Morphology: the base processor

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1. Introduction

Since the early 1980s, the Lexical Integrity Hypothesis (LIH) has been one of the cornerstones of morphological research that delineates the division between morphology and syntax. It is a set of principles that distinguish morphology from syntax and this division, and the constraints that lead to this division have been a significant tool for the arguments towards morphology as a separate component.

Among its various characterizations, there are two properties that seem related but are distinct:

(i) Syntax cannot manipulate morphological structure (Lapointe 1980 among others): this first characterization implies that syntactic rules do not create lexemes and word forms and that syntactic outputs are not equivalent to morphological outputs.
(ii) Syntax cannot enter word-internal structure (a.k.a. No Phrase Constraint, Botha 1984): the second characterization can be rephrased as the ban against syntactic items in word structure.

In this paper, we hold the view that the first property above is sufficient to characterize a word-formation component separate from a phrase-structure component, and the violation of the second property above does not pose a threat to this. We propose a system which excludes syntax from creating morphologically complex structures, but allows syntactic outputs within words. We first show that syntax cannot create lexemes and word forms, and that various well-known data support the implications of (i) but not of (ii), thus leading to a model of autonomous morphology (section 2). Next, we lay down what an autonomous morphology component does (section 3).

2. The limitations on syntactic operations in word structure

In this section, we summarize some well-known reasons discussed in the literature that argue against syntax-based word formation.

2.1 Syntax does not predict fixed affix order; fixed order despite ambiguity

The ordering of affixes may be fixed, irrespective of the presumed position of these functional projections in syntax.

2.1.1 Headless relative clauses

The various syntactic and semantic functions of the plural and possessive affixes in headless relative clauses in Turkish do not yield variable affix order. The sequence *V-relativizer-plural-possessive* is fixed, yet this word form is four-ways ambiguous as shown in (1),

adapted from Göksel (2006), giving the pattern of grammatical relations in (2) (*-DIK*: object relativizer, *-(y)An*: subject relativizer):[1]

(1) a. *kovala-dık-lar-ımız*
(chase-OBJ.REL-PL-1.PL.POSS)
'the ones who we chase' (Object-Subject)
b. *kovala-yan-lar-ımız*
(chase-SUB.REL-PL-1.PL.POSS)
'the ones who chase us' (Subject-Object)
c. *kedi kovala-yan-lar-ımız*
(cat chase-SUB.REL-PL-1.PL.POSS)
'[the ones among us] who chase cats' (Subject-Partitive)
d. *kedi kovala-yan-lar-ımız*
(cat chase-SUB.REL-PL-1.PL.POSS)
'[the ones among us] that cats chase' (Object-Partitive)

(2)

Relativizer	*Plural*	*Possessive*
	OBJ	SUB
	SUB	OBJ
	SUB	PART
	OBJ	PART

The point in (1) and (2) is that the plural suffix can refer to an object or a subject, and the possessive marker can refer to a subject, an object, or a partitive, yet the ordering is fixed.

2.1.2 Free pronouns vs. bound person markers

The distribution of the (bound) person markers in Turkish is more limited than the distribution of the free pronouns; the person affixes are restricted to the final position of the verbal complex, whereas pronouns can occur at the beginning or the end of a clause:

(3) a. *(ben)bul-du-m*
I find-PST-1.SG
'I (have) found'

b. *bul-du-m (ben)*
find-PST-1.SG I
'I (have) found, I have'

c. **m(u)-bul-du*
1.SG-find-PST

d. **bul-(u)m-du*
find-1.SG-PST

Similarly, in Chichewa, the order of a free form and that of a bound form are distinct. We would expect this language to show an SOV order in clauses based on the order of the bound markers. However, the free order yields SVO (4a) (from Bresnan and Mchombo 1987):

(4) a. *njúchi zi-na-lúm-á alenje* (SVO)
bees Sub-PST-bite-INDIC hunters
'The bees bit the hunters'
b. *njúchi zi-na-wá-lúm-á* (**alenje*) (Sub_{Aff}+…Obj_{Aff}+V…)
bees Sub-PST-OBJ-bite-INDIC (hunters)
'The bees bit them'

[1] The following is a list of nonstandard abbreviations used in the paper: CM: compound marker, CTPT: centripetal direction, INDIC: indicative mood, INTR: intransitive, NZ: nominalizer, PART: partitive, PV: preverb, QP: question particle, REL: relativizer.

2.1.3 The position vs. the scope of negation

The position of the negative marker in Turkish and Mongolian is fixed although it has scope ambiguity (from Göksel 1993):

(5) a. *oku-t-ma-dı-m* *vs.* b. **oku-ma-t-tı-m*
read-CAUS-NEG-PST-1.SG
'I didn't make him read'

(5a) has two interpretations as below, despite the fixed order of the negative marker:[2]

(i) not > cause > read: I did not cause him to read
≠ ≠
(ii) cause > not > read: I caused him not to read

2.1.4 The interpretation of voice morphology

In Kinande, the order of an applicative and reflexive is fixed, although the construction is ambiguous (from Alsina 1999):

(6) *hum-ir-an* *vs.* **hum-an-ir*
hit-APP-REFL
(i) 'hit X for each other
(ii) 'hit each other for X'

2.2 Syntax does not predict variable affix order; variable order despite single interpretation

In Turkish, the plural (agreement) marker, *-lAr*, and the past marker, *-DI,* have variable position, the sole difference being differences in register.

(7) a. *(onlar)* *gid-iyor(-lar)-dı* (…Per.Num+Tense)
they go-PROG(-PL)-PST
'they were going'
b. *(onlar)* *gid-iyor-du(-lar)* (…Tense+Per.Num)
they go-PROG-PST(-PL)
'they were going'

There are also inter paradigm differences between the behavior of 1st/2nd and 3rd Person in ordering tense, person/number values following aspect:

(8) a. *gid-iyor-mu-sun-uz* (…Asp+Q+Per+Num)
go-PROG-QP-2-PL
'are you going'
b. *gid-iyor-lar-mı* (…Asp+Num+Q)
go-PROG-PL-QP
'are they going'

[2] See also Li (1990) and Kelepir (2000) for similar observations.

2.3 Syntax does not predict slot competition or syncretism

There is an abundance of examples from position class languages where order is purely morphological. Below we present some of these.

In Pazar Laz, *-t* shows PL of subject, object, or both without changing position (from Öztürk and Pöchtrager 2011):

(9) a. *t'k'va* *ma* *ce-m-ç-i-t*
you.PL.ERG I.DAT PV-P.1-beat-PST.2-PL
'you(PL) beat me'

b. *si* *şk'u* *ce-m-ç-i-t*
you.SG.ERG we.DAT PV-P.1-beat-PST.2-PL
'you(SG) beat us'

c. *t'k'va* *şk'u* *ce-m-ç-i-t*
you.PL.ERG we.DAT PV-P.1-beat-PST.2-PL
'you(PL) beat us'

In Georgian *v-* (1.SUB) and *g-* (2.OBJ) are mutually exclusive as Anderson (1982: 597 example 18) shows:

(10) a. *v-xedav* b. *g-xedav* c. *g-xedav-s*
'I see him' 'I see you' 'he sees you'

In Nimboran, the same slot can be occupied by values that belong to different features, and a single item can block affixes in more than one slot (cf. Inkelas 1993: 589):

(11)

0	1	2	3	……
Root	PL.SUB PL.OBJ	DUAL.SUB PART	MASC.OBJ	
	----------Dur----------			

These are a few of the examples cited in the literature, examples that show that affixes of different paradigms, person, number, voice morphology, negative, interrogative can be fixed, irrespective of syntactic and semantic function, or free, again, irrespective of semantic and syntactic function. If syntax determined affix positions and combinatorial conditions, we would expect invariable parallelism between syntactic operations and morphological elements and we would not need an autonomous morphological component. In the face of the examples above, the only logical conclusion is that we need a component that forms words.

3. Autonomous morphology: scope and function

We claim that an autonomous morphological component is responsible for the following:

(i) Creating candidate-lexemes regardless of their complexity/simplicity (cf. Kunduracı 2013),
(ii) Using and restricting a variety of base types in morphological operations (cf. Pounder 2000) (These base types are not only roots and stems but also word forms, syntactic phrases, and prosodic phrases),
(iii) Creating bases only for morphological well-formedness, e.g. concatenative purposes (specific stem forms to enable derivation or inflection),
(iv) Organizing paradigmatic relations (slots).

3.1 Autonomous morphology creates candidate lexemes

As discussed in previous literature, Turkish possessive phrases (12a) and Noun-Noun compounds (12b) show a superficial similarity: both involve the *-(s)I* suffix in the head element, which functions as the possessive marker (POSS) in possessive phrases and as the compound marker (CM) in compounds. Two of the well-known structural differences between a possessive phrase and a compound are reversibility and separability: unlike compounds, possessive phrases can be reversed and their constituents can be separated (12c). We assign such properties of compounds to their structural status: compounds must be candidate-lexemes created by autonomous morphology (cf. Kunduracı 2013) unlike possessive phrases.

(12) a. *[çocuğ-un kitab-ı] nerede* (Possessive Phrase)
child-GEN book-POSS where
'Where is the child's book?'
b. *[çocuk kitab-I nerede* (Compound)
child book-CM where
'Where is the child book (childrens' book)'
c. *kitab-I nerede çocuğ-un/*çocuk__*
book-POSS where child-GEN
'Where is the child's book?'

3.2 Autonomous morphology operates on and restricts its own bases

Bases for operations may be chosen according to lexical, semantic, phonological, prosodic, syntactic or purely morphological properties. However, it is always morphology that determines such conditions on bases (of morphological operations). Turkish and Yakut display differences in word size, i.e. there is a limit that, once it is reached, auxiliaries are used for further concatenations (cf. Göksel 1998):

(13) Turkish
a. **var-mış-acağ-ı*
arrive-PRF-FUT.NZ-3.POSS
Int.: 'that (s)he/it will have arrived'
b. *var-mış ol-acağ-ı*
arrive-PRF AUX-FUT.NZ-3.POSS
'that (s)he/it will have arrived'
Yakut
c. **si-i-bit-im*
eat-AOR-PST-1.SG
Int.: 'I had been eating'
d. *si-i olor-but-um*
eat-AOR AUX-PST-1.SG
'I had been eating'

The auxiliary verb in (13b) is necessary for the combination of PRF and FUT.NZ in Turkish. This combination is not possible within the same word morphologically, as shown in (13a). Yakut also displays a similar case (13c, d).

3.3 Autonomous morphology may use syntactic and prosodic units as a base

It is well-known that morphology can select a stem or a word as its base (Ralli 2013: 79, cited in Bağrıaçık et al. frth., *i.a.*):

(14) Greek
a. [$_{\text{WORD}}$ [$_{\text{STEM}}$ [$_{\text{STEM}}$ STEM] –CM– [$_{\text{STEM}}$ STEM]]-INFLECTION]
b. [$_{\text{WORD}}$ [$_{\text{STEM}}$ STEM] –CM– [$_{\text{WORD}}$ STEM-INFLECTION]]

It is also known that units in the lower levels of the Prosodic Hierarchy (Nespor and Vogel 1986) can be selected as bases for reduplication (Inkelas and Zoll 2005). What becomes clearer is that morphological operations can also involve higher prosodic units (e.g. Phonological Phrase) and syntactic phrases as bases or part(s) of bases. We present examples for both types in the next sections.

3.3.1 Prosodic Phrases as bases

Reduplication of a prosodic base for emphasis, a derivational process outputting emphatic adverbial constructions, is attested in Turkish and Greek. In Turkish, all phonological phrases can be doubled and located in the post-verbal position, creating emphatic adverbs, which is a derivational process (cf. Göksel, Kabak and Revithiadou 2013):

(15) { [[*Ev-e*] } *gid-iyor-uz*] {*ev-e*} !
home-DAT go-PROG-1.PL house-DAT
'We're going to HOME'

Such an operation occurs, even if the Phonological Phrase is part of an exocentric compound:

(16) *{eşek arı-sı} bu eşek!*
donkey bee-CM this donkey
'This is a wasp!'

These are not cases of copy and elide, as neither the elided part nor the remnant is a syntactic constituent: they belong to an exocentric (lexicalized) compound.[3]

In a similar vein, prosodic units inside morphological units (here affixes) serve as bases for higher level prosodic operations:

	Presentational Focus	Contrastive focus
(17)	a. *ye-miş-lér-di* eat-PRF-3.PL-PST 'They'd eaten (it).' (from Sebüktekin 1984)	b. *ye-MİŞ-ler-di* eat-PRF-3.PL-PST 'They HAD eaten (it).'

	Presentational Focus	Comma intonation
(18)	a. *yaslán-ın* L% lean.back-2.IMP 'Lean back.' (from Göksel and Güneş 2013)	b. *YASlan-ın* H% lean.back-2.IMP 'Lean back...'

In (17b), a high (proposition) level prosodic operation operates on a base which is a word form and focal stress targets a single morpheme, distinguishing the construction from the one with presentational focus (17a). In (18b), comma intonation, which again operates on propositions, targets the first syllable of a word form.

[3] We follow Kunduracı (2013) in that we consider lexicalized compounds to undergo the same process of morphology that also outputs novel compounds and that there is one additional, process in the case of lexicalized compounds, i.e. entering the lexicon with or without a new meaning.

3.3.2 Syntactic phrases as bases

Turkish phrasal compounds host bona fide phrases:

(19) a. { { [*ev-e* *gid-ecek*]} {*düşünce*}}*-si*
home-DAT go-FUT thought-CM
'the thought that he is going to go to home'
b. { { [*nerede* *mi* *ol-duğ-u*]} {*soru*}}*-su*
where QP be-NZ-3.POSS question-CM
'the question about where he is'

The nonhead in this compound is a phrase, not a quotation of type N. Quotations and phrases in such compounds can be distinguished syntactically, semantically and prosodically in Turkish (see Göksel 2015). As in Kunduracı (2013), we consider that such forms involve a syntactic item as the first base, which undergoes a morphological operation, i.e. compounding, and that this does not mean that the compounding operation is syntactic; the two elements are still inseparable:

(20) {{XP} {Y}}
{syntactic unit} {lexeme stem} = morphological output

(20) represents the structure of a phrasal compound: XP represents the first base, which is complex, i.e. a syntactically created element, and Y, the second base, which is a lexeme stem. These two are compounded by means of a morphological process outputting morphologically complex forms. In this way, not only the fact that one of the compounded elements is syntactic but the fact that the compounded elements are not separable can be accounted for as well.

3.3.3 Support for phrasal bases from nonconcatenative morphology

The examples we have given so far involved concatenative morphology. In this section, we show that nonconcatenative morphology may also build on phrasal bases.

In Karajá, a clausal structure undergoes a nonconcatenative morphological process: base modification in the formation of a relative clause. Note that the only exponent of the relative clause morphology here is tonal change (from Ribeiro 2006):[4]

(21) a. [*ɗori* *∅-d-∅-ɔrɔ=d-e*]
white 3-CTPT-INTR-go.ashore=CTPT-IMPRF
'The white man came ashore.'
b. *ɗori* *∅-d-∅-ɔrɔ=d-é*
white 3-CTPT-INTR-go.ashore=CTPT-IMPRF.REL
'the white man that came ashore'

3.4 Autonomous morphology may create bases only for combinatorial purposes

In Turkish, there are cases where affixes are necessary only to provide bases for further morphological derivations. In (22), the expression in (a) does not mean 'something with some

[4] Interrogative morphology is also known to involve base modification (intonational change), see Cheng and Rooryck (2000), Göksel et al. (2009).

piece of wrapping', and the expression in (b) does not mean 'something with (some piece of) building', which would be the expected meaning if the affix *-ı* were interpreted independently. Rather, here the nominalizer (NZ) is clearly not added for semantic reasons:

(22) a. *sar*(-ı)-lı*
wrap-NZ-*lI*
'wrapped'

b. yap**(-ı)-lı*
do-NZ-*lI*
'made/bodied'

The form *sarı-*, for example, is not (necessarily) an existing lexeme with the meaning 'wrapping', but is a novel form required to allow the further operation above.

Thematic vowels in many languages serve this purpose too. In Latvian, a thematic vowel (*-i* below) is necessary when producing word forms, as shown by Haspelmath and Sims (2010).

(23) a. *gulb-i-m*
swan-TV-DAT
'to (the) swan'

b. **gulb*

Note that the same applies to compound markers that have no meaning but function (cf. Ralli 2008; Kunduracı 2013).

3.5 Autonomous morphology organizes paradigms

Kunduracı (2013) proposes that Turkish N-N compounds, like (24a), are produced in a word-formation paradigm and that the compound marker (CM) is in a paradigmatic relation with certain derivational affixes, as exemplified in (24b). It is important that the compound marker would be required semantically, considering the meaning of the compound *elma ağac-ı* 'apple tree', which is identical in both (a) and (b), whereas (b) lacks the compound marker. This case is assigned to a paradigmatic relation involving compounding and derivational affixations:

(24) a. *elma ağac*(-ı)*
apple tree-CM
'a/the apple tree'

b. *elma ağaç(*-ı)-lı*
apple tree-*CM-*lı*
'with an/the apple tree'

Another paradigmatic point to make is for inflection: although the 1st person possessive marker, *-(I)m* would be expected semantically, as shown below, it is not affixed after the 2nd person possessive marker, *-(I)n*, due to, again, a paradigmatic slot competition:

(25) a. *ben-im [sen-in resm-in]-*im*
I-GEN you-GEN picture-2.POSS-*1.POSS
for 'your picture that I have' (from Kunduracı 2013)

In this section, we hope to have shown that morphology arranges word size and restrictions on word structure. It may use stems, syntactic constituents, and prosodic constituents as a base. This means that not only stems but also phrasal and prosodic constituents (i.e. constituents of morphology-external components) can be input to morphological operations such as affixation, compounding, reduplication, base modification, and this spans derivational and inflectional morphology (contra arguments in weak lexicalism, Aronoff 1976; Anderson 1982, 1992). Morphology also organizes paradigms.

An autonomous morphological system then can explain:

(i) obvious differences between syntactic and morphological outputs
(ii) morphological complexes
(iii) morphologically required stem forms
(iv) formal similarities between derivational and inflectional processes
(v) paradigms[5]

4. Conclusions

Morphological principles and syntactic principles (i.e. operations, inputs, outputs) are not identical (as in Aronoff 1976, 1994; Anderson 1982, 1992; Zwicky 1984, 1992; Di Sciullo and Williams 1987; Spencer 1991; Beard 1995; Stump 2001; Ackema and Neelemen 2007; Di Sciullo 2009). Morphology works on bases and either provides lexemes for the lexicon or provides new bases, which are not lexemes, for further operations. In terms of concatenation conditions and outputs, morphology seems less flexible than syntax. But in terms of the inputs, morphology seems more flexible than syntax (wider variety of input/base types).

There are post-syntactic morphological operations as well as pre-syntactic ones (cf. Aronoff 1976; Anderson 1992; Lieber and Scalise 2006). However, this does not lead to split morphology (cf. Booij 1994, 1996; Kunduracı 2013). There is one autonomous morphology (as in Aronoff 1994; Sadock 2012; Pounder 2000; Göksel 2006; Kunduracı 2013 among others).

We also consider two alternatives for the autonomous morphology and its operations: there could be (i) simultaneous representations of syntax and morphology (cf. Ackema and Neeleman 2004; Sadock 2012), or (ii) feeding between syntax and morphology, but without a strict order (cf. Lieber and Scalise 2006; Kunduracı 2013). The next task would then be to decide what kind of data could be used in understanding this.

Going back to the Lexical Integrity Hypothesis, we hope to have shown that syntax cannot manipulate morphology, nor determine the output conditions of morphology, i.e. syntax cannot create words, but can supply constituents for words.

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[5] Although productivity is also an important task of morphology, it is not discussed in the present study.

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