

MORPHOLOGY IN TYPOLOGY: HISTORICAL RETROSPECT, STATE OF THE ART AND PROSPECTS

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Summary

Morphology, understood as internal structure of words, has always figured prominently in linguistic typology, and it is with the morphological classification of languages into “fusional”, “agglutinating” and “isolating” proposed by the linguists and philosophers of the early 19th century that the advent of typology is often associated. However, since then typology has shifted its interests towards mapping the individual parameters of cross-linguistic diversity and looking for correlations between them rather than classifying languages into idealized “types”, and to syntactically and semantically centered inquiries. Since the 2nd half of the 20th century, morphology has been viewed as just one possible type of expression of meaning or syntactic function, often too idiosyncratic to yield to any interesting cross-linguistic let alone universal generalizations. Such notions as “flexive” or “agglutinating” have proven to be ill-defined and requiring revision in terms of more primitive logically independent and empirically uncorrelated parameters. Moreover, well-founded doubts have been cast upon such basic notions as “word”, “affix” and the like, which have notoriously resisted adequate cross-linguistically applicable definitions, and the same has been the fate of still popular concepts like “inflection” and “derivation”. On the other hand, most theoretically oriented work on morphology, concerned with both individual languages and cross-linguistic comparison, has largely abandoned the traditional morpheme-based approaches of the American structuralists of the first half of the 20th century, shifting its attention to paradigmatic relations between morphologically relevant units, which themselves can be larger than traditional words. These developments suggest a reassessment of the basic notions and analytic approaches of morphological typology. Instead of sticking to crude and possibly misleading notions such as “word” or “derivation”, it is necessary to carefully define more primitive and empirically better-grounded notions and parameters of cross-linguistic variation in the domains of both syntagmatics and paradigmatics, to plot the space of possibilities defined by these parameters, and to seek possible correlations between them as well as explanations of these correlations or of the lack thereof.

Keywords: linguistic typology, cross-linguistic variation, morphological typology, syntagmatics, paradigmatics

1. Morphology and linguistic typology¹

Linguistic typology is an empirically grounded and theoretically oriented study of linguistic diversity in all its possible facets. The primary goals of typology are, first, to determine the dimensions along which languages can differ or be similar, and, second, to relate the observed

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distributions of the values of these parameters of variation and similarity to such factors as genealogical inheritance, areal contact, or hypothetical universal properties of human language (cf. Plank 2001: 1399). Morphology constitutes one of the primary and obvious loci of linguistic diversity and has hence always figured prominently in cross-linguistic studies. On the other hand, with its propensity towards language-specific idiosyncrasy and irregularity, morphology has been notoriously resistant to universal generalizations and constraints. Moreover, the very status of morphology as an independent component of linguistic systems is not undisputable. The simplest reason for this is the existence of languages with no meaningful structure below the level of word, i.e. lacking morphology altogether, e.g. Vietnamese or some pidgins, putatively suggesting that morphology, as a non-universal component of language, should be reduced to the workings of the universal ones, i.e. syntax and phonology. The more complex and perplexing reason is the lack of universally applicable definitions of basic morphological concepts such as “word” or “affix” (see e.g. Haspelmath 2011, 2015, Alpatov 2018), suggesting that even those languages whose words show some internal structure draw the dividing line between morphology and syntax each in its own way — or even distinguish between more than two levels of analysis, as suggested by work such as Bickel & Zúñiga (2017) or Tallman et al. (2018).

Despite all these conceptual problems, the body of descriptive and theoretical work on morphology dealing with a wide and expanding set of languages, both spoken and signed, is steadily growing. This suggests that even if the boundaries of morphology cannot be rigidly drawn and the quest for putative “morphological universals” is not very fruitful, the mapping and explanation of observed cross-linguistic patterns of diversity and similarity in morphological systems is a necessary enterprise capable of producing interesting results and of advancing the theory and methodology of linguistic analysis and typological comparison (see e.g. overviews by Bickel & Nichols 2007, Brown 2011 and Arkadiev & Klamer 2019).

This chapter will first briefly review the history of ideas in morphological typology, focusing on the fate of the “classic” approach (section 2). Then the problematic status of such basic notions as “word” and “affix” (section 3) and “inflection” and “derivation” (section 4) will be discussed, reviewing some proposals concerning their reassessment. Section 5 gives an overview of a number of early 20th century cross-linguistic approaches to selected morphological issues. Section 6 offers a summary and some thoughts concerning the ways morphological typology could develop.

2. Traditional morphological typology and its reassessment

Morphological typology in its modern sense is held to have originated in the well-known classification of languages into “isolating / analytic”, “agglutinating”, “flexive” and “incorporating / polysynthetic” proposed by the German philologists and philosophers Friedrich von Schlegel (1808), August Wilhelm von Schlegel (1818) and further developed by Wilhelm von Humboldt (1822, 1836) (see Ziegler (2000) and Ringmacher (2001) for overviews). It has to be kept in mind that, taken in its historical context, i.e. the advent of the German romantic idealism seeking holistic insights into the nature and workings of human culture and mind, this classification was no more than a rather impressionistic division suggested by its proponents as a reflection of deeper connections between language, ethnography and the rather elusive concept of “spirit” (*Geist*). Moreover, this classification, also viewed as reflecting the general laws of historical development of languages in connection with cultural and “spiritual” evolution, was overlaid with evaluations of certain language types (primarily of the “flexive” one represented by the ancient Indo-European languages like Sanskrit and Greek) as superior to others, sometimes with concomitant ethnographic, if not racist, implications.

If distilled to its linguistic essence, the original classification of the Schlegels, revised and extended by Humboldt on the basis of a larger and more diverse set of languages, con-

cerned the (predominant way of) encoding of grammatical information. Thus, “isolating” languages like Chinese have very little if any grammatical structure, “analytic” languages like modern English heavily rely on independent grammatical words, while “synthetic” languages express most grammatical relations morphologically, with “polysynthetic” or “incorporating” languages like Classical Nahuatl constituting an extreme degree of synthesis, “packaging” whole sentences into single complex wordforms, as shown in example (1).

Koryak (Chukotko-Kamchatkan, Russia; Kurebito 2017: 844)

- (1) *tə-nk'e-mejŋə-jetemə-nni-k*
 1SG.S-midnight-big-yurt.cover-sew-1SG.S[PFV]
 ‘I sewed a lot of yurt covers in the middle of a night.’

Synthetic languages, in turn, were divided into “flexive” and “agglutinating”. The former, like Latin, tend to express many grammatical meanings in single affixes (this phenomenon was later called “cumulation”) which often fuse with lexical roots or stems into hardly analyzable forms. By contrast, the “agglutinating” languages, like Turkish, to a large degree adhere to the “one meaning ~ one form” principle, allowing only transparently phonologically motivated changes in the shape of affixes (allomorphy) like vowel harmony and lacking cumulation and fusion. The difference between these two types can be clearly seen in the (partial) nominal paradigms from Sanskrit and Turkish given in Table 1. While the Turkish forms are easily and unequivocally segmentable, it is left to the reader to decide how (if at all) the given Sanskrit wordforms can be divided into meaningful parts.

Table 1. Paradigms of Sanskrit ‘king’ (Whitney 1879: 141–142) and Turkish ‘hand’ (Lewis 2001: 29).

Sanskrit			Turkish		
	Singular	Plural		Singular	Plural
Nominative	<i>rājā</i>	<i>rājānas</i>	Nominative	<i>el</i>	<i>el-ler</i>
Accusative	<i>rājānam</i>	<i>rājñas</i>	Accusative	<i>el-i</i>	<i>el-ler-i</i>
Instrumental	<i>rājñā</i>	<i>rājabhis</i>	Genitive	<i>el-in</i>	<i>el-ler-in</i>
Dative	<i>rājñe</i>	<i>rājabhyas</i>	Dative	<i>el-e</i>	<i>el-ler-e</i>
Ablative	<i>rājñas</i>	<i>rājabhyas</i>	Locative	<i>el-de</i>	<i>el-ler-de</i>
Genitive	<i>rājñas</i>	<i>rājñām</i>	Ablative	<i>el-den</i>	<i>el-ler-den</i>
Locative	<i>rājñi</i>	<i>rājasu</i>			

Diachronically, according to Humboldt, analytic languages become agglutinating when function words merge with content words and become affixes, and these in turn develop into flexive languages when phonological fusion obliterates morphemic boundaries; the fate of flexive languages is to become analytic due to erosion of phonologically weakened inflections (as happened e.g. in the transition from Latin to modern Romance), and after that the whole cycle can start anew.

This attempt to reduce the morphological diversity of even those languages which were known to the linguists of the first half of the 19th century to a small number of discrete idealized types, appealing as it looks at first glance, has encountered many problems. First, it is clear that “analytic” vs. “synthetic” are not discrete types but rather a continuum. Second, the notions of “agglutinative” and “fusional / flexive” were not sufficiently well-defined and too broad, with e.g. languages as different as Latin and Arabic falling into the same “flexive” class. Moreover, as was clear already early on, “ideal” representatives of the types were rare if at all existent, real languages rather showing a messy mixture of distinct traits. The recognition of these facts has led many researchers to either reject the classification (and often the whole typological enterprise as well) altogether, as did the Neogrammarians (e.g. Delbrück 1901: 47–48), or to revise it trying to come to terms with the real empirical diversity of lan-

guages. Thus, for instance, the eminent Czech linguist Vladimír Skalička (1951/1979), while maintaining the classic divisions, singled out the “introflexive” type opposed to both agglutinating and flexive types as expressing grammatical information by stem modification rather than affixation. Most importantly, Skalička clearly recognized the often neglected distinction between idealized types and language-particular systems which often bear traits of several different types and argued that instead of classifying whole languages into “isolating”, “agglutinating” etc. it is necessary to use these notions for comparison of concrete linguistic phenomena.

While in the second half of the 19th century, dominated by historical-comparative studies and the positivistic Neogrammarian view that rejected such notions as “the spirit of the language” and synchronic classification as such, morphological typology receded into the background, it made its reappearance with the advent of synchronic structural linguistics in the first quarter of the 20th century. Most notably, Edward Sapir (1921: Ch. 6) has cast well-founded doubt on the validity of the classic tri- or quadripartite classification arguing that it conflated at least two different parameters of cross-linguistic variation (cf. Haspelmath 2009: 14): (i) degree of synthesis, i.e. the overall tendency to express grammatical information word-internally (“analytic” ~ “synthetic” ~ “polysynthetic”), and (ii) degree of fusion or “technique”, i.e., roughly, analyzability of morphologically complex words (“agglutinating” vs. “inflective”); Sapir also singled out what he called “symbolic” technique, i.e. stem change, cf. Skalička’s “introflexive” type above). Sapir rightly claimed that these parameters were both logically and empirically independent of each other: “an inflective language ... may be analytic, synthetic, or polysynthetic” (Sapir 1921: 137). He developed a rather complex morphological typology based, in addition to these two formal features, on the types of grammatical information expressed (his “concrete relational” and “pure relational” concepts), see Table 2 (adapted from Sapir 1921: 150–151). Note that Sapir conceived of intermediate types such as “agglutinative-isolating” or “fusional-agglutinative”, thus recognizing the fact that individual languages often show a mixture of different types.

Table 2. Sapir's morphological classification of languages.

Fundamental type	Technique	Synthesis	Example
A (Simple Pure-relational)	Isolating	Analytic	Chinese
	Agglutinative	Analytic	Modern Tibetan
B (Complex Pure-relational)	Agglutinative-isolating	Analytic	Polynesian
		Polysynthetic	Haida
	Fusional-isolating	Analytic	Cambodian
	Agglutinative	Synthetic	Turkish
	Fusional-agglutinative		Classical Tibetan
	Agglutinative-fusional		Sioux
	Fusional		Salinan
Symbolic	Analytic	Shilluk	
C (Simple Mixed-relational)	Agglutinative	Synthetic	Bantu
	Fusional	Analytic	French
D (Complex Mixed-relational)	Agglutinative	Polysynthetic	Nootka
	Fusional-agglutinative		Chinook
	Fusional		Algonquian
		Analytic	English
	Fusional-symbolic	Synthetic	Latin
			Arabic

Sapir's multifaceted morphological typology did not gain popularity as such. Rather, it was completely revised in an influential paper by Joseph Greenberg (1960/1954), that proposed the first fully empirically-grounded non-aprioristic approach to morphological typology. Greenberg started with the already mentioned intuition that "analytic" vs. "synthetic" languages formed a cline rather than discrete classes, and offered a quantitative index of synthesis calculated as the ratio of morphemes to words in a sufficiently long text. Though it is the index of synthesis which has gained greatest popularity, Greenberg also proposed the following indices, all based on text frequencies: index of agglutination, understood as juncture of morphs "with slight or no modification" (Greenberg 1960/1954: 185), i.e. the ratio of agglutinative junctures to all morpheme junctures; index of compounding (ratio of roots to words); the derivational and the inflectional indices (ratio of derivational resp. inflectional morphemes to words); prefixal and suffixal indices (ratio of prefixes resp. suffixes to words), and some others. Table 3, adapted from Greenberg (1960/1954: 193) shows the numerical values of these indices for the languages investigated by Greenberg, already revealing a considerable degree of cross-linguistic diversity.

Table 3. Greenberg's indices for selected languages.

	Sanskrit	Old English	Persian	English	Yakut	Swahili	Vietnamese	Eskimo
Synthesis	2.59	2.12	1.52	1.68	2.17	2.55	1.06	3.72
Agglutination	0.09	0.11	0.34	0.30	0.51	0.67	n/a	0.03
Compounding	1.13	1.00	1.03	1.00	1.02	1.00	1.07	1.00
Derivation	0.62	0.20	0.10	0.15	0.35	0.07	0.00	1.25
Inflection	0.84	0.90	0.39	0.53	0.82	0.80	0.00	1.75
Prefixing	0.16	0.06	0.01	0.04	0.00	1.16	0.00	0.00
Suffixing	1.18	1.03	0.49	0.64	1.15	0.41	0.00	2.72

Greenberg's "quantitative turn" in morphological typology has had a considerable and still continuing impact, as reflected, e.g. such work as Krupa (1965), Altmann & Lehfeldt (1973), Cysouw (2007), as well as in the quantitative morphological features in the *World Atlas of Language Structures* (Haspelmath et al. eds. 2005; Dryer & Haspelmath eds. 2013), e.g.

“inflectional synthesis of the verb” (Bickel & Nichols 2005) or “prefixing vs. suffixing in inflectional morphology” (Dryer 2005) (see also section 5).

The last attempt to revise the classic morphological typology on more precise theoretical grounds worth mentioning here is the little-known though highly insightful paper by the Russian typologist and orientalist Vladimir Alpatov (1985) (see Testelefs (2001: 309–310) for some discussion). Alpatov reduced the whole issue to the single parameter of degree of bondedness of functional elements, thus abstracting away from such independent and potentially confounding factors as cumulation, inflection classes and the like. He proposed a tripartite classification of grammatical morphemes into “flexions”, “formants” and “function words” based on two parameters, i.e. (i) separability and (ii) non-phonologically conditioned changes on morpheme boundaries; see Table 4. Note that Alpatov considered the fourth logically possible combination of values, i.e. separable morphemes admitting non-phonological changes, as empirically unattested. This, however, has been disproved by the discovery of so-called “edge inflection” (see, e.g., Anderson et al. (2006)).

Table 4. Classification of grammatical morphemes in Alpatov (1985).

	Flexions	Formants	Function words
Non-phonological changes on junctures	yes	no	no
Separability by lexical elements	no	no	yes

Morphological typology was then built by Alpatov on the basis of the eight logically possible combinations of the three morpheme classes, with some types empirically unattested (see Table 5; note that “yes” and “no” refer to statistically predominant rather than absolute patterns, though Alpatov does not provide any quantitative data). Interestingly, the classical “flexive” languages like Latin or Russian are characterized as those where not only flexions, but also function words play an important role, while some languages traditionally treated as “agglutinative” (like Japanese) in fact combine both flexions and formants.

Table 5. Morphological typology in Alpatov (1985).

	Flexions	Formants	Function words	Example
Type I	yes	yes	yes	French
Type II	yes	yes	no	Japanese
Type III	yes	no	yes	Latin
Type IV	no	yes	yes	Burmese
Type V	yes	no	no	none
Type VI	no	yes	no	Turkish
Type VII	no	no	yes	none
Type VIII	no	no	no	(Old Chinese)

The typology proposed by Alpatov (1985), although almost completely neglected by mainstream linguistics, seems quite promising due to its logical simplicity and operationalizability. It remains a desideratum to apply it to a representative sample of languages.

The most recent reassessment of — and in a sense a final blow to — the classic morphological typology, in particular, the notoriously elusive distinction between “flexion” and “agglutination” has come from works by Frans Plank (1999) and Martin Haspelmath (2009). Both of them start from the observation that the “types” in question in fact conflate a number of independent properties of morphological elements (see also Plungian 2001). If “agglutination” can be seen simply as adherence to the biuniqueness of form-function mapping, “flexion” comprises at least two very different deviations from it (cf. Carstairs 1987: 12–18), viz. **cumulation** (simultaneous expression of several functions by one form, as in Sanskrit, as op-

posed to **separation**, as in Turkish, cf. Table 1 above), and non-phonologically conditioned **allomorphy** (variance of exponence, as opposed to invariance). Plank (1999) presents a meticulous cross-linguistic survey of cases where either both cumulation and separation or both variance and invariance are present in the same system or subsystem, showing that such cases are fairly abundant in languages and can be subjected to some general regularities, mainly of diachronic nature.

Haspelmath (2009) asks two fairly obvious questions: first, do the abovementioned parameters of agglutination / flexion correlate with each other? and, second, are individual languages consistent with respect to each of these parameters? Having investigated a balanced 30-language sample, Haspelmath arrives at negative answers to both questions. In particular, he shows that there is no significant correlation between cumulation, stem alternations and what he calls “affix suppletion”, all assessed as Greenberg-style quantitative indices, and neither is there a correlation between cumulation in verbs and cumulation in nouns (though the other two indices show significant correlations across word-classes).

To conclude, during the two centuries of its contemporary existence, morphological typology has evolved from a rather speculative division of languages into several holistically defined discrete “types” to a multidimensional space defined by concrete parameters of deviation from meaning-form biuniqueness cross-cutting word classes and morphological categories and subcategories (for an overview see e.g. Bickel & Nichols 2007: 180–201). Empirically-based studies have shown that individual linguistic systems tend to be non-uniform with respect to at least some of these parameters, but much more typological research is needed in order to arrive at an adequate understanding of how this multidimensional space is populated.

3. Words, affixes and beyond

Morphology is “the grammar of words” (cf. Booij 2005), hence the definition and identification of “word” are essential for morphological analysis and morphological typology. Importantly, “word” has two orthogonal understandings. On the syntagmatic axis, **wordforms** have to be distinguished from phrases and parts of words (stems and affixes), while on the paradigmatic axis one needs to identify **lexemes**, i.e. sets of wordforms sharing lexical meaning and differing in the values of inflectional features. Both understandings of “word” are not unproblematic; the syntagmatic word will be discussed in this section, while the problems associated with lexeme and the inflection/derivation divide will be addressed in section 4.

It has proven to be notoriously difficult to identify what precisely a “wordform” is, both in particular languages and cross-linguistically. This is due to the fact that wordforms in individual languages can only be identified using structural criteria, both phonological and morphosyntactic (see e.g. Dixon & Aikhenvald 2002, Julien 2006). Such criteria (“wordhood tests”) often yield conflicting results even in the same language (Haspelmath 2011; van Gijn & Zúñiga 2014; Tallman et al. 2018). This is clear for phonological criteria such as primary stress assignment, tonal contour, vowel harmony or sandhi, which identify phonological words not always aligned with grammatical words (Bickel & Nichols 2007: 172-174; Bickel & Zúñiga 2017). However, morphosyntactic criteria such as independent occurrence, uninterruptibility, nonextractability, non-selectivity and others (see Haspelmath 2011 for a critical overview) often do not fully converge either. This makes it hard if at all possible to identify “words”, “phrases” and “affixes” in a consistent way.

For example, in Chácobo (Panoan, Bolivia; ISO 639-3 cao), according to Tallman (Ms.), a number of elements of the verbal complex can be identified as “non-words” (suffixes or enclitics) by their failure to pass the independent occurrence test, hence the string containing the verb root together with these elements can admittedly be called “word”. However, such putative “words” are shown to be interruptible by free elements like the negation marker

yáma (2) or even by full noun phrases (3), suggesting that the strings in questions are in the end larger than “words”.

Chácobo (Panoan, Bolivia; Tallman Ms.: 20, 17)

- (2) *tsaya=ma yáma=ki*
 look.at=CAUS NEG=DCL:PST
 ‘He doesn’t make him see.’

- (3) *tĩš-í ina tĩki=ki.*
 bite-ITR dog black=DCL:PST
 ‘The black dog bit itself.’

Moreover, some of the bound elements of the Chácobo verbal complex, like =*tikín* ‘again’ occurring in slot 18, but not those occurring in the slots closer to the root, e.g. =*boná* marking associated motion in slot 15, can be extracted to the second position in the clause, compare examples (4) and (5).

Chácobo (Panoan, Bolivia; Tallman Ms.: 10–11)

- (4) *hakirikí(=tikín) tsi tsáya(=tikín)=ki*
 then(=AGAIN) P3 look.at(=AGAIN)=DCL:PST
 ‘Then he saw him again.’

- (5) *hakirikí(*=boná) tsi tsáya=boná=ki*
 then(*=GOING:TR/PL) P3 look.at=GOING:TR/PL=DCL:PST
 ‘Then he saw her while going.’

This offers *prima facie* evidence for the need to postulate in Chácobo more types of elementary elements than simply “roots”, “affixes” and “clitics”, and, concomitantly, a wider range of strings of elements than just “word” and “phrase” (see Tallman Ms.: 26–29 for a full taxonomy). The multifaceted nature of the “wordform” has been noted already in Alpatov (1985), where two types of strings are identified on the basis of the distinction between flexions and formants (see above): “wordform 1” consisting of the root/stem and flexions, and “wordform 2” containing formants. Since there are languages, where, like in Japanese, both flexions and formants are prominent, it would be arbitrary to postulate a single notion “word” for their description, because, as Alpatov (1985: 96) states, “there are no grounds to believe the distinction between flexions and formants to be more important than the one between formants and function words, and vice versa” (see Alpatov 2018 for a development of these ideas).

From the observation that, first, language-specific criteria are needed for identification of such elements as “words” and “affixes” in individual languages and, second, that consistent application of such criteria often yield more types of both elementary and complex elements than just “affixes”, “words” and “phrases”, it inevitably follows that these notions cannot be used for cross-linguistic comparison and theorizing about universal properties of language, at least not without many caveats. Thus Haspelmath (2011) concludes that the very notion “word” as a comparative concept for typology is invalid, and the distinction between syntax and morphology is therefore ill-defined and irrelevant for linguistic theory. This conclusion appears overly pessimistic; instead, it is worthwhile to investigate the typological space generated by various wordhood parameters and test to what extent and at which points they converge in different languages (see Tallman et al. 2018 for an attempt at such an investigation for several languages of the Americas).

The question of delineating the domain of morphology, crucially hinging on the definition of “word” and “affix” discussed above, is largely orthogonal to the problem of types of encoding or **exponence** of grammatical information available in natural languages. Although concatenative or linear exponence by means of prefixes and suffixes, as well as reduplication,

is the most common type of morphological expression cross-linguistically, various kinds of non-concatenative morphology also abound in the languages of the world and need to be taken into account (cf. Skalička’s “introflexive” and Sapir’s “symbolic” above). These include infixation, vocalic and consonantal alternations, truncation, as well as non-segmental exponence such as stress and tone changes, and combinations thereof. Probably the best-known and most widely studied case of non-concatenative exponence is the Semitic root-and-pattern morphology (McCarthy 1981, Arad & Shlonsky 2005, among many others), exemplified in Table 6 adapted from McCarthy (1981: 385).

Table 6. Non-concatenative morphology of the Arabic verb ‘write’.

	Perfective		Imperfective		Participle	
	Active	Passive	Active	Passive	Active	Passive
base	<i>kataba</i>	<i>kutiba</i>	<i>yaktubu</i>	<i>yuktabu</i>	<i>kātibun</i>	<i>maktūbun</i>
causative	<i>ʔaktaba</i>	<i>ʔuktiba</i>	<i>yuktibu</i>	<i>yuktabu</i>	<i>muktibun</i>	<i>muktabun</i>
reciprocal	<i>takātaba</i>	—	<i>yatakātabu</i>	—	<i>mutakātibun</i>	—

One of the most striking cases of non-concatenative morphology comes from the Western Nilotic languages, in particular from Dinka amply described by Torben Andersen (1993, 1994, 2002, 2016, 2017). Dinka words are largely monosyllabic, but they exhibit a considerably elaborate morphology. Affixes are almost absent in Dinka, most morphological properties being expressed by means of alternations in vowel length, consonant and vowel quality, voice quality and tone, see Table 7 based on Andersen (1994: 28).

Table 7. Non-concatenative morphology of Dinka verbs (‘kick’).

	simple	centrifugal	centripetal	benefactive	antipassive
basic	<i>w̥ɛc</i>	<i>w̥ɛc</i>	<i>w̥ɛc</i>	<i>w̥ɛc</i>	<i>w̥ɛc</i>
1Sg	<i>w̥ɛc</i>	<i>w̥ɛc</i>	<i>w̥ɛc</i>	<i>w̥ɛc</i>	<i>w̥ɛc</i>
2Sg	<i>w̥ɛc</i>	<i>w̥ɛc-é</i>	<i>w̥ɛc</i>	<i>w̥ɛc-é</i>	<i>w̥ɛc-é</i>
3Sg	<i>w̥ɛc</i>	<i>w̥ɛc</i>	<i>w̥ɛc</i>	<i>w̥ɛc</i>	<i>w̥ɛc</i>
1Pl	<i>w̥ɛc-k̥ù</i>	<i>w̥ɛc-k̥ù</i>	<i>w̥ɛc-k̥ù</i>	<i>w̥ɛc-k̥ù</i>	<i>w̥ɛc-k̥ù</i>
2Pl	<i>w̥ɛc-k̥à</i>	<i>w̥ɛc-k̥à</i>	<i>w̥ɛc-k̥à</i>	<i>w̥ɛc-k̥à</i>	<i>w̥ɛc-k̥à</i>
3Pl	<i>w̥ɛc-k̥è</i>	<i>w̥ɛc-k̥è</i>	<i>w̥ɛc-k̥è</i>	<i>w̥ɛc-k̥è</i>	<i>w̥ɛc-k̥è</i>
passive	<i>w̥ɛc</i>	<i>w̥ɛc-è</i>	<i>w̥ɛc-è</i>	<i>w̥ɛc-è</i>	—

If for spoken languages the Dinka-style non-concatenative morphology is admittedly exceptional, it is said to be the norm for signed languages where morphological exponence is mainly achieved by means of modification of the sign shape and/or hand movement as well as by such “prosodic” signals as head movement or mimics, see e.g. Aronoff et al. (2005a, 2005b), Sandler & Lillo-Martin (2006), and Napoli (2019).

At the other pole of the putative continuum of morphological means is the so-called periphrastic exponence, i.e. grammaticalized multi-word syntactic constructions, see e.g. Ackerman & Stump (2004), Brown et al. (2012), Chumakina & Corbett (eds. 2013). If in analytic languages, such as Polynesian, Mon-Khmer or Kwa, invariable function words are the only or the predominant means of grammatical markers, in most languages with periphrastic exponence it interacts with “genuine” morphology in intricate ways. For example, in the Mande languages of West Africa exponence of aspect, tense, mood and polarity is distributed across several clausal constituents influencing the choice of the so-called predicative marker, of a free-standing particle or auxiliary and of the form of the verb itself, see examples (6a–c) from Dan, where the second element is the predicative marker.

- Dan (Mande, Côte d'Ivoire; ISO 639-3: daf; Vydrin 2017: 495–497)
- (6) a. *Gbàtò yǎ kó dɔ̃.*
 PN 3SG.EXI house build\NTR
 ‘Gbato builds houses.’ (neutral aspect)
- b. *Gbàtò yà ɛ̄ bā kó dɔ̃.*
 PN 3SG.PRF REFL POSS house build
 ‘Gbato has built his house.’ (perfect)
- c. *Gbàtò yáú kó dɔ̃.*
 PN 3SG.NEG.IPFV house build
 ‘Gbato does not build houses.’ (negative imperfective)

It is important to bear in mind that the existence of periphrastic expression of morphological information of the type attested in such languages as Mande is to a large extent orthogonal to the issue of wordhood, since both lexical and functional parts of periphrastic constructions are usually indisputable wordforms and are often not adjacent to each other. Nevertheless, the existence and cross-linguistic frequency of periphrasis calls for a reassessment of the relations between morphology and syntax, which, even if still understood as distinct components of grammar, are clearly interdependent and able to “feed” each other.

4. Inflection, derivation and what lies in between

As said in the preceding section, the definition and cross-linguistic identification of “word-form” has been recognized as one of the fundamental problems of grammatical theory. The orthogonal problem of the delimitation of lexemes and, consequently, of inflectional paradigms, or, in other words, of the distinction between derivation and inflection, has likewise been subject to critical scrutiny, see Bybee (1985: Ch. 4), Dressler (1989), Plank (1994), Laca (2001) and Spencer (2013).

First, the common intuition that derivation feeds the lexicon, while inflection is relevant to syntax (cf. the “Split Morphology hypothesis”, Anderson 1982, Scalise 1988, Perlmutter 1988, Bickel & Nichols 2007: 169-172) has been shown to be empirically and conceptually flawed. Derivation often has clear syntactic repercussions (e.g. in causativization or in nominalization), while some inflection is not immediately relevant to syntax (e.g. number in languages with no agreement; cf. Sapir’s distinction between “concrete relational” and “pure relational” concepts, recast as the dichotomy of “contextual” vs. “inherent” inflection by Booij (1994, 1996) or of “early” vs. “late system morphemes” by Myers-Scotton (2002); the validity of these notions has also been subject to doubt, see Spencer 2013: 77-82).

In most theoretical discussions of inflection and derivation they are regarded as two poles on a continuum structured by a set of features, see Dressler (1989), Plank (1994), Haspelmath & Sims (2010: Ch. 5), Corbett (2010), Spencer (2013). Table 8 presents some of the familiar features (cf. Haspelmath & Sims 2010: 89-98, Booij 2006: 655-659).

Table 8. Features of prototypical inflection and derivation

Parameter	Inflection	Derivation
Function	Does not change syntactic category of a word	May change syntactic category of a word
Meaning	Often has purely grammatical meaning	Tends to have lexical semantic content, i.e. meanings similar to the meanings of independent words
Regularity	Is often semantically regular	May have unpredictable semantic content
Syntactic determinism	Is often syntactically determined	Does not require a specific syntactic environment
Obligatoriness	Function is obligatory	Function is not obligatory
Productivity	Is highly productive	Often applies only to certain words, or classes of words
Paradigmaticity	Is often organized in paradigms	Is often not organized in paradigms
Fusion	Can be marked by portmanteau morphemes	Is rarely marked by portmanteau morphemes
Recursivity	Is marked only once in the same word	May apply twice in the same word
Position	Occurs in a peripheral position near the edges of a word	Occurs in a central position close to the root

These features are useful as heuristics to place particular morphological processes on the continuum between prototypical inflection and prototypical derivation (with different morphological processes in the same language and even different uses of the same morphological process often occupying different positions on the scale, see e.g. Say 2005 on Russian reflexive verbs and Nau 2001 for an analysis of Latvian). However, the big questions are whether these properties tend to cluster cross-linguistically and whether, if they do, the two traditionally recognized clusters of properties are the only ones attested in languages. The answers to both questions, in particular, to the second one, are in the negative (see Spencer 2013 for a comprehensive discussion).

Thus, Bauer (2004) proposes a six-way classification of morphological processes, setting valency-changing, class-changing, and evaluative formations aside from other kinds of derivational morphology as being regular and in some sense paradigmatic, and in opposition to inflectional morphology, which does not create new lexemes. However, it is precisely the criterion of new lexeme creation which is most doubtful. Not only does it obviously involve circularity, but it also creates purely empirical problems. In languages with highly productive and compositional valency- or class-changing operations it is hardly feasible to treat all such cases as distinct lexemes (cf. Spencer 2013: 42-43). For instance, Northwest Caucasian languages such as West Circassian (Adyghe) or Abaza, there are dozens of applicative prefixes adding an indirect object to the valency frame of the verb, see Smeets (1992), Lander (2016), Lander & Letuchiy (2017) on West Circassian and O'Herin (2001) on Abaza. Consider example (7) from Abaza, showing a fully transparent comitative applicative added to a transitive verb and occurring to the left of the indisputably inflectional agent prefix; even though sometimes such applicatives are lexicalized, postulating a separate lexeme for fully compositional cases like (7) does not seem a viable descriptive option.

Abaza (North-West Caucasian, Russia; ISO 639-3: abq; example from recorded oral narratives)

- (7) *zaká-zak haqʷá šá-c-tə-ž-g-wə-š-ʔ*
 one-one stone 2PL.IO-COM-LOC-2PL.ERG-carry-IPFV-FUT-DCL
 ‘Each of you will have to carry a stone with you.’

To account for phenomena like the Abaza applicatives de Reuse (2009) proposes the term “Productive Non-inflectional Concatenation” (PNC), understood as a special kind of morphology distinct from inflection and derivation and sharing many features with syntax, see Table 9. PNC is especially characteristic of polysynthetic languages such as those of the Eskimo-Aleut or Northwest Caucasian families, cf. example (8). However, de Reuse (2009: 28) identifies as PNC such phenomena of familiar European languages as e.g. the English productive and potentially recursive prefix *anti-*, to which one can add e.g. multiple verbal prefixation in Slavic languages (see e.g. Tatevosov 2008).

Table 9. Productive noninflectional concatenation (de Reuse 2009: 22)

	Inflection	(Nonproductive) derivation	PNC	Syntax
Productivity	yes	no	yes	yes
Recursivity	no	no	yes	yes
Necessarily concatenative	no	no	yes	yes
Variable order possible	no	no	yes	yes
Interaction with syntax	yes	no	yes	yes
Category change	no	yes	yes	yes

Abaza (author’s field notes; PNC elements in boldface)

- (8) *a-š j-ʔ-čá-zapàta-məʃʷa-rkʷa-ʒə<l>šʷa-zá-p*
 DEF-door 3SG.N.ABS-open-INTF-FREQ-DEPR-CONT-think<3SG.F.IO>-INFR-NPST.DCL
 ‘She probably thinks that the door is unfortunately still often open ajar.’

Finally, Spencer (2013) presents extensive empirical and conceptual arguments for treating the range of phenomena he calls “lexical relatedness” (i.e. paradigmatic relations between morphological objects sharing some semantic, syntactic and formal properties) as a multidimensional space of the type shown in Table 10 adapted from Spencer (2013: 7, 273). “Lexemic index” is the technical representation of the traditional intuition that derivation creates new lexemes, however, it is important to note that in Spencer’s system it is one of the four attributes varying independently of the others.

Table 10. Typological space for lexical relatedness ('+' attribute changed; '-' attribute unchanged).

	FORM	SYNTAX	SEMANTICS	Lexemic index
identity	–	–	–	–
logical impossibility	–	–	–	+
Same lexeme				
contextual inflection	+	–	–	–
transpositions	–	+	–	–
	+	+	–	–
regular polysemy	–	–	+	–
evaluative morphology; contentful inflection	+	–	+	–
argument-structure operations	–	+	+	–
	+	+	+	–
New lexeme				
perfect synonymy	+	–	–	+
transpositional lexemes	–	+	–	+
	+	+	–	+
strong polysemy	–	–	+	+
syntactically inert derivation	+	–	+	+
conversion	–	+	+	+
canonical derivation	+	+	+	+

In his book Spencer (2013: Ch.3) shows that most logically possible combinations of the features from Table 10 are attested in natural languages, some of them, like conversions, transpositions, class- or valency-changing operations, being very frequent, which suggests that the traditional dichotomy of “inflection” and “derivation” and even its scalar representations are empirically inadequate and should be abandoned. More on the role of morphology in lexical relations and lexical typology see “Lexical typology and morphology”.

5. Modern qualitative and quantitative approaches

Since morphology is the relation between meaning and form in the structure of words (as suggests the title of Bybee 1985), the primary goals of morphological typology are thus to determine the ways languages relate meaning and form and to discover the factors underlying the cross-linguistic variation attested in this domain.

A useful starting point for studying the meaning-form relations in morphology is the idealized model that assumes a biunique mapping between meaning and form, with each morphological feature or ‘meaning’ expressed by only one form, and each form expressing only one such ‘meaning’ (cf. Dressler 1987: 111). Morphologies of most languages display deviations from this “agglutinative ideal”, and the cross-linguistic investigation of such deviations is one of the primary concerns of morphological typology. An influential classification of the deviations from the biuniqueness model has been proposed by Carstairs (1987: 12-18), see Table 11.

Table 11. Deviations from biuniqueness according to Carstairs (1987).

	many meanings ~ one form	many forms ~ one meaning
syntagmatic axis	cumulation	extended exponence
paradigmatic axis	syncretism	allomorphy

During the last several decades there has been an increasing amount of theoretical and typological work dealing with the phenomena listed in Table 11 and their various subtypes, see e.g. Plank (1986), Carstairs (1987), Plank (ed.) 1991 and Stump (2016) on the issue in general, Carstairs-McCarthy (1994, 1998, 2001, 2002, 2010) on various types of allomorphy, Veselinova (2003, 2005a, 2005b), Corbett (2007), Corbett et al. (2005) and Bobaljik (2012) on suppletion, Plank (1991), Baerman et al. (2005), Baerman & Brown (2005a, 2005b), Arkadiev (2009) on syncretism, Blevins (2004), Finkel & Stump (2007), Corbett (2009), Palancar (2011), Baerman (2012, 2014, 2016), Stump & Finkel (2013) on inflection classes, Caballero & Harris (2012) and Harris (2017) on multiple exponence. Such more intricate phenomena as deponency and defectiveness have also received attention, see e.g. Baerman et al. (eds. 2007), Baerman et al. (eds. 2010) and Sims (2015). Though most of these issues have usually been considered by typologists and theoretical linguists as “exceptions” and “irregularities”, their cross-linguistic study has proven to be both feasible and instructive by showing what types of mismatch between meaning and form are possible in morphological systems, how they interact with each other and with syntax, and what kind of motivations may underlie them (see e.g. Harris 2017 for an excellent example of a sophisticated and insightful diachronic-typological approach to a “quirky” morphological phenomenon).

Another aspect of form-meaning relations, in a way orthogonal to deviations from bi-uniqueness, concerns the syntagmatic relations between the components of complex words. In this field, affix ordering has featured prominently, starting with Greenberg (1963)’s Universals # 28 concerning the mutual order of inflectional and derivational affixes and # 39 concerning the mutual order of case and number affixes (see Baker 1985, Bybee 1985, Muysken 1986, Stump 1997, 2006, Cinque 1999, Mithun 2000, Paster 2009, Manova & Aronoff 2010, Spencer 2013: 219-249, Manova ed. 2015; for a general overview see Rice 2011).

Among the universal principles explaining cross-linguistic tendencies in affix ordering, Baker (1985)’s Mirror Principle and Bybee (1985)’s Principle of Relevance, despite being formulated in quite distinct frameworks, both reflect the observation that the relative ordering of affixes in words hosting more than one affix in a sequence is largely steered by semantics. As Bybee (1985: 34-35) shows, in many languages verbal affixes occur in the order “(verbal root)-aspect-tense-mood-person”, which corresponds both to the meanings’ decreasing degree of “relevance” to the semantics of the root and their widening semantic scope (Bybee’s “generality”). The much more fine-grained hierarchy of affixal positions proposed in the generative framework by Cinque (1999) largely reflects the same observation. The clearest support for such semantics-based theories of affix order come from languages where affixes may occur in variable order depending on their mutual scope, as in examples (9a,b).

Cuzco Quechua (Quechuan, Peru; ISO 639-3 quz; Muysken 1988: 278)

- (9) a. *mikhu-naya-chi-wa-n*
eat-DESID-CAUS-1OBJ-3SBJ
‘It causes me to feel like eating.’ (causative > desiderative)
- b. *mikhu-chi-naya-wa-n*
eat-CAUS-DESID-1OBJ-3SBJ
‘I feel like making someone eat.’ (desiderative > causative)

Yet in many languages affixes occur in a rigid order hardly amenable to a scope-based motivation, as e.g. in Athabaskan languages, cf. (10) showing the order of elements of the Slave verb (adapted from Rice 2000: 9).

- Slave (Athabaskan, Canada; ISO 639-3 den)
- (10) preverb – quantifier – incorporate – object – 3rd person subject – qualifier – sub-situation aspect – situation aspect – viewpoint aspect – 1st/2nd person subject – valency – root – aspect suffix

Conventionalized and opaque affix orders attested in many languages of the world have been subsumed under the term “template morphology” as opposed to “layered morphology” organized primarily according to semantic scope, see Simpson & Withgott (1986), Stump (2006), Bickel & Nichols (2007: 214-220), Good (2016). The prototypical differences between these two types of morphological organization are presented in Table 12 adapted from Stump (2006: 561) and Bickel & Nichols (2007: 214).

Table 12. Layered vs. template morphology

Diagnosics	Layered morphology	Template morphology
Zero morphemes (significant absence)	No	Yes
Zero derivation	Yes	No
Monodeterminacy (one root, one head)	Yes	No
Only adjacent morphemes may influence each other	Yes	No
Morphemes cannot be sensitive to more peripheral morphemes	Yes	No
Usually encodes at most one argument	Yes	No
Scope-determined position	Yes	No

It has to be borne in mind that much like “agglutination” and “flexion”, “layered” and “template” morphology are idealized concepts. Most languages with complex morphology present a mixture of both kinds of ordering. Thus, in North West Caucasian languages, e.g. in the abovementioned West Circassian, suffixes appear to be organized in a layered system even admitting semantically determined permutations, while prefixes follow a more or less rigid template, cf. Korotkova & Lander (2010: 302). Nevertheless, for some prefixes scope-based rearrangements are possible as well (Lander 2016: 3519), as shown in examples (11a,b); note that only the benefactive and comitative prefixes can occur in different scope-driven orders, while the causative prefix is fixed in the pre-root position, even though it often takes scope over the prefixes located further from the root.

West Circassian (Lander 2016: 3519, 3523)

- (11) a. **a-də-f-je-z-ke-txə-ɸ**
 3PL.IO-COM-(3SG.IO-)BEN-DAT-1SG.ERG-CAUS-write-PST
 ‘I together with them asked him/her to write for him/her.’ (COM > CAUS > BEN)
- b. **f-a-d-je-z-ke-txə-ɸ**
 (3SG.IO-)BEN-3PL.IO-COM-DAT-1SG.ERG-CAUS-write-PST
 ‘I asked him/her to write together with them for him/her’ (CAUS > COM > BEN)

The issue of ordering of morphological exponents is relevant not only for affixes and clitics (on the latter, see Simpson & Withgott 1986; Spencer & Luís 2012: 112–126), but for non-concatenative morphology as well. This can be illustrated with an example from Dinka, whose non-affixal morphology is organized into a layered structure of operations successively applying to a monosyllabic word, as shown in example (12).

Dinka (Andersen 2016: 678)

(12)	‘house.NOM’	<i>uḡt</i>	
	‘house.PL’	<i>uḡoot</i>	vowel lengthening, tone shift
	‘house.PL.CS1’	<i>uḡoot</i>	no change
	‘house.PL.CS1.CS2’	<i>uḡɔɔt</i>	vowel lowering
	‘house.PL.CS1.CS2.GEN’	<i>uḡɔɔt</i>	tone shift

At least since Greenberg’s (1960/1954) morphological indices, discussed in section 2, syntagmatic aspects of morphology have been subject to quantitative analyses aiming at cross-linguistic assessment of the complexity of morphological systems (on morphological complexity in general see Baerman et al. eds. 2015, Arkadiev & Gardani eds. to appear, and references therein). This field of inquiry has been extended by Nichols (1992, 2009), who considers such more complex parameters as sum of head-marking and dependent-marking constructions or the number of inflectional categories expressed in the verb (Bickel & Nichols 2005) and bases her research on large cross-linguistic samples. Such an approach to morphological complexity is, however, fairly limited in that it disregards the paradigmatic aspects of morphology (cf. Nichols [to appear] for an attempt to quantify the latter as well).

Though morphological paradigms are looked at with skepticism by some generative morphologists (cf. e.g. Bobaljik 2007), the phenomena pertaining to paradigmatic relations between words, such as syncretism, suppletion, inflection classes, deponency etc., cannot be neglected by any theory of morphology aiming at empirical and cross-linguistic adequacy (cf. e.g. Plank (ed.) 1991, Ackerman et al. 2009 or Stump 2016; see also Bauer 2019 for a general discussion of paradigms in morphology). It is precisely the paradigmatic dimension of morphology, in particular such phenomena as “morphomic” (opaque) allomorphy and inflection classes, that has been called “autonomous morphology” (Aronoff 1994, Maiden 2005, Cruschina et al. eds. 2013) and claimed to be irreducible to other components of grammar (cf. Stump 2016) and to constitute one of the core domains of linguistic complexity (Dahl 2004, Baerman et al. 2015).

In the beginning of this section, the large bulk of work investigating many aspects of paradigmatic organization of morphology from a cross-linguistic perspective has been mentioned. Among these, it is worth singling out the prominent line of research dealing with inflection classes. Starting in the 1980’s with the question of the possible limits on the number of inflection classes (Carstairs 1983, 1987: Ch. 3, 7; Carstairs-McCarthy 1994, 2010: Ch. 5), this field has not only substantially expanded its empirical database but also turned to more sophisticated quantitative measures based on information theory. If Carstairs-McCarthy has been trying to formulate a constraint on the number of inflectional classes based on the maximal number of distinct exponents available for a particular inflectional value, it has been subsequently shown that the fairly restrictive principles of paradigmatic economy proposed by Carstairs-McCarthy (1994, 2010) are violated in languages with exuberant inflection class systems like Nuer (Western Nilotic, South Sudan) or Seri (isolate, Mexico). In order to make sense of such systems as well as of “simpler” ones attested in better-known European languages, it has been proposed to assess the complexity of inflection-class systems in terms of the so-called Paradigm Cell Filling Problem (Ackerman et al. 2009: 54), i.e. inferences regarding particular form in a paradigm made by speakers on the basis of other forms of the same paradigm. The predictiveness of paradigm forms has been addressed in the typology of “principal part” systems developed by Finkel & Stump 2007 and Stump & Finkel (2013), as well as in the entropy-based approach of Ackerman & Malouf (2013, 2016). In the latter work a useful distinction has been proposed between the **enumerative** and the **integrative** types of morphological complexity. The former relates to the sheer number of elements in a system (e.g. number of inflectional feature values or distinct exponents), while the latter is measured as “the average conditional entropy, the average uncertainty in guessing the realization of one

randomly selected cell in the paradigm of a lexeme given the realization of one other randomly selected cell” (Ackerman & Malouf 2013: 429). Ackerman & Malouf (2013) claim that such information-based metrics of inflectional complexity are superior and, in particular, propose the following Low Conditional Entropy Conjecture: “enumerative morphological complexity is effectively unrestricted, as long as the average conditional entropy, a measure of integrative complexity, is low” (Ackerman & Malouf 2013: 436).

The entropy-based approach to morphological paradigms has also proven useful for the analysis of defectiveness, apparently an irregular quirk *par excellence*, see Sims (2015) for a view of defectiveness as a phenomenon amenable to systematic generalizations. This line of inquiry, requiring a close collaboration between morphologists and computational linguists (cf. Walther 2013, Bonami & Beniamine 2016), presents perhaps the strongest empirical and conceptual support for the indispensability of the paradigmatic dimension in morphology, both as it is admittedly represented in the speakers’ knowledge of language and as it should be accounted for in adequate theories of morphology.

6. Conclusions and prospects

Morphological typology has numerous achievements, nevertheless, its fruitful existence has become impossible without a serious reconsideration of its basic concepts and methods. Instead of sticking to such vaguely defined notions as “word”, “affix” or “derivation”, morphologists gradually shift their attention to more basic and more easily cross-linguistically comparable features which can be considered as variables creating a number of multidimensional spaces populated by concrete morphological phenomena. Likewise, considerable doubt has been cast on the validity and usefulness of the classic notion of “morpheme” developed in American structuralism of the first half of the 20th century; instead, implicative paradigmatic relations between complex morphological objects have gained prominence in both morphological theorizing and psycholinguistic approaches (see e.g. Clahsen et al. 2001, Hay & Baayen 2005, Baayen et al. 2011, Clahsen 2016). Morphological typology should follow suit and fully recognize the limitations of affix-based methods and research questions in order to achieve an empirically adequate coverage of cross-linguistic diversity in morphological structures. On the other hand, morphological theorizing should pay still more attention to conceptual and methodological problems raised in typology as well as keep track of the ever growing body of empirical data from a widening variety of languages all over the world (including sign languages) brought forth by typologically-oriented descriptive work.

Abbreviations

1 — 1st person; 2 — 2nd person; 3 — 3rd person; ABS — absolutive; BEN — benefactive; CAUS — causative; COM — comitative; CONT — continuative; CS — construct state; DAT — dative; DCL — declarative; DEF — definite; DEPR — depreciative; DESID — desiderative; ERG — ergative; EXI — existential; F — feminine; FREQ — frequentative; FUT — future; INFR — inferential; INTF — intensifier; IO — indirect object; IPFV — imperfective; ITR — intransitive; LOC — locative; N — neuter; NEG — negation; NPST — nonpast; NTR — neutral aspect; OBJ — object; P3 — 3rd position element; PFV — perfective; PL — plural; PN — proper name; POSS — possessive; PRF — perfect; PST — past; REFL — reflexive; S — single argument of canonical intransitive verb; SBJ — subject; SG — singular; TR — transitive.

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