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# Morphologie Morphology

Ein internationales Handbuch zur Flexion und  
Wortbildung

An International Handbook on Inflection and  
Word-Formation

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## VIII. Formale Prozesse

### Formal processes

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##### 1. Introductory remarks

###### 1.1. Informal characterization of morphological processes

A **morphological process** is, roughly speaking, an action by the speaker of a language: using a particular type of linguistic sign in order to express, within the boundaries of a word-form, a meaning applied to the meaning of the stem of this word-form. Morphological processes are defined by the following three oppositions: First, a morphological process is the use of a linguistic sign, and therefore a morphological process is meaningful. As such, morphological processes are opposed to the use of **morphological means**, one-sided, meaningless entities that are "building blocks" for morphological signifiers. Second, a morphological process is a morphological (i.e. word-internal) phenomenon involving a sign which, together with other signs, is part of a word-form. As such, morphological processes are opposed to non-morphological, or syntactic, processes (see 2.1.2, (b); cf. Art. 34, 39). Third, a morphological process is an action, namely the action of using a linguistic sign. As such, morphological processes as events are opposed to **morphological signs** as entities (cf. Art. 23). Thus, morphological processes should be distinguished from

- (a) morphological non-significative events (i.e. using morphological means),
- (b) non-morphological significative events (i.e. non-morphological processes) and
- (c) morphological entities (i.e. morphological signs).

##### 1.2. Alternative terminology

Two terms compete in the literature with *morphological process* in the intended meaning: **formal process** and **grammatical process**. The term *formal process* is infelicitous, since, first, there is no opposed term *\*informal process* or *\*meaningful process*; and, second, so-called "formal processes" are meaningful by their nature. The term *grammatical process* is better (it is opposed to *lexical process*) but, according to its literal meaning, it seems more appropriate for the subclass of linguistic processes that express any grammatical meaning, including those that function outside the word-form. Therefore, the term *morphological process* is preferred here.

##### 2. The notion of morphological process

###### 2.1. Definition

###### 2.1.1. Underlying notions

The definition of morphological process is based on the following four notions (cf. Mel'čuk 1982; 1993; 1997a: 59–195 for details) plus a special auxiliary notion of linguistic expressive process (see 2.1.2):

- (a) **Linguistic sign** (cf. Art. 23): a triplet consisting of a signified, a signifier and syntactics (cf. Art. 52);
- (b) **elementary linguistic sign**: roughly, a sign which cannot be represented in terms of "smaller" signs (cf. Art. 52 for a definition);
- (c) **word-form**: a sufficiently autonomous sign, which is not necessarily elementary (all signs that appear in the representation of the word-form *w* are said to be **components** of *w*);
- (d) **stem**: the part of a word-form that includes the root and perhaps other components, but is not a complete word-form (cf. also Art. 62).

In the typology of morphological processes and the discussion of the examples, six further notions are used:

- (e) **grammatical meaning**: roughly, **inflectional meaning (grammeme)** or **derivational meaning (derivateme)**; syntactic meanings, which are of course grammatical as well, are ignored here;
- (f) **segmentals**: morphological means involving strings of phonemes;
- (g) **suprasegmentals**: morphological means involving complexes of prosodies;
- (h) **linguistic union**  $\oplus$ : an operation that unites linguistic units according to their nature (cf. Art. 52);
- (i) **root** and
- (j) **affix** (cf. Art. 27).

### 2.1.2. Auxiliary notions

A method or a technique used by speakers of a natural language to express something is called a (**linguistic**) **expressive process**. Expressive processes are subdivided with regard to two parameters:

- (a) Depending on the nature of the meaning expressed, an expressive process can be **grammatical** (i.e., it expresses a grammatical meaning) or **non-grammatical**. The majority, or, more precisely, all but two expressive processes are grammatical; the only non-grammatical processes are **lexicalization** (selecting lexical units for a given meaning in a sentence) and **composition**, this latter being a special case of lexicalization – lexicalization within the boundaries of a word-form. (Lexicalization and composition can both involve other expressive – i.e. grammatical – processes.)
- (b) Depending on the textual limits within which the meaning is expressed, an expressive process can be **morphological** (i.e., the expression takes place within the boundaries of a word-form) or **non-morphological** (syntactic, i.e., the expression takes place within the boundaries of a sentence).

These parameters intersect, giving four classes of expressive processes:

- (i) Grammatical morphological processes: affixation, modification, etc. (see 3.2; linguistic signs used by these processes could be called **grammatical signs** – cf. *dependent morphemes*, Langacker 1987: 336);

- (ii) grammatical non-morphological processes: use of auxiliary words (which mark syntactic constructions or express grammatical meanings in so-called **analytical forms** – cf. Art. 68, 78), agreement and government (roughly, transferring features from one word-form to another), meaningful word order permutations, sentence prosodization, etc.;
- (iii) non-grammatical morphological process: composition (see 3.2.1);
- (iv) non-grammatical non-morphological process: lexicalization.

Since expressive processes are actions (in particular, of applying linguistic signs to other signs), their names should be deverbal nouns, e.g., nouns in *-(a)tion/-sion*, derived from the names of signs used: *X-ation* from *X*, such as *affixation* from *affix*, *replication* from *replica*, etc. All expressive processes are strictly synchronic linguistic phenomena.

### 2.1.3. Definition of a morphological process

Let there be a stem *R* and an elementary sign *X* whose signified 'X' bears on the signified 'R' of *R*.

- (1) An expressive process  $\mathcal{P}$  of language  $\mathcal{L}$  is said to be a morphological process if and only if the sign *X* that  $\mathcal{P}$  uses in order to express 'X' for 'R' is a component of the same word-form as *R*.

A morphological process  $\mathcal{P}$  is an operation – a particular case of the operation of linguistic union  $\oplus$ ;  $\mathcal{P}$  joins a sign *X* to its "target"-stem *R* for which *X* expresses the meaning 'X'; and  $\mathcal{P}$  does so within a word-form that includes *R*.

### 2.2. Examples

Two typical examples of morphological processes and two typical examples of phenomena which are not morphological processes (but could be mistaken for such) are quoted and checked against the definition (see 3 for the types of morphological processes).

The first example shows that different types of morphological processes can express the same grammeme. In the Tsimshian language Nass of Canada, the nominal plural is expressed by one of four morphological processes (cf. Sapir 1921: 60): suffixation (2a), prefixation (2b), modification (2c) and reduplication (2d):

- (2) (a) *waky* 'brother' ~ *waky-kw* 'brothers'
- (b) *an?on* 'hand' ~ *ka-an?on* 'hands'
- (c) *gwula* 'cloak' ~ *gwila* 'cloaks'
- (d) *gyat* 'person' ~ *gyi-gyat* 'people'

Conversely, the same type of morphological process can express different grammemes; this is the most current case. In English, for instance, suffixation expresses a large variety

of grammemes and derivatememes (3a), modification expresses three grammemes (3b), and conversion expresses numerous derivatememes (3c):

(3) (a) 'PLURAL'	<i>book</i>	~	<i>book-s</i>
'PAST'	<i>want</i>	~	<i>want-ed</i>
'COMPARATIVE'	<i>smart</i>	~	<i>smart-er</i>
'ADVERBIALIZER'	<i>smart</i>	~	<i>smart-ly</i>
'one who ...'	<i>sing</i>	~	<i>sing-er</i>
'cause to be ...'	<i>sharp</i>	~	<i>sharp-en</i>
(b) 'PLURAL'	<i>tooth</i>	~	<i>teeth</i>
'PAST'	<i>sing</i>	~	<i>sang</i>
'PAST.PARTICIPLE'	<i>sing</i>	~	<i>sung</i>
(c) 'one who ...'	<i>[to] gossip</i>	~	<i>[a] gossip</i>
'cause to ...'	<i>burn<sub>intr</sub></i>	~	<i>burn<sub>trans</sub></i>
'quantum of ...'	<i>[to] kiss</i>	~	<i>[a] kiss</i>
'address as ...'	<i>Sir</i>	~	<i>[to] sir</i>

In Russian, the subjunctive-conditional mood is expressed by the clitic *by* accompanying the past form of the verb:

- (4) *plyl* 'swam' ~ *plyl by* 'would swim'  
*žil* 'lived' ~ *žil by* 'would live'

*By* is a separate word-form, not a component of the word-form that includes the root *ply[v]-* or *ži[v]-*; therefore, the condition of the definition (1) is not satisfied: using *by* is not a morphological process. It is, however, a grammatical process of Russian, since the auxiliary word *by* expresses a grammeme, 'subjunctive-conditional'.

In (5), quadruplets of Chinese word-forms are shown which differ in tone (ˉ flat, ˊ rising, ˋ falling and ˊˋ falling-rising):

- (5) *mā* 'mother' ~ *má* 'flax' ~ *mà* 'curse' ~ *mǎ* 'horse'  
*yī* 'one' ~ *yí* 'stranger' ~ *yì* 'town' ~ *yǐ* 'chair'  
*fū* 'husband' ~ *fú* 'support' ~ *fù* 'rich'  
 ~ *fǔ* 'ax'

Here and in all similar cases, which are extremely numerous in Chinese, tones play an important semantic role: they oppose the corresponding signifiers. Therefore, Chinese tones are a linguistic means, and they are used within word-forms. However, they do not mean anything by themselves, each tone being an integral part of a signifier rather than an independent signifier. It is impossible to associate a specific tone with a specific meaning; therefore, using tones is by no means a morphological process in Chinese.

### 2.3. The inherently additive character of morphological processes

The proposed definition of a morphological process essentially presupposes that the construction of a complex word-form *w* by the speaker happens in two major steps: first, the speaker selects a stem *R*, which expresses the lexical meaning 'R' he needs, and then he adds to it other word-form components, i.e., he applies to *R* various morphological processes in order to express meanings (grammatical and non-grammatical) which modify 'R' within the boundaries of *w*. Therefore, morphological processes, as well as the signs they use, are strictly additive – although the signified or the signifier of the sign added can be subtractive or replacive.

Thus, a **subtractive signified** is a "command" to delete a component in the signified or the syntactics of the target sign, as in the Russian decausativizing suffix *-sja* in *serdit* 'to cause to be angry' ~ *serdit'sja* 'to be angry', where *-sja*, added to a verbal stem, deletes the component 'cause to' in its signified. A **subtractive signifier** is the operation of truncation, as found, for instance, in the French plural formations *auf* /œf/ 'egg' ~ *aufs* /œf/ 'eggs', *bœuf* /bœf/ 'ox' ~ *bœufs* /bœf/ 'oxen' (cf. Art. 60). Yet, in spite of the subtractive character of its signified or its signifier, the corresponding sign is additive: it is always joined as a whole to its target. There are no subtractive signs (in the sense of "signs that are subtracted from other signs") and, consequently, no subtractive morphological processes (cf. Mel'čuk 1991: 279–285). From this it follows that there are no replacive signs (in the sense of "signs that replace other

signs") and, therefore, no replacive morphological processes either, replacement being reducible to subtraction plus addition. However, replacive signifieds and replacive signifiers do exist. Thus, a **replacive signified** (cf. Mel'čuk 1990: 301f.) can be illustrated by so-called **parasitic formations** (cf. Matthews 1972: 86): a meaningful affix  $a_1$  is added to the target word-form after another meaningful affix  $a_2$  such that the signified 'a<sub>1</sub>' replaces 'a<sub>2</sub>' rather than being added to the signified of the stem along with 'a<sub>2</sub>'. This situation obtains in so-called secondary grammatical cases of some Daghestanian languages, e.g. in the Dargwa noun *žuz* 'book' with the ergative *žuz-li* and the dative *žuz-li-s*, where the signified 'dative' of *-s* replaces the signified 'ergative' of *-li*. A **replacive signifier** occurs, for example, in the apophony *foot* ~ *feet*. Once again, all the corresponding signs and morphological processes are strictly additive. A morphological process is by definition an application, or addition, of a linguistic sign to another sign. This addition should not be construed simplistically as strict concatenation or set-theoretical union; it could be a much more complex operation. Yet it is addition: signs as such are never subtracted or replaced, only their signifieds or signifiers can be.

### 3. Typology of morphological processes

One finds inventories of morphological processes in all major morphological manuals and reference books (cf. Sapir 1921: 61–81 and Anderson 1990: 284–286; Nida 1949: 62–77 under "Types of Morphemes"; Reformatskij 1967: 263–310; Bulygina 1972; Matthews 1974: 116–135; 1991: 122–144; Bergenholtz & Mugdan 1979: 58–73 under "Morphological Constructions"; Mel'čuk 1982: 77–105; Majewicz & Pogonowski 1984: 57–64 under "Moods [sic] of Expression"; Anderson 1985: 165–174; Bauer 1988 a: 19–42; Szymanek 1989: 32–105). All these inventories are more or less identical; basic facts about morphological processes seem to be well known. Yet this is an empirical achievement, while what seems more attractive is a theoretical calculus of morphological processes – in order to have a logical justification for a given inventory, which would also allow for a better understanding of relationships among various processes. Proposals

for such a calculus have been made before (cf. Mugdan 1977: 47–50); here, another attempt is made to elaborate it and make it more precise.

#### 3.1. Major types of morphological processes

To establish the major types of morphological processes, two features are needed:

- (a) The meaning to be expressed can be grammatical or non-grammatical; this leads to a distinction between grammatical and non-grammatical morphological processes.
- (b) The sign  $X$  which the given morphological process uses can belong to one of six major types that are relevant in this respect.

The number six is arrived at as follows: Let there be a stem  $R = \langle 'R'; /R/; \Sigma_R \rangle$  and a meaning ' $\sigma$ ' that is to be expressed for  $R$ , i.e. ' $\sigma$ ' has ' $R$ ' as its target; the resulting sign  $w$  should be a single word-form or a part thereof (since only morphological processes are considered here). The sign  $w$  must thus have the signified ' $R \oplus \sigma$ '. What about its signifier? In other words, how can one express ' $\sigma$ ' with  $R$ ? To do this, one can either add something to  $R$  (without changing anything in  $R$ ) or change a component of  $R$ : this addition or change will constitute the signifier of the sign  $s$  of which ' $\sigma$ ' is the signified. One cannot limit oneself to changing ' $R$ ' only: the result will present no observable difference and thus one obtains **polysemy**, i.e., two homophonous signs,  $R^1 = \langle 'R'; /R/; \Sigma_R \rangle$  and  $w = R^2 = \langle 'R \oplus \sigma'; /R/; \Sigma_R \rangle$ . This case is irrelevant here; therefore, the two other possibilities must be considered: changing the signifier  $/R/$  or the syntactics  $\Sigma_R$  of  $R$  (or both). Looking for a possible signifier of  $s$ , one finds that natural languages have exactly two types of signifiers:

- entities, which can be segmentals or suprasegmentals, and
- operations (substitutions), which can be applicable to signifiers or to syntactics.

As a result, one can distinguish six major types of linguistic signs and, accordingly, of morphological processes, which are susceptible of further subdivision (cf. 3.2 and Art. 54–61). In what follows, subscripts distinguish senses of polysemous terms. Thus, "reduplication<sub>3</sub>" denotes a morphological process which uses a sign of the type "redu-

plication<sub>2</sub>”; a reduplication<sub>2</sub> has as its signifier an operation called “reduplication<sub>1</sub>”.

First, if the meaning ‘ $\sigma$ ’ is expressed by affecting the signifier /R/, this can be done in two ways only: ‘ $\sigma$ ’ is expressed either

- (a) by an entity added to /R/ or
- (b) by an operation applied to /R/ and modifying it.

If ‘ $\sigma$ ’ is expressed by an added entity, this entity can be

- (a1) a segmental signifier – a segment /s/ – that is joined to /R/ or
- (a2) a suprasegmental / $\Sigma$ / on a particular syllable – that is superposed onto /R/.

Depending on whether the sign  $s = \langle \sigma; /s/; \Sigma_s \rangle$ , whose signifier is a segment, is a root or an affix, the corresponding morphological process is called **composition** or **affixation**. (A particular case of composition is known as **incorporation**, cf. Art. 88.) The existence of so-called “combining forms” (*pseudo-*, *astro-* or *-cracy*, *-burger*, etc.) does not change the picture: they can be identified partly with roots and partly with affixes. The sign  $s = \langle \sigma; /s/; \Sigma_s \rangle$ , whose signifier is a suprasegmental, is a **suprafix**. The corresponding morphological process is **suprafixation**.

If ‘ $\sigma$ ’ is expressed by an operation that modifies /R/, this operation can be either

- (b1) a substitution  $/R/ \Rightarrow f(/R/)$ , where  $f$  is an operation called **replication<sub>1</sub>**, which consists in copying /R/ or a part of it and joining the copy to /R/, or
- (b2) a substitution  $/X/ \Rightarrow /Y/$ , called **alternation**, which does not copy anything but substitutes a string of phonemes or a configuration of prosodemes for another such string or configuration.

The sign  $s = \langle \sigma; /R/ \Rightarrow f(/R/); \Sigma_s \rangle$ , whose signifier is a replication<sub>1</sub>, is a **replica**. The corresponding morphological process is **replication<sub>2</sub>**. The sign  $s = \langle \sigma; /X/ \Rightarrow /Y/; \Sigma_s \rangle$ , whose signifier is an alternation, is an **apophony**. The corresponding morphological process is **modification**.

Second, if the meaning ‘ $\sigma$ ’ is expressed by changing the syntactics  $\Sigma_R$ , this can be done just in one way: through a substitution  $s_i \Rightarrow s_j$  which replaces some feature(s)  $s_j$ ; such a substitution is called a **conversion<sub>1</sub>**. The sign  $s = \langle \sigma; s_i \Rightarrow s_j; \Sigma_s \rangle$ , whose signifier is a conversion<sub>1</sub>, is a **conversion<sub>2</sub>**. The corresponding morphological process is **conversion<sub>3</sub>**.

Fig. 53.1 summarizes the classification of morphological processes (with some subdivisions introduced in 3.2); for the sake of brevity, it specifies only the signifiers of the signs used by each type.

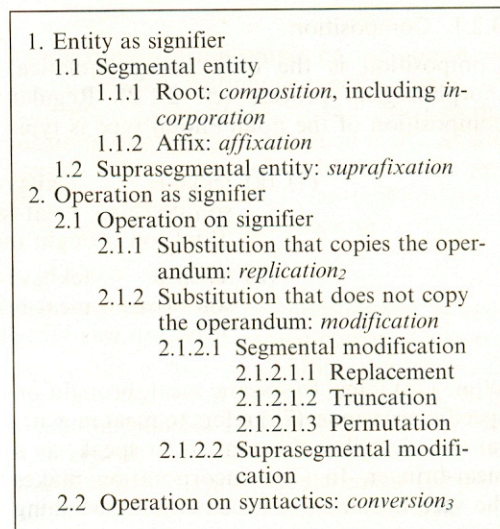


Fig. 53.1: Hierarchy of morphological processes in Art. 53

The classification that lies behind the structure of Ch. VIII is shown in Fig. 53.2; it is based on a somewhat different hierarchy of criteria and limits itself to processes that involve a single base (which excludes composition, cf. Art. 87–88) and a difference in the signifier only (which excludes conversion, cf. Art. 90).

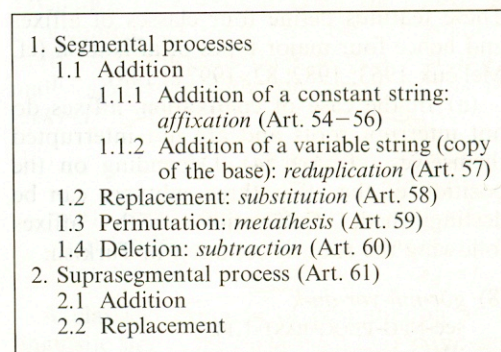


Fig. 53.2: Hierarchy of morphological processes in Ch. VIII

3.2. Brief survey of morphological processes  
The definitions of morphological processes considered are not explicitly stated here, since most of them are trivial: “X is the mor-

phological process which uses signs of type *X*". (For the two morphological processes which are not like this – composition and incorporation – the definitions are given in Art. 87–88.)

### 3.2.1. Composition

Composition is the only non-grammatical morphological process (cf. 2.1.2). Regular composition of the noun+noun type is typi-

- (7) (a) /ekke-te tekitsʏən ren-∅-nin-∅/  
 SON-INSTR.SG meat-NOM.SG bring-AOR-3SG.SUBJ-3SG.OBJ  
 '[My] son brought meat.'  
 (b) /ekək-∅ tekitsʏə-ret-∅-ʏʔi/  
 SON-NOM.SG meat-bring-AOR-3SG.SUBJ  
 '[My] son was bringing meat.'

While (7a) refers to specific meat, brought on specific occasions, (7b) refers to meat in general and describes the son, so to speak, as a meat-bringer. In (7b), incorporation makes the verb intransitive, which entails switching from an ergative to a nominative construction – in (7b), the grammatical subject is not in the instrumental, as in (7a), but in the nominative –, as well as changes in the personal suffixes.

### 3.2.2. Affixation

Affixes are classified according to two features:

- Do they interrupt roots?
- Are they interrupted themselves?

These features define four classes of affixes and hence four major types of affixation (cf. Mel'čuk 1963; 1982: 82; 1997a: 148).

(a) In the case of **confixation**, affixes do not interrupt roots and are not interrupted themselves (cf. Art. 54). Depending on the position of the affix, three subtypes can be distinguished. **Suffixation**, with affixes following the root, is common in Turkish:

- (8) *gör-mü-yor-du-k*  
 see-NEG-PROG-PAST-1.PL  
 'We were not seeing.'

**Prefixation**, with affixes preceding the root, can be illustrated by subject and tense markers in Koryak:

- (9) (a) /tə-ku-lle-ʏi/  
 1SG.SUBJ-PRES-lead-2.SG.OBJ  
 'I lead thee.'

cal of German; (6b) and (6c) exhibit interfixation as well (cf. (10) in 3.2.2):

- (6) (a) *Gemeinde-wald*  
 community-forest  
 (b) *Zeitung-s-aufsatz*  
 newspaper-LINK-article  
 (c) *Phrase-n-struktur*  
 phrase-LINK-structure

Regular incorporation of the noun+verb type is typical of Chukchi:

- (b) /∅-ku-lle-n-et/  
 2SG.SUBJ-PRES-lead-3.SG.OBJ-DUAL  
 'Thou ledest them two.'

**Interfixation**, with affixes that are positioned between two roots, often marks compounding, as in German (6) or Russian (10):

- (10) (a) *naučn-o-techničesk[-ij]*  
 scientific-LINK-technological  
 (b) *voenn-o-promyšlenn[-yj]*  
 military-LINK-industrial  
 (c) *krasn-o-bel[-yj]*  
 red-LINK-white

(b) **Infixation** uses affixes which interrupt roots but are not interrupted themselves (cf. Art. 55). For example, the Tagalog verbs *patáy* 'kill' and *sulat* 'write' (which form the present by reduplication<sub>1</sub> of the first syllable of the root) take the infixes *-um-* and *-in-* in the active and passive, respectively:

- |             |                                      |  |
|-------------|--------------------------------------|--|
|             | past                                 | present                                  |
| (11) active | <i>p-um-atáy</i><br><i>s-um-ulat</i> | <i>p-um-ápatáy</i><br><i>s-um-usulat</i> |
| passive     | <i>p-in-atáy</i><br><i>s-in-ulat</i> | <i>p-in-ápatáy</i><br><i>s-in-usulat</i> |

(c) **Circumfixation**, where affixes do not interrupt roots but are interrupted themselves (cf. Art. 54), occurs in Malay *ke-cina-cina-an* 'to be like a Chinese', *ke-anak-anak-an* 'to be like a doll', etc., with the circumfix *ke-...-an* 'to be like ...', which derives verbs from nouns.

(d) **Transfixation**, where affixes interrupt roots and are interrupted by elements of roots themselves (cf. Art. 56), is typical of Arabic; thus, the roots *r-s-m* 'draw [a drawing]'

and *d-r-b* 'hit' combine with the transfixes *-a-a-* 'ACTIVE PERFECTIVE', *-u-i-* 'PASSIVE PERFECTIVE', etc.:

- (12) (a) *r-a-s-a-m[-a]* 'He has drawn.'  
           *r-u-s-i-m[-a]* 'He/it has been  
   drawn.'  
        (b) *d-a-r-a-b[-a]* 'He has hit.'  
           *d-u-r-i-b[-a]* 'He/it has been hit.'

### 3.2.3. Suprafixation

Theoretically, there are two major subtypes of suprafixation. **Accentual suprafixation** could be assumed in English pairs of the type *cónflict* and *conflict* (with an unstressed root and two different superimposed accentual suprafixes), but one could also argue that the noun is derived from the verb by a process of stress shift, i.e. accentual modification (3.2.5; cf. Matthews 1974: 133, <sup>2</sup>1991: 142f.). Clear examples of **tonal suprafixation** are easier to find. In Banda-Linda and other Ubangi languages of central Africa, for instance, tones express temporal-aspectual distinctions in the verb (cf. Cloarec-Heiss 1986: 223–234):

- (13)           impera- per- past pro-  
                 tive     fect     perfect gressive  
   'arrive' *gũ*      *gú*      *gũ*      *gù*  
   'vomit' *ndǎ̄*     *ndǎ́*     *ndǎ̀*     *ndǎ̂*  
   'guard' *bātà*     *bātà*     *bātà*     *bātà*

### 3.2.4. Replication

Replication<sub>2</sub> produces a segmental unit (a string of phonemes) that is a copy of (a part of) the base (a root plus perhaps other signs) and is placed to the right, to the left or inside of it (cf. Art. 57). Replications<sub>2</sub> can be classified according to the following seven features:

- (a) Number of iterations (**reduplication**<sub>3</sub> – one copy, **triplification**<sub>3</sub> – two copies, **quadriple****duplication**<sub>3</sub> – three copies, etc.);  
 (b) simple vs. complex (the domain of copying consists of one / of more than one sign);  
 (c) total vs. partial;  
 (d) exact vs. non-exact;  
 (e) contiguous vs. distant (the copy is / is not in contact with the base);  
 (f) left vs. right;  
 (g) continuous vs. discontinuous (the copy interrupts / does not interrupt the base).

As a result, there are numerous theoretically possible types of replications<sub>2</sub>. The most widespread are reduplications<sub>3</sub>, as in Kazakh, where a simple total non-exact continuous

right continuous reduplication<sub>3</sub> expresses the meaning 'rather lousy X and things related to it':

- (14) 'tea'           *šaj*      ~    *šaj-paj*  
       'book'       *kitap*     ~    *kitap-mitap*  
       'bread'      *nan*       ~    *nan-pan*

Triplification<sub>3</sub> (of the simple partial non-exact contiguous left continuous type) occurs in the Australian language Mayali and expresses the meaning 'ecological zone where many Xs are found', e.g. in /*gu-be?-be-berrk*/ from /*gu-berrk*/ 'dry place' and /*an-bo?-bo-bowk*/ from /*an-bowk*/ 'seasonal swamp'.

### 3.2.5. Modification

The sign type used by modification is **apophony**. Apophonies are first classified according to the nature of signifiers transformed: they are segmental or suprasegmental. **Segmental apophonies** are further subdivided depending on the nature of the alternation which is their signifier: **replacement** (of phonemic strings or phonemic features; cf. Art. 58), **truncation** (cf. Art. 60) and **permutation** (cf. Art. 59). In spoken Romanian, many nominal plurals are formed by replacement, viz. palatalization:

- (15)           singular           plural  
   'tree' *copac* /ko'pak/    *copaci* /ko'patʃi/  
   'man' *bărbat* /bər'bat/   *bărbați* /bər'batsʃi/  
   'wolf' *lup* /lup/            *lupi* /lupʃi/  
   'bear' *urs* /urs/            *urși* /ursʃi/

Perjorative/augmentative formation in Polish has been cited as a case of truncation (cf. Szymanek 1989: 95f.); in (16c), the loss of *-k* is accompanied by a "reverse" alternation *cz* /tʃ/ ⇒ *k*, since the final /k/ of a stem normally alternates with /tʃ/ before /k/, as in *rzek[-a]* 'river' ~ *rzecz-k[-a]* 'small river':

- (16)                               base form    augmen-  
   tative  
   (a) 'bread roll' *bulk[-a]*     *bul[-a]*  
   (b) 'vodka'      *wódk[-a]*    *wód[-a]*  
   (c) 'barrel'     *beczk[-a]*    *bek[-a]*

A classical example of permutation as a linguistic sign is the metathesis that expresses the incompletive aspect in Rotuman:

- (17)           completive    incompletive  
   'decide'      [*pure*]           [*puer*]  
   'pull'       [*futi*]           [*fyt*] /*fuif*/  
   'sweep'      [*tofi*] /*tafi*/    [*tœf*] /*taif*/

**Suprasegmental apophonies** are subdivided depending on the nature of the suprasegmen-



tals involved. **Accentual apophony** occurs in Tagalog "passive" adjective formation:

- |                           |              |                     |
|---------------------------|--------------|---------------------|
| (18) noun                 |              | "passive" adjective |
| <i>álam</i> 'knowledge'   | <i>alám</i>  | 'known'             |
| <i>ínit</i> 'heat'        | <i>ínit</i>  | 'heated'            |
| <i>kálat</i> 'dispersion' | <i>kalát</i> | 'dispersed'         |

**Tonal apophony** can be exemplified by oblique case formation in Maasai (on the case labels, cf. Mel'čuk 1997 b: 132–143; the symbols ', ` and ^ denote high, low and falling tones, while mid tone is not marked):

- |          |            |           |
|----------|------------|-----------|
| (19)     | nominative | oblique   |
| 'horse'  | /embártá/  | /embartá/ |
| 'weapon' | /enarét/   | /enárèt/  |
| 'dogs'   | /ildíéin/  | /ildíéin/ |
| 'fork'   | /éómà/     | /éómâ/    |

### 3.2.6. Conversion<sub>3</sub>

Conversions<sub>3</sub> are classified according to the type of the feature of syntactics that is replaced: part of speech (**category conversion<sub>3</sub>**), inflection/derivation type (**paradigmatic conversion<sub>3</sub>**) and government/agreement (**rectional conversion<sub>3</sub>**). Pure types are rare; in most cases, several different features of syntactics are changed simultaneously. Category conversion<sub>3</sub> is widespread in English; thus, by changing a noun denoting an artifact or substance 'X' into a verb, one expresses the meaning 'to submit Y to the action of X for which X is designed':

- |               |   |
|---------------|---|
| (20) noun     | verb                                      |
| <i>bomb</i>   | [to] <i>bomb</i> 'attack with bombs'      |
| <i>hammer</i> | [to] <i>hammer</i> 'strike with a hammer' |
| <i>salt</i>   | [to] <i>salt</i> 'season with salt'       |
| <i>oil</i>    | [to] <i>oil</i> 'lubricate with oil'      |

In Kirundi (and the majority of Bantu languages), the plural of a noun is formed by paradigmatic conversion<sub>3</sub>, namely a change in its noun class, e.g. from Class XI to Class XII:

- |                 |                   |                  |
|-----------------|-------------------|------------------|
| (21)            | Class XI, sg.     | Class XII, pl.   |
| 'river'         | <i>ur-uzi</i>     | <i>inz-uzi</i>   |
| 'needle'        | <i>uru-shinge</i> | <i>in-shinge</i> |
| 'piece of wood' | <i>uru-sate</i>   | <i>in-sate</i>   |

Similarly, a change from Class XVI to Class XI can express singulative as in *ubu-dede* 'necklace' ⇒ *uru-dede* 'bead of a necklace'; other class conversions<sub>3</sub> express diminutive, augmentative, pejorative augmentative, etc. A case of rectional conversion<sub>3</sub> is shown in

(22): by changing the gender of a feminine noun meaning 'X' to masculine (and hence the agreement pattern, e.g. from the article *la* to *el*), Spanish expresses the meaning 'agent essentially related to X':

- |                |           |                           |
|----------------|-----------|---------------------------|
| (22)           | feminine  | masculine                 |
| <i>policía</i> | 'police'  | 'policeman'               |
| <i>defensa</i> | 'defense' | 'full-back [soccer]'      |
| <i>espada</i>  | 'sword'   | 'matador [bull-fighting]' |

### 3.3. Hierarchy of morphological processes

Based on semiotic considerations – the degree of their naturalness from the viewpoint of linguistic communication, i.e. being transparent and diagrammatic, so that addition of meaning is paralleled by addition of sound, etc. (cf. Art. 30–31; Dressler 1987: 101) –, the grammatical morphological processes form the approximate hierarchy (23a); composition, being of a completely different semantic nature, does not belong to it. Within each major class of morphological processes, the subclasses form a hierarchy of their own, e.g. (23b) for affixation or (23c) for modification:

- |          |  |
|----------|--|
| (23) (a) | affixation > suprafixation > replication <sub>2</sub> > modification > conversion <sub>3</sub> |
| (b)      | suffixation > prefixation > infixation > transfixation   |
| (c)      | replacement > truncation > permutation   |

These hierarchies are not very strict, especially on the boundaries of major classes. Thus, affixation as a whole is semiotically better than suprafixation; but it is far from clear whether transfixation is superior to suprafixation (rather the opposite seems to be true). Similarly, it is difficult to say whether truncation is semiotically better than permutation, whether truncation should really precede conversion<sub>3</sub>, etc. Overlapping in border areas is widespread; in any event, much more study is needed. The main problem is that some semiotic properties can be in conflict. Thus, conversion<sub>3</sub> is highly abstract and not transparent, therefore semiotically wanting. But at the same time, it is an extremely economical process, therefore semiotically valued. Such contradictions explain the existence of so-called "Devil's cases" (Dressler 1985: 327): linguistic phenomena that, at first glance, seem semiotically unviable, like suppletion (cf. Art. 52).

The hierarchies in (23) have a certain predictivity. The higher a morphological process

is in such a hierarchy, the higher are the chances that it will be

- (a) more likely (more frequent) in the languages of the world and in a given language;
- (b) diachronically more stable;
- (c) learnt earlier by children;
- (d) lost later in aphasia;
- (e) more favored by pidgins;
- (f) more productive (cf. Dressler 1982: 74f.).

Thus, suffixation is by far more common than other types of affixation and all the other morphological processes; suffixes are better retained in the history of language, they are used by children at earlier stages of speech development, stay longer under aphatic disturbances, prevail in pidgins and are more productive. Being segmental units, affixes, and especially suffixes, are perceived as grammatical signs *par excellence*, all the others being somehow "secondary".

#### 3.4. Morphological processes and language types

The distribution of morphological processes in languages is related to language types (cf. Dressler 1985: 324): roughly speaking, the more pronounced the agglutinating character of  $\mathcal{L}$ , the higher is the probability that  $\mathcal{L}$  will use, predominately or exclusively, the morphological processes closer to the left edge of the relevant hierarchy in (23). For fusional languages the opposite is true. Thus, rather agglutinating Turkic languages capitalize on suffixation, admitting a little reduplication<sub>3</sub> and a little conversion<sub>3</sub>, but no modification at all. On the other hand, Modern Germanic languages, being rather fusional, make extensive use of modification. But, as almost always in natural language, these links are statistical correlations and by no means strict logical implications.

#### 4. Zero processes

When an inflectional meaning (i.e. a grammeme), which is obligatory, is to be expressed, this can be done by the absence of the expected morphological process: the non-application of a morphological process, in a position where a grammeme is obligatorily present, can be contrasted with its application. Given the tendency of languages to economize speakers' efforts, this will often be the case. A meaningful absence is called *zero*; all

morphological processes can use **zero signs** (cf. Art. 45), and those that do are **zero morphological processes**. For a zero sign, its type is determined by the type of its non-zero counterpart; thus, the meaningful absence of a suffix is a zero suffix, a meaningful absence of an apophony is a zero apophony, etc. **Zero suffixation** occurs in the genitive plural of Russian feminine nouns such as 'wall':

(24)		singular	plural
	nominative	<i>sten-á</i>	<i>stén-y</i>
	genitive	<i>sten-ý</i>	<i>stén-∅</i>
	dative	<i>sten-é</i>	<i>stén-am</i>

In English, the plural of *foot* is expressed by the apophony *oo* ⇒ *ee*; it can be argued that the singular is expressed by the meaningful absence of any modification of the basic form, i.e. a **zero apophony**. Similarly, the singular of the Kirundi nouns in (21) is expressed by the meaningful absence of any change in the syntactics of the root (it remains in its inherent Class XI); this is a **zero conversion**<sub>2</sub>. – Since zero processes are an extremely powerful descriptive device, we need stringent principles governing the use of zeroes (cf. Art. 45); among other things, since derivatemes are never obligatory, the typology of morphological processes developed here does not allow for derivational zeroes.

#### 5. Problems of delimitation

##### 5.1. Suppletion

One often sees an extra item on a list of morphological processes: suppletion. However, suppletion is not a linguistic sign but a relation between two signs; therefore it cannot be used by a morphological process (cf. Art. 52). When, in order to express the meaning 'σ' bearing on the sign *X*, the language  $\mathcal{L}$  uses a sign *Y* suppletive with respect to *X*, this is done precisely because 'σ' cannot be expressed by any morphological process:  $\mathcal{L}$  does not have a separate sign with the signified 'σ' which could be combined with *X*. Being entirely irregular by its very nature, suppletion cannot be a morphological process, the latter being typically regular.

##### 5.2. Word-manufacturing techniques

Languages have a number of techniques used to construct new lexical units: clipping (*advertisement* ⇒ *ad*, *telephone* ⇒ *phone*; cf. Art. 92), blending (*breakfast* + *lunch* ⇒ *brunch*; cf. Art. 93), acronymization (*Acquired*

*Immune Deficiency Syndrome* ⇒ *aids*; cf. Art. 92), analogical formation (Russ. *sovok* 'Homo Sovieticus', using *sov-* from *sovetskij* and homophonous with *sovok* 'dust pan'; cf. also Art. 93), and the like. Aptly dubbed "word-manufacturing methods" (Szymanek 1989: 33), these phenomena, in sharp contrast to genuine morphological processes, are strictly diachronical: they expand lexical stock by creating new words, but they do not express meanings. **Back-formation** (of the type *vacuum cleaner* ⇒ [*to*] *vacuum-clean*) is less obvious, but it is a diachronical phenomenon, too, even if it is highly productive and produces semantically predictable results. As soon as a verb of the type [*to*] *vacuum-clean* is formally derived by backformation, it becomes semantically primary; thus, *vacuum-cleaner* means 'appliance designed to vacuum-clean with'; therefore, viewed synchronically, it is derived from the verb [*to*] *vacuum-clean*. (Before the appearance of the verb, the noun *vacuum cleaner* was synchronically a semantic simplex; *vacuum*, *clean* and *-er* were no more than etymology, however transparent.) Being diachronical by their very nature, word-manufacturing techniques cannot be morphological processes, the latter being typically synchronical.

### 5.3. Combinations of morphological processes

It has been suggested that two or more morphological processes can be used simultaneously to express one grammatical signified. The two major types of such combinations are

- (a) different kinds of confixes used simultaneously and
- (b) a confix used simultaneously with a modification.

Other combinations (e.g. confix + suprafix, confix + conversion<sub>3</sub>, etc.) are logically equivalent to one of them. An example of type (a) is the claim that in the Mayan language Tzutujil, a transitive verb can be detransitivized by a process that involves "simultaneous suffix and infix", *-o7m* (where 7 stands for /ʔ/) and *-j-*, as in *loq* 'buy [trans]' ~ *lo-j-q'-o7m* 'buy [intr], item bought' (Bauer 1988b: 21). But *-o7m* does not occur without *-j-*, and *-j-*, when it occurs without *-o7m*, marks the passive rather than the detransitive. Therefore, a single morph can be postulated here – the transfix *-j-o7m* (whose component *-j-* is, in all probability, diachroni-

cally related to the passive infix *-j-*). In cases of this kind, the alleged combination can be analyzed as a single elementary linguistic sign. – The Welsh nouns in (25) are a typical example of type (b). Here, it has been suggested that "one of the ways of forming the plural is vowel change plus a suffix" (Bauer 1988 b: 21).

(25)	singular	plural
'garden'	<i>gardd</i>	<i>gerdd-i</i>
'giant'	<i>cawr</i>	<i>cewr-i</i>
'hour'	<i>awr</i>	<i>or-iau</i>

Yet the internal change in (25) can be viewed as a meaningless alternation accompanying the plural-marking suffix (in spite of the fact that in some Welsh nouns, which have no plural suffix, such alternation is a morphological process, e.g. *alarch* 'swan' ~ *elyrch* 'swans', *paladr* 'ray' ~ *peyladr* 'rays', etc.). This description follows from the Principle of the Single Morphological Process (cf. 6.1.), according to which only one component of the combination should be admitted to the status of a signifier, so that only one sign is present; the other components can be viewed as contextually-induced morphological means, expressing no meaning.

Nevertheless, situations in which a grammeme can be simultaneously expressed by more than one morphological process do exist, although such situations are probably rather infrequent. One example can be found in Alutor (cf. Mel'čuk 1973): The conditional mood has a prefix /ʔ-/ and a special set of personal markers, which are different from the personal markers of the two other moods, the indicative and the imperative. At the same time, these moods, unlike the conditional, have no separate marker, so that their personal markers must be taken to express mood cumulatively, together with person and number. Considerations of symmetry require the inclusion of the grammeme of mood into the signified of the conditional personal markers as well; as a result, 'CONDITIONAL' is expressed in Alutor verbal forms twice: by the conditional prefix /ʔ-/ and by a conditional personal marker. – Duplication (repeated expression) of information is typical of natural languages. No doubt similar duplication should be present equally among morphological processes. But subtler analyses and more accurate descriptions are needed in order to find reliable facts.

## 6. Non-uniqueness of solutions

Identifying specific morphological processes that have been applied in an actual utterance can be a tricky business: one often has to distinguish between a morphological process and the use of a (meaningless) morphological means or between two or more different morphological processes.

### 6.1. Morphological process or morphological means?

In Germ. *Vater* 'father' ~ *Väter* 'fathers', the alternation  $a \Rightarrow \ddot{a}$  marks the plural, which has not other explicit mark; therefore, this is a morphological process, namely a modification (which uses an "Umlaut" apophony). But what about *Nacht* 'night' ~ *Nächte* 'nights'? Here the plural is marked by the suffix *-e*, which sometimes is and sometimes is not accompanied by the alternation of the type  $a \Rightarrow \ddot{a}$  in the stem (cf. *Tag* 'day' ~ *Tag-e* 'days', etc.) On the other hand, the Umlaut in *Nacht-* is not necessarily connected with plural either, as the adjective *nächt-lich* 'nightly' and the diminutive *Nächt-chen* show. Is then the alternation  $a \Rightarrow \ddot{a}$  in *Nächt-e* also a plural marker, or more precisely, is it an apophony whose signifier is  $a \Rightarrow \ddot{a}$  and which marks the plural together and simultaneously with the suffix? The answer depends on the methodological principle posited for morphological description. Either any observable phenomenon related to the expression of a meaning is taken to be its marker ("maximalist" approach; cf. Bauer 1988 b), or only one of the observable phenomena related to the expression of a meaning is taken to be its marker, all the others being considered as meaningless companions ("minimalist" approach). The latter principle contributes to the simplicity of morphological descriptions. This is the Principle of a Single Morphological Process:

- (26) Among several morphological phenomena related to the expression of a meaning, try to choose only one as a marker for the meaning in question, relegating all the others to the status of conditioned companions.

According to (26), the only marker of the plural in the word-form *Nächte* is the suffix *-e*; the substitution  $a \Rightarrow \ddot{a}$  is then considered to be a meaningless accompanying alternation. Such a treatment implies that one and the same linguistic phenomenon can be described in similar circumstances in two dif-

ferent ways. Thus, the substitution  $a \Rightarrow \ddot{a}$  is taken to be a sign, namely an apophony (and thus an operandum of a morphological process), in *Vater* ~ *Väter*, but a meaningless alternation in *Nacht* ~ *Nächte* (and thus not a result of a morphological process). Yet the fact that the same or very similar phenomena may play very different roles in different contexts is well known in natural languages.

### 6.2. Which morphological process?

Very often a given morphological phenomenon can be described, from a purely logical viewpoint, in terms of more than one alternative morphological processes. For example, the Arabic passive forms in (12) can also be interpreted in terms of multiple modification (apophonies  $a \Rightarrow u$  and  $a \Rightarrow i$ ) applied to the unanalyzable stems *rasam-* and *ḡarab-* (cf. Kilani-Schoch & Dressler 1984). The Romanian plurals in (15) could be said to have a suffix /j/ which triggers an empty alternation (e.g. /k/  $\Rightarrow$  /tʃ/) in *copac* ~ *copaci*) and then "disappears", so to speak, fused with the stem; and the English examples of conversion in (20) can be reanalyzed as zero affixation, where the meaning 'to submit to the action of X for which X is designed' is expressed by- $\emptyset_{\text{SUBMIT}}$ . These are situations of non-uniqueness of morphological solutions, so typical of natural languages. To resolve them, the researcher needs to proceed from a series of methodological principles, similar to (26). Only four such principles will be stated here to serve as an illustration. The Principles of Internal Linguistic Consistency is a very general one:

- (27) Everything else being equal, prefer the description in terms of the morphological process that is more consistent with other phenomena observed in the language.

Clearly, this trivial principle requires a special in-depth study for every difficult case. The other three principles are more specific:

- (28) Everything else being equal, prefer the description in terms of the morphological process that is
- higher in the relevant hierarchy (23);
  - "more visible" in the relevant form;
  - the most general one, i.e. applicable in most, if not all, cases of the same type.

According to the Principle of the Higher Morphological Process (28a), transfixation

should be preferred over modification in Arabic verbs (12). The restriction "everything else being equal" is important for all these principles. Thus, in the case of Engl. *foot* ~ *feet*, modification (apophony *oo* ⇒ *ee*) is preferred over infixation of *-oo-* and *-ee-* into the discontinuous root *f-t* although infixation is higher in the hierarchy (23), because everything else is not equal: other infixes do not massively occur in English and *f-t* is not related to the meaning of 'foot' (cf. *fat*, *feat*, *fit*, *fort*, *fought*, *fart*, etc.). The Principle of the "More Visible" Morphological Process (28b) means that one should not postulate an abstract process when there is a candidate which is actually observable. Therefore, modification (apophony) should be preferred over suffixation of /j/ in Romanian noun plurals (15), since the phonemic substitution is directly observable while the suffix has to be postulated as an abstract entity. A particular case of this principle is the rule that zero should be postulated only as a last resort (cf. Art. 45; Haas 1957); thus, conversion<sub>3</sub> should be preferred over zero affixation in the English noun-verb pairs (20). The Principle of the Most General Morphological Process (28c) can be applied to the Russian abstract nouns *šir* 'wide space', derived from the adjective *šir[-ok-ij]* 'wide', *rvan* 'torn things' from *rvan[-yj]* 'torn', etc. Here, two morphological phenomena are observable: a categorial-paradigmatic conversion<sub>3</sub> (Adj ⇒ Noun) and a modification of palatalization ( $r \Rightarrow r'$ ,  $n \Rightarrow n'$ ). In the hierarchy (23), modification is higher than conversion<sub>3</sub>, but despite (28a) it is not preferred here because conversion<sub>3</sub> is more general: it is used also for nouns derived from adjectives whose roots end in a palatalized consonant and where palatalization is thus impossible, e.g. *ran* 'early hours' from *rann[-ij]* /ran<sup>h</sup> 'early'. Therefore, in conformity with (28c), all such Russian formations are described in terms of conversion<sub>3</sub>, while palatalization (where it occurs) is taken to be an accompanying meaningless alternation. This shows that different methodological principles can be in conflict, so that more principles are needed to guide our choices. Of course, the principles themselves have to be justified, and this can be done only by reference to the generality, simplicity and elegance of the resulting description.

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## 54. Prefixation, suffixation and circumfixation

1. Terminology
2. Formal properties
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### 1. Terminology

Prefixation, suffixation and circumfixation are the non-intrusive types of affixation, i.e. those which add affixes to the margins of a lexical base, as opposed to infixation (Art. 55) and transfixation (Art. 56). A **prefix** is an affix which is bound before the base. A **suffix** is an affix which is bound after the base. A **circumfix** is an affix of which one part is

bound before, and the other part after, the base. The term *affix* is also commonly used to refer to "zero" or "empty affixes" (cf. Art. 45), which are ignored here.

Although the terms *prefix*, *suffix* and *circumfix* (and their translation equivalents) are the most widely accepted, a variety of other terms have been employed historically and/or are found in contemporary work. In German, *Vorsilbe* and *Nachsilbe* are frequently employed, especially by school grammarians, for prefixes and suffixes, respectively. These terms suggest that affixes are always (single) syllables, which is not always the case, even in German (cf. 2). *Ending* (French *désinence*, German (*Flexions*)*endung*, Russian *okončanie*) is often used as a synonym for *inflec-*