of their position w.r.t. the stem (Trommer, 2001)[1]:

(2)

	both prefix		both suffix		mixed		all	
P > N	8	80.0%	13	68.4%	25	100%	46	85.2%
N > P	2	20.0%	6	31.6%	0	0%	8	14.8%
sum	10		19		25		54	

Hence we get the distribution in (3):

(3)

	both prefixes	Mixed	both suffixes
P > N	Person Number V	Person V Number	V Person Number
N > P	*Number Person V	*Number V Person	*V Number Person

A similar pattern can be found for the relation between (portmanteau) inversion marking and subject agreement in language families like Algonquian or Chukotko-Kamchatkan I will call the pattern found for Aspect and Tense the "Movement Pattern" and the one between agreement markers the "Alignment Pattern".

2 Standard Accounts of Affix Order

Probably, the most influential leitmotif in approaches to the ordering of inflectional affixes is that the semantic content of affixes determines "how close" these affixes appear with respect to the stem. This basic idea is made explicit in Bybee (1985) and formalized in as different accounts as Noyer (1992) and Wunderlich and Fabri (1994). A similar effect can be derived through a head-movement analysis as in Baker (1985), assuming that there is a universal phrase structure for functional projections, and that affixes can be

[1]The data refer to ordering patterns (one language may have more than one such pattern) taken from a survey on 99 languages with 58 languages exhibiting the relevant split in person/number marking. See Trommer (2001, chapter 6) for details and for an account of the deviating patterns

idiosyncratically specified as prefixes or suffixes. While these approaches differ considerably in detail, they all involve the following three claims:

- Symmetry of Prefix and Suffix Orderings
- Different categories show the same type of ordering generalization
- The Order of Affixes w.r.t Stems is accidental or determined by idiosyncratic stipulation

All these claims are problematic, given the crosslinguistic data in section 1. While the symmetry of prefix and suffix ordering seems to hold for aspect and tense, (1) this is not the case for person and number affixes (3). This difference also vitiates the second claim. Finally, there are restrictions on the order of affixes, if both appear on different sides (the middle columns of (1) and (3)) of the stem, which contradicts the third claim. To be sure, standard approaches would predict different structures, for example (4a.b.) but not (4c.d.):

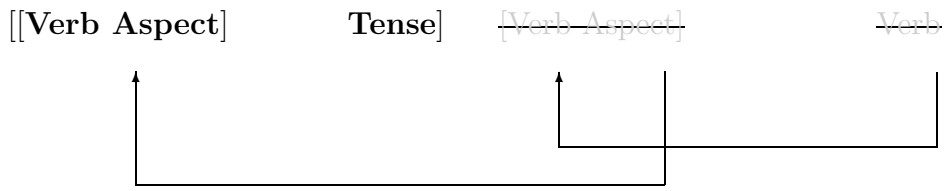
(4) a. [[Aspect V] Tense]
b. [Tense [V Aspect]]
c. *[[Tense V] Aspect]
d. *[Aspect [V Tense]]

But these structures do not impose any restrictions on the *surface order* of affixes. Both Aspect V Tense and Tense V Aspect are equally possible, as it seems, counter to fact. The hybrid account proposed in the following sections offers a principled account of such orderings.

3 A Hybrid Account

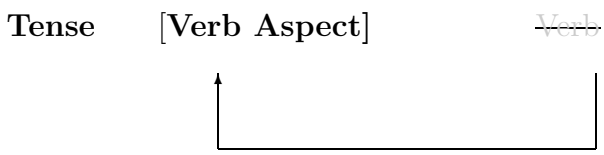
The Movement Pattern naturally follows from a Kaynean approach to morphosyntax (Kayne, 1994; Cinque, 1999; Julien, 2000) where affix order results from uniformly leftward movement. Given standard assumptions about the universal architecture of the verbal extended projection, the order Verb > Aspect > Tense results from the movement of the verb to Aspect and of the complex containing the Verb and Aspect to the Right of Tense:

(5) Verb Movement to Aspect and Tense



If movement stops at Aspect^0, we get Tense > Verb > Aspect:

(6) Head-Movement to Aspect



Finally, the order Tense > Aspect > Verb emerges, if no movement at all happens, and the heads remain in their base positions:

(7) Base Order

Tense **Aspect** **Verb**

On the other hand, the Alignment Pattern is supposed to follow from the ranking of violable constraints in the sense of Optimality Theory (Prince and Smolensky, 1993), which align person features to the right and number features to the left edge of morphological words.

(8) a. L ⇦ PER (Align Person Agreement maximally to the left)
b. NUM ⇨ R (Align Number Agreement maximally to the right)

This implies that P > V > N should be the maximally harmonic candidate, since it violates none of the relevant constraints. Indeed this is the most common single ordering crosslinguistically. P > N > V and V > P > N while faring somewhat worse, are still better than N > P > V and V > N > P and N > V > P is the least harmonic candidate.[2]. This corresponds closely to the typological results in (2).

(9)

	L ⇦ PER	NUM ⇨ R
✌ P > V > N		
☞ P > N > V		*
☞ V > P > N	*	
☚ N > P > V	**	*
☚ V > N > P	*	**
✝ N > V > P	**	**

Apart from favoring orders where number follows tense, this accounts for the facts that PER V NUM is the overall favored pattern (see (2)) and for the observation that number agreement in languages without person agreement is almost exclusively suffixal. Finally, it lets expect that subject agreement contrary to other affix types does not prefer suffixal or prefixal status (Hawkins and Gilligans, 1988, pg. 225), since ranking of the constraints in (8) is arbitrary and suffix/prefix position are preferred by one constraint each.

Note that, while different types of affixes are subject to different ordering mechanisms, it is never necessary to stipulate which affix is a prefix or a suffix. This follows completely from the mechanisms also responsible for the respective order of affixes. Thus, the proposed approach, even if looking at the first glance more complex than standard accounts, removes a major source of arbitrary stipulation.

[2]I assume that P > N > V and V > P > N become optimal if a third constraint is taken into account that requires agreement affixes expressing the same head to appear on the same side of the verbal stem (COHERENCE). See Trommer (2001, chapter 6) for details

4 Case Studies

Especially for the proposed alignment constraints, it is crucial to note that they do not simply state cross-linguistic preferences, but determine by their interaction completely the affix order of single languages. This is exemplified here with two languages, showing how different constraint ranking results in different ordering requirements.

4.1 Turkana

In the Nilo-Saharan Language Turkana (Dimmendaal, 1983), tense markers precede, while aspect markers follow the verb stem:

(10) *ɛ- á- lós -í*
3 Past go Asp
'he went' (Dimmendaal, 1983, pg. 130)

This derives straightforwardly from movement of the verb to Asp^0. Affixes marking person or person and number precede all other markers:

(11) *kí- los -í*
3Pl go Asp
'we will go' (Dimmendaal, 1983, pg. 122)

This is to be expected if L ⇦ PER in Turkana is ranked higher than NUM ⇨ R . The violation of the latter is tolerated to get no violations of the first constraint:

(12)

kí-los-í, 'we go'

	L ⇦ PER	NUM ⇨ R
☞ PN > V		*
V > PN	*!	

However, in most instances person and number agreement are expressed in Turkana by separate affixes. and number agreement follows aspect:

(13) *é- lós -e -té*
3 go Asp Pl
'they will go' (Dimmendaal, 1983, 122)

This also follows from the constraint hierarchy, since L ⇦ PER – even if ranked highest – is irrelevant for an affix marking only number:

(14)

é-*lós-e****-té****, 'they go'*

	L ⇦ PER	NUM ⇨ R
☞ P > V > N		
P > N > V		*!
V > P > N	*!	
N > V > P	*!*	**

This situation where a constraint, blocked otherwise by higher-ranked constraints, surfaces in a language only under restricted circumstances is called *Emergence of the Unmarked* (McCarthy and Prince, 1994) in the OT-literature and constitutes a main argument for ranked violable constraints.

4.2 Georgian

Reversed ranking of alignment constraints should lead to the same pattern for person and number affixes, but to suffixal positions for affixes expressing person and number. This seems to be true in Georgian (Aronson, 1982): While pure person (v-, 1st person) and pure number agreement (-t) occur again at the left and right edge (15), the 3pl marker -en (16) is on the right of the stem:

(15) v-xatav-t

	NUM ⇨ R	L ⇦ PER
☞ P > V > N		
P > N > V	*!	
V > P > N		*!
N > V > P	*!*	**

(16) xata̲v-en

	NUM ➪ R	L ➪ PER
PN > V	*!	
☞ V > PN		*

5 The Interaction of Movement and Alignment

Obviously in natural languages, agreement and other inflectional categories appear together in the same word forms. This raises the question how the two sub-systems, responsible for their orderings, interact.

5.1 Movement and Alignment in the same Affix: Amharic

A first point where such an interaction is relevant are affixes that express agreement and interpretable features at the same time. A case where this seems to hold are the agreement paradigms of the Ethiopian language Amharic (Leslau, 1995). As other Semitic languages, Amharic has two sets of agreement affixes. The first one occurs in the imperfective aspect and patterns roughly with Turkana (person affixes are prefixes, number affixes suffixes), while in the perfective aspect all agreement affixes are suffixes:

(17)

	Imperfect	**Perfect**
3. sg. mas	***yë-****säbër*	*säbbär****-ä***
3. sg. fem	***të-****säbër*	*säbbär****-äcc***
2. sg. mas	***të-****säbër*	*säbbär****-h***
2. sg. fem	***të-****säbr-i*	*säbbär****-sh***
1. sg.	***ë-****säbër*	*säbbär****-hu***
3. pl.	***yë-****säbr-u*	*säbbär****-u***
2. pl.	***të-****säbr-u*	*säbbär****-accuh***
1. pl.	***ënnë-****säbër*	*säbbär****-n***

Since Imperfect is the unmarked aspect category of the language, and since there is no other affixal reflex of aspect, it is natural to assume that the

perfect markers express, in a portmanteau fashion, aspect and agreement, while the imperfect conjugation instantiates "pure" agreement. In terms of the proposed approach, this means that movement ranks out alignment. I will assume in the following that this is an unviolable property of Universal Grammar, deriving from the fact that morphology follows syntax.

5.2 The order of Tense and Subject Agreement

5.2.1 The Affixal Status of Tense and SAgr

In Distributed Morphology (DM, Halle and Marantz, 1993, pg. 146), it is assumed that subject agreement (SAgr) is standardly attached to Tense. If this is correct, it should be reflected in some way in the position of agreement w.r.t tense. Indeed, in a majority of languages if tense and agreement affixes coocurr, the agreement affix that has the same affixal status as the tense affix. (18) and (19) show the relevant results from Trommer (2001) and Julien (2000):

(18) Affixal status of SAgr and Tense Trommer (2001, pg. 160)

	T suffix		T prefix		all	
Agr conform	48	71.6%	19	70.4%	67	71.3%
Agr not conform	19	28.4%	8	29.6%	27	28.7%
sum	67		27		94	

(19) Affixal status of SAgr and Tense (Julien, 2000, pg. 360)

	T suffix		T prefix		all	
Agr conform	80	58.4%	23	71.9%	103	60.9%
Agr not conform	57	41.6%	9	28.1%	66	39.1%
sum	137		32		169	

I propose to account for the tendency that SAgr is on the same side of the stem as tense by the constraint REFLECT AGR which requires that SAgr appears right-adjacent to the tense marker. This gives the possible rankings in (20), if Tense is a suffix and the ones in (21), if it is a prefix:

(20) Tense suffix

	Ranking	Affixal Status
☞ V > T > A	REFLECT AGR ≫ ...	conform
☞ V > T > A	NUM ➪ R ≫ ...	conform
☞ A > V > T	L ➪ PER ≫ ...	not conform

(21) Tense prefix

	Ranking	Affixal status
☞ T > A > V	REFLECT AGR ≫ ...	conform
☞ A > T > V	L ➪ PER ≫ ...	conform
☞ T > V > A	NUM ➪ R ≫ ...	not conform

NUM ➪ R and L ➪ PER alone would predict that SAgr could equally well appear as a prefix or a suffix in any constellation. Since REFLECT always favors conform order, rankings requiring conforming SAgr and Tense affixes are more frequent, but there is always a ranking which results in non-conformity.

This account makes two further predictions. First, if Tense and SAgr are both prefixes, A < T and T > A should be distributed rather evenly and second the order V > A > T should be completely excluded. These points will be discussed in the next two sections.

5.2.2 The Order of Tense and SAgr in Prefixal Position

In the results from Trommer (2001, pg. 161) (first column in (22)), the order T > A is actually more frequent than A > T. This is however contradicted by the results of Julien (2000, pg. 360) which finds the opposite distribution (second column).

(22) Affixal status of SAgr and Tense as Prefixes

	Trommer (2001)	Julien's Evaluation	Julien's data
T > A	12 63.2%	9 39.1%	17 47.2%
A > T	7 36.8%	14 60.9%	19 52.8%
sum	19	23	36

See Trommer (2001) for a detailed discussion of these differences which seem to be based on the specific interpretation Julien makes of her raw data (col-

umn 3 of (22)). For the moment I will take it for granted that both T > A and A > T are well attested which follows from the assumed constraints.

5.2.3 The Order of Tense and SAgr in Suffixal Position

The prediction of the constraint set is that in suffixal position agreement should always follow Tense. Indeed this is true in the large majority of patterns:

(23) Affixal status of SAgr and Tense as Suffixes

	my results		Julien's data	
V > T > A	41	85.4%	64	80%
V > A > T	7	14.6%	16	20%
sum	48		80	

One class of exceptions are languages with the order: V A_1 T A_2. An example is Dumi:

(24) *phɨk -kɨ -t -a*
get:up -[+1 +pl] -npast -[-du]
'we (excl.) get up.' (van Driem, 1993, pg. 96)

Note that the offending -k̲ɨ only appears together with a second number affix that appears after the tense marker. A plausible account is that a blocking constraint allows only one number marker on the right of Tense. This forces the 1st plural marker in the second-best position to the left of Tense:

(25) 1sg 2sg

	BLOCK [NUM]	du ➪ R	pl ➪ R
☞ [1pl] T [du]			**
[du] T [1pl]		*!*	
T [1pl] [du]	*!		*
T [du] [1pl]	*!	*	

There seem also to be languages where SAgr is adjoined to a non-tense head. See Trommer (2001, pg. 214) and Julien (2000, pg. 214) for more discussion.

5.2.4 The Order of Tense and SAgr in Mixed Positions

Siewierska (1993, pg. 68) makes the observation that

(26) ".if SAgr is a suffix so is the tense marker."

Siewierska finds that this is true for 91% of the languages from a sample of 262 languages[3]

(27) The relationship between the form of SAgr and tense affix

N=262	Tense suff N=188	Tense pref N=60	Tense both N=14
SAgr suff N=112	102 91%	9 8%	1 1%
SAgr pref N=116	68 57%	41 35%	7 6%
SAgr both N=34	18 53%	10 29%	6 18%

These results are also replicated in other studies

(28) Order of SAgr and Tense (Mixed cases)

	Siewierska (1993)	Julien (2000)	Trommer (2001)
A > V > T	68 88.3%	57 86.4 %	19 70.4%
T > V > A	9 11.7%	9 13.6%	8 29.6%
sum	77	66	27

This result seems to be problematic, since, according to the proposed constraints, A > V > T given suffixal T and T > V > A given prefixal T are equally probable. In each case, alignment constraints can be said to outrank REFLECT.

The point however is that suffixal T is much more frequent than suffixal oneJulien (2000, pg. 51 ff.). Especially in the patterns involving Tense and SAgr, suffixal Tense is far more frequent. This is true in my data for 75

[3]Actually Siewierska's sample contains 308 languages. 262 is the number of them that exhibit both agreement and tense inflection.

of 107 patterns (70%) and for Julien's data in 127 out of 172 (79.6%) The distribution of T and A in mixed cases thus seems to follow crucially from the independent distribution of T alone.

6 Summary and Prospects

The approach proposed in this paper allows to derive affix ordering in core cases that can also be accounted for in standard ("mirroring") approaches. Additionally, it imposes strong restrictions on the order of affixes which appear on opposite sides of the verbal stems and – in the case of agreement – accounts for ordering patterns which cannot be captured in more traditional analyses. A major theoretical advantage of the model is that it does away with idiosyncratic stipulations for affixes specifying them as prefixes or suffixes. The position of affixes w.r.t. stems is determined exhaustively by movement or alignment. If this account is basically correct, it supports a model of grammar, where at least part of the morphology module is located postsyntactically, because affix order is determined partly by movement, partly by constraints, presupposing the previous application of movement. Agreement, even if subject to nonsyntactic ordering principles, interacts with other inflectional categories (e.g. in portmanteaus) and typically appears "outside" of it. This is naturally captured in a model where morphology applies after syntax as in Distributed Morphology (Halle and Marantz, 1993, DM). Given standard assumptions of DM where agreement heads are inserted after application of all other syntactic operations, it is natural that also the ordering of agreement should be subject to somewhat different principles. Moreover, if separate person and number agreement is accounted for by fission, i.e. by literally splitting up agreement heads as is proposed in many DM analyses (Noyer, 1992; Halle, 1997), the order of the resulting items cannot be derived in syntax where they are not present. Hence, additional ordering mechanisms are necessary, as proposed in this paper. Note that the exposition here is restricted to very general patterns. Especially, only subject agreement in the features person and number is considered. Discussion of further differentiation in number and person features (dual vs. plural etc.) and of constraints on object agreement is to be found in Trommer (2001).

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