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Inflection and derivation as traditional comparative concepts

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Abstract: This article revisits the distinction between inflectional and derivational patterns in general grammar and discusses the possibility that this well-known distinction is not rooted in the reality of languages, but in the Western tradition of describing languages, through dictionaries (for words, including derived lexemes) and through grammar books (where we often find tables of exemplary paradigms). This tradition has led to rather different terminological treatments of the two kinds of patterns, but from the perspective of a constructional view of morphology, there is no need to incorporate such differences into formal grammatical descriptions. For practical purposes, we need clear and simple definitions of entrenched terms of general linguistics, so the article proposes semantically based (retro-) definitions of *inflection*, *derivation* and *lexeme* that cover the bulk of the existing usage. Finally, I briefly explain why we need sharp definitions of comparative concepts, and why prototype-based and fuzzy definitions of traditional terms are not helpful.

1 Overview: inflection versus derivation as a terminological difference

The purpose of this article is to point out that the well-known distinction between inflectional and derivational patterns within morphology is primarily a terminological difference. There is a long tradition of talking differently about patterns such as those in (1) and (2) (from English), but there is no robust evidence that this contrast corresponds to a general difference in human languages.

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|-----|-----------------------|-------|------------------------|-------|-----------------|
| (1) | inflectional patterns | V-s | '3rd person singular' | e.g., | <i>help-s</i> |
| | | V-ed | 'past tense' | | <i>help-ed</i> |
| | | V-ing | 'gerund-participle' | | <i>help-ing</i> |
| | | V-Ø | 'imperative' | | <i>help-Ø</i> |
| (2) | derivational patterns | V-er | 'agent (noun)' | e.g., | <i>help-er</i> |
| | | V-Ø | 'event (noun)' | | <i>help-Ø</i> |
| | | V-ful | 'ornative (adjective)' | | <i>help-ful</i> |

I will begin by briefly describing the different ways of talking about derivation on the one hand, and the eight classical inflectional dimensions (case, person, number, gender, tense, aspect, mood, voice) on the other (Section 2). Then I point out that derivation and inflection are intimately connected with two traditional ways of presenting linguistic information: dictionary lists for derivation, and exemplary paradigms for inflection (Section 3). These ways of presenting linguistic patterns are closely connected to the terms *lexeme* (for the dictionary word) and *word-form* (for the word in an inflectional paradigm).

In the next step, I describe a basic intuition that many linguists have probably had: Inflectional word forms are CELL FILLING, while derived lexemes are LEXICON ENRICHING (Section 4). This leads to certain stereotypical expectations, such as the completeness and uniqueness of paradigm cells, and the accidental nature of derivational creations. There is substantial literature discussing the general differences between inflection and derivation (e.g., Booij 2000; Scalise 1988; Štekauer 2015), and Section 5 summarizes the most important differences that have been cited, with a brief discussion of problems with each of these criteria, and pointers to the earlier rich literature. We will see that while the different ways of speaking are quite entrenched in linguistics (as noted in Sections 3–4), linguists actually have a fairly broad consensus that there is little basis for the conceptual bifurcation in the phenomena of the world's languages.

What are the larger consequences of these entrenched differences in talking and thinking about inflectional and derivational patterns? Most importantly, many linguists have advocated a view of the cognitive architecture of grammar in which the different ways of speaking are interpreted as reflecting different cognitive modules: a cognitive lexicon (for derivation) and a cognitive syntax (for phrasal patterns and inflection). One key point of this article is that if one wants to argue for such a cognitive architecture, one cannot use the traditional ways of speaking in support of it. I discuss this issue in Section 6, and then I sketch a way of describing, notating and conceptualizing inflection and derivation that does not treat them as fundamentally different (Section 7).

One might conclude that the inflection-derivation contrast should be given up entirely, but since linguists will anyway continue to speak in these traditional terms, I will propose explicit definitions of *inflectional construction* and *derivational construction* in Section 8, as well as a definition of *lexeme*. These definitions have a purely methodological goal and do not imply any theoretical or substantive claims. Their arbitrariness will hopefully make it clear that these terms are “merely ways of speaking”,¹ and that they are not more than comparative concepts for general linguistics (Haspelmath 2021c).

2 Different ways of talking about inflection and derivation

There is no generally accepted definition of “inflection” or “derivation”, but the terms are widely understood through certain characteristic situations. Textbooks often make reference to dictionary entries (for derivation) and stereotypical examples such as nominal plural forms and verbal tense forms (for inflection). The following quotation is representative:²

A *lexeme* is a basic vocabulary item, something we might find as an entry in a dictionary (or in our mental lexicon). Morphology that does not form a new lexeme, like the plural *-s* on nouns and *-ed* and *-ing* on verbs, is called *inflection*. ... Morphological processes that create new lexemes are *derivational*. (Mithun 2014: 88, 90)

Perhaps the main way in which the inflection-derivation distinction gets entrenched in many linguists’ habits is through the peculiar ways of talking about inflectional patterns. Most people who have studied a language such as Latin, Russian, German or Spanish are familiar with the special “inflection-speak” that will be illustrated in the following. First, we often talk about inflected forms by means of a schema “VALUE – DIMENSION – FORM”, or simply “VALUE – DIMENSION”.

- (3) schema: “VALUE – DIMENSION – (FORM)”
- a. *the dative case (form)*
 - b. *the second person (form)*
 - c. *the future tense (form)*
 - d. *the imperative mood (form)*

1 The phrase “merely a way of speaking” is inspired by Hockett (1954: 212), who discussed the use of process-based terms in morphology and concluded that as long as it is “merely a way of speaking”, with no theoretical claims attached to it, it is not problematic.

2 Similarly Harley (2006: 121–122), Lieber (2009: 7), Aronoff and Fudeman (2011: 43, 47).

Thus, Latin *lupō* ‘to the wolf’ is said to be the “dative case (form)” of *lupus* ‘wolf’, or Spanish *cantará* ‘will sing’ is said to be the (third-person singular) “future tense (form)” of *cantar* ‘sing’.³ Derivational forms like English *singer* (from *sing*) are never treated in this way: We do not say that *singer* is the “agentive nominality form” of *sing*, and we do not say that *colonial* is the “relational adjectivity form” of *colony*. This peculiar use of *form* in speaking about inflection is of course the basis of the term *word-form*.⁴

We typically give special treatment to a small set of inflectional DIMENSIONS, or CATEGORIES, or FEATURES (Corbett 2012; Kibort 2010).⁵ The eight classical inflectional dimensions are listed in (4).

- (4) the classical inflectional dimensions (with some typical values)
- a. case (nominative, accusative, ...)
 - b. person (1st, 2nd, 3rd, ...)
 - c. number (singular, plural, ...)
 - d. gender (masculine, feminine, ...)
 - e. tense (present, future, past, ...)
 - f. aspect (perfective, imperfective, habitual, ...)
 - g. mood (indicative, imperative, subjunctive, ...)
 - h. voice (active, passive, ...)

Inflected forms may realize several feature values simultaneously (and often cumulatively, i.e. in a single morph), and in this case, they are normally stated sequentially. The feature label must be omitted, so instead of *dative singular form* in (5a), one cannot say “dative case singular number (form)”. (An exception is “person”, which is never omitted, as seen in (5b)).

- (5) simultaneously expressed feature values, stated sequentially
- a. *dative singular form*
 - b. *1st person plural form*
 - c. *masculine accusative form*
 - d. *passive subjunctive form*

Note also that such sequential descriptions tend to have a fixed order (e.g., *??singular dative form* sounds very odd, while *dative singular form* is perfect).

³ The dimension label is mostly optional: *dative (case)*, *imperative (mood)*, *future (tense)*. However, the dimension label *person* is obligatory: *second person plural* (not **second plural*). Omitting the dimension label becomes obligatory in sequences of values, as noted below in (5).

⁴ *Word-form* was used in Haspelmath (2002) following the usage of Mel’čuk and other Russian-speaking linguists (Russian *slovo-forma* [word-form] has long been a widespread term). Another term used in textbooks is *grammatical word* (Matthews 1974: 31).

⁵ I use the terms (*inflectional*) *dimension* and (*inflectional*) *feature* interchangeably, and I avoid “inflectional category” because of its ambiguity (it can also refer to an inflectional feature value).

Morphologists do not set up analogous “features” or “dimensions” for derivational patterns, and inflectional patterns other than the classical features in (4) are not normally treated in the same way. For example, even though Turkish has not only tense suffixes and person-number suffixes on verbs, but also two types of polarity forms, this way of talking is not used. We do not say, for example, that (6a) is a “negative polarity form”, or that (6b) is an “affirmative polarity form”.⁶

- (6) Turkish
- a. *gel-me-di-k*
come-NEG-PST-1PL
‘we did not come’ (negative)
 - b. *gel-di-k*
come-PST-1PL
‘we came’ (affirmative)

Instead, we would say that *gel-me-di-k* in (6a) is a negative verb (form), just as we would say that *sing-er* is an agentive noun, and that *coloni-al* is a relational adjective. Thus, polarity is treated more like derivation in our “ways of speaking”, for no good reason.

For the eight classical inflectional dimensions, there is an even more peculiar way of speaking, using the preposition “in” with the value(-feature) label.

- (7) schema “IN THE (VALUE)”
- a. *The Ancient Greek Odyssey begins with a noun in the Accusative (ándra).*⁷
 - b. *In the Dative, Polish ręka ‘hand’ has the stem ręc-.*
 - c. *Russian verbs do not inflect for person in the Past tense.*

And the sentence in (7c) illustrates a further peculiarity of the way we talk: We say that a “word” may “inflect for a feature (or category, or dimension)”: A verb may inflect for tense, a noun may inflect for number, and an article may inflect for gender. With sets of words such as *sing*, *singer*, *song*, there is no analogous way of speaking. The verb *derive* is used in a completely different way, using the complex word as a subject of a passive construction: “*Singer* is derived from *sing*”. (By contrast, we would not be able to say that “*help-ed* is inflected from *help*” or similar.)⁸

⁶ Similarly, we would not normally say that “the Turkish verb inflects for polarity”, although it is normal to say that it “inflects for tense”.

⁷ The capitalization of “Accusative” (and similar capitalization usage elsewhere in this paper) follows the convention of Comrie (1976) (see Haspelmath 2020b: 355), where language-particular categories are capitalized.

⁸ But the passive variant is *inflected* can be used for the word class (*nouns are inflected*, synonymous with *nouns inflect*), and we can talk about *inflected forms* (which is the same as *inflectional forms*). These are very peculiar expressions with no analogs elsewhere in grammatical terminology.

Another peculiarity of the classical dimensions is that one can say things like (8), where the value label is preceded by a definite article (“the Genitive”, “the Subjunctive”, etc.).

- (8) a. *In colloquial German, we do not use the Genitive much.*
 b. *The Subjunctive is characteristic of formal American English.*
 c. *In French, the Simple Past occurs frequently in narratives.*

Here we use the feature value name to refer generically and collectively to the forms that express this value. “The Genitive” in (8a) really means “Genitive case forms of nouns”, and “the Simple Past” in (8c) means “Simple Past tense forms of verbs”.⁹ There is no analogous way of talking about derivational patterns. For example, we do not say that “the action nominalization occurs frequently in legal texts”, or that “Polish uses the relational adjective more than German”. When talking generically about derivational patterns, we usually use the plural (“Polish makes extensive use of relational adjectives”), and we often refer to them using their shape (e.g., “-able adjectives” in English).

There are more differences, e.g., (i) that we often use the term “stem” for a segment sequence that is the base of inflected forms, but much more rarely for the base of a derived lexeme, and (ii) that we often talk about a language having “a lot of inflection” (or “rich inflection”), using the term as a kind of mass noun (we would be less likely to say that a language has “little derivation”, or “rich derivation”).

Where do these different ways of talking about inflectional and derivational patterns come from? This is a question for historians, but it seems clear that they are rooted in the tradition of Latin grammar going back to antiquity. Aelius Donatus’s influential grammars *Ars Minor* and *Ars Major*, written in the 4th century, treat all (and only) the inflectional features in (4) as “accidents” (or categories) of Latin grammar,¹⁰ and partially, this old way of talking and thinking about such patterns seems to have persisted into modern times.

⁹ An additional observation is that the classical inflectional dimension labels can be used generically without an article, e.g., “aspect in Russian”, “voice in Latin”; or even in a global sense referring to languages in general (e.g., “number”: Corbett 2000; “person”: Siewierska 2004). There is nothing analogous to this for derivational patterns (one would use plurals, e.g., “applicative constructions”: Peterson 2007).

¹⁰ The term “accidence” was used for inflectional morphology until well into the 20th century (e.g., Kruisinga 1932; see Lyons 1968: Section 5.4.5; Dahl 1985: 11–13). It appears that the term “category” (used either for features or feature values) became common only after Bloomfield (1933), while the terms “feature” and “feature value” are still younger (Corbett 2012; Zwicky 1985).

3 Dictionaries and exemplary paradigms

Both dictionaries and grammars have been written for many centuries in the Western (or European) tradition of linguistics, and they have always been two rather different genres of books. While from a general-theoretical point of view, a “grammar-lexicon continuum” has often been argued for (e.g., Broccias 2012; Berg 2015; Jackendoff and Jenny 2020: Section 1.3), linguists have always kept the two domains separate in practical terms (and there are even two different agent nouns for the two tasks: *grammarian* and *lexicographer*). From the beginning, dictionaries

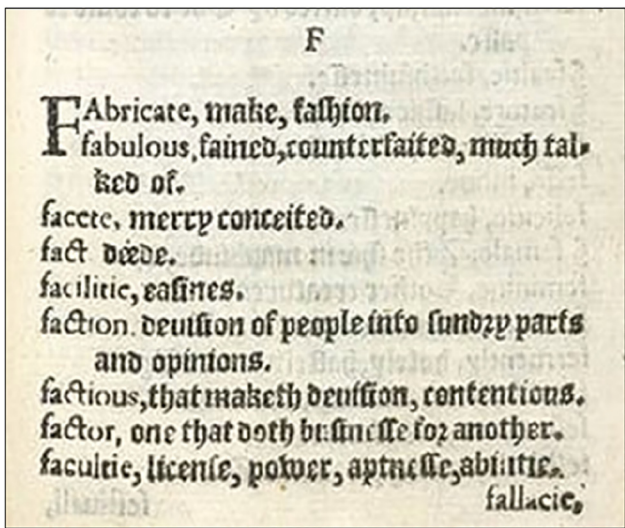


Figure 1: A section from an early English dictionary (Cawdrey 1604).

Paradigma in Consonantem desinentium.

	Singulariter.	Pluraliter.
	Manus.	
N.	die Hand /	die Hende.
G.	der Hand /	der Hende.
D.	der Hand /	den Henden.
A.	die Hand /	die Hende.
V.	o du Hand /	o ihr Hende.
Ab.	von der Hand /	von den Henden.

Figure 2: A German nominal inflectional paradigm from Clajus (1578: 48).

have been presented in the form of alphabetical word lists (e.g., Figure 1), and grammars have long presented inflectional patterns in terms of tables showing exemplary paradigms (e.g., Figure 2). In the dictionaries, both minimal nouns and verbs and derived nouns and verbs are typically listed (e.g., both *faction* and *factionous* in Figure 1).

The logical alternatives have been employed very rarely if at all: There are very few (if any) dictionaries that list all the inflected forms, and very few (if any) grammars that present derivational families in tabular form.¹¹ In fact, until the 20th century, grammars usually disregarded derivational patterns entirely (ten Hacken 2014: 14).

Dictionaries are often used even by nonlinguists, and everyone who has studied a foreign language with Indo-European-style inflection patterns is familiar with tabular exemplary paradigms. Thus, it may well be that the way we learn about inflectional patterns on the one hand, and about lexemes (or dictionary words) on the other, may have had an influence over the way we think about them in general linguistics.¹²

4 The basic intuition: inflection is cell filling, derivation is lexicon enriching

Much discussion of inflectional patterns in the general-linguistics literature is based on the idea that inflection is characterized by paradigm schemas with cells that must be filled. By contrast, derivation is commonly said to serve the purpose of enriching the lexicon. As I noted, these two fundamental ideas may well have been based originally on the way linguistic data have been presented in grammars and dictionaries.

Now if inflectional patterns are primarily thought of as sets of realizations of an inflectional paradigm schema, then they can be “non-morphological” in two ways. They may be filled (i) by suppletive forms, or (ii) by periphrastic forms.

¹¹ However, it is not uncommon for dictionaries to go even further than the best-known dictionaries of European languages and to list roots rather than lexemes. Wehr’s (1952) dictionary of Arabic is a well-known example of a root dictionary.

¹² There is a possible parallel here with the way we think about word-forms (= grammatical words): Since many linguists are highly familiar with languages that use word division by spaces, orthographic word-forms are very salient, and the usual orthographic practice may have had an influence on our way of thinking about these entities. Users of languages with no word division (such as Chinese and Thai) may well have different intuitions. Similarly, people who have never seen an alphabetically listed dictionary may have different intuitions about “dictionary words”, and as more and more dictionary usage is electronic (with no, or almost no, role for alphabetic lists), this may eventually have a secondary effect on our thinking about these elements.

Suppletive forms, as illustrated by Lezgian ‘eat’ in (9), are not really morphological in that they lack the defining criterion of parallels in both shape and meaning. The Lezgian stems *ne-* and *t’ü-* both mean ‘eat’, but they are not formally similar, i.e. they are different roots. However, the infinitive cell of ‘eat’ can only be filled by *ne-*, and the past-tense cell can only be filled by *t’ü-*. So if the situation is viewed from a cell filling perspective, then they can be thought of as “inflected forms of the same lexeme”, but this is an extended sense of “morphology”.

(9) Lezgian verb forms (Haspelmath 1993: 123, 126)

	‘beat’	‘be silent’	‘eat’
INFINITIVE	<i>gata-z</i>	<i>kis-iz</i>	<i>ne-z</i>
PAST TENSE	<i>gata-na</i>	<i>kis-na</i>	<i>t’ü-na</i>

Periphrastic forms are not really morphological either. They are more like syntactic phrases in that they consist of several grammatical words, as illustrated in (10). In this paradigm, the phrase *more intelligent* fills the comparative degree cell of the lexeme *intelligent*.

(10) English adjective forms

	‘warm’	‘nice’	‘intelligent’
POSITIVE	<i>warm</i>	<i>nice</i>	<i>intelligent</i>
COMPARATIVE	<i>warm-er</i>	<i>nic-er</i>	<i>more intelligent</i>

Again, since it is a defining criterion of morphology that it concerns the internal structure of “words”, periphrastic (or “analytic”) forms can be included only in an extended (and fairly unclear) sense of “morphology”.

Because of the cell filling intuition of inflection, it has been a widespread view that suppletive morph sets that express the same inflectional meanings are “allomorphs” of the same “morpheme”. For example, the different Latin plural suffixes (*-i*, *-ae*, *-a*) illustrated in (11) have often been treated as allomorphs of a single abstract morpheme {NOMINATIVE PLURAL}.

(11) Latin inflectional number forms (nominative)

	‘garden’	‘table’	‘word’
SINGULAR	<i>hort-us</i>	<i>mens-a</i>	<i>verb-um</i>
PLURAL	<i>hort-i</i>	<i>mens-ae</i>	<i>verb-a</i>

In views of inflection that do not build directly on Bloomfieldian morpheme decomposition, it is often said that morphosyntactic feature values are REALIZED BY EXPONENTS (e.g., Matthews 1974; Stump 2001; Zwicky 1985). Thus, instead of talking about GRAMMATICAL MEANINGS being EXPRESSED, morphologists have often come to prefer to use these more abstract terms (*feature value*, *realization*, *exponent*), which are felt to

be more adequate because the relationship between meanings and forms is not simple (for a recent survey of the complexities, see Anderson 2015).

By contrast, derivational morphology is often said to be lexicon enriching, e.g.,¹³

Derivational morphology has the function of lexical enrichment (lexical function), i.e. of forming new words, inflectional morphology does not (a very old criterion). (Dressler 1989: 6)

But is there any substantive claim involved in the treatment of inflection as cell filling, and of derivation as lexicon enriching? If inflection were by nature cell filling and thus crucially different from derivation, we would expect suppletion, periphrasis and “allomorphy” to be restricted to particular kinds of patterns, of the sort we call “inflectional”. But this does not seem to be the case, as we will see in the remainder of this section.

Suppletion is stereotypically associated with inflection, but even Corbett (2007: 12), who mostly restricts his rich discussion of suppletive patterns to classical inflection, admits that one may identify suppletion also in derivational pairs as in (12), where *byk* ‘bull’ and *korov(a)* ‘cow’ are a suppletive set (similarly Mel’čuk 2006: 405–467).

(12) Russian animal nouns

	‘bear’	‘tiger’	‘bull/cow’
MALE	<i>medved’</i>	<i>tigr</i>	<i>byk</i>
FEMALE	<i>medved-ic(a)</i>	<i>tigr-ic(a)</i>	<i>korov(a)</i>

If one includes kinship terms in the discussion,¹⁴ then many or most languages must have derivational suppletion of this sort, so it is not a marginal pattern at all. We do not often call it *suppletion*, but this is only because we do not normally think of these patterns in terms of filling cells.

Likewise, there is of course “derivational periphrasis”, even though we do not often give it this label. An example comes from French nouns for game practitioners, where some games have corresponding practitioner nouns with suffixes (*-eur*, *-iste*), while others require an “analytic” expression (Bonami and Strnadová 2019: 176).¹⁵

(13) French game nouns and practitioner nouns

	‘bridge’	‘boule’	‘go (game)’
GAME	<i>bridge</i>	<i>boules</i>	<i>go</i>
PRACTITIONER	<i>bridg-eur</i>	<i>boul-iste</i>	<i>joueur de go</i> ‘player of go’

¹³ A similar and more recent quotation comes from Štekauer (2015: 222): “Derivational morphology has a semiotic function and contributes to lexical enrichment”.

¹⁴ As is done by Bloomfield (1933: 270), who mentions derivational pairs like *count*: *countess* alongside suppletive pairs like *son*: *daughter*, *ram*: *ewe*.

¹⁵ See also Booij (2002) on “periphrastic word formation” (Dutch separable particle verbs).

Finally, what about “allomorphs of the same morpheme”? Recall that the Latin plural suffixes *-i/-ae/-a* are often treated as “belonging to the same morpheme”. Again, we find parallel phenomena with derivational patterns, e.g., English suffixes for inhabitant nouns like those in (14) (Carstairs-McCarthy 2005: 18).

- (14) English city and inhabitant nouns¹⁶
- | | | | |
|------------|------------------|---------------|------------------|
| CITY | <i>London</i> | <i>Rome</i> | <i>Vienna</i> |
| INHABITANT | <i>London-er</i> | <i>Rom-an</i> | <i>Vienn-ese</i> |

Carstairs-McCarthy notes:

At first sight, [this] set of nouns ... seems eminently suitable for analysis in terms of an ‘inhabitant’ morpheme with allomorphs *-er*, *-ite*, *-ian*, *-an*, *-ese* and perhaps others, in complementary distribution ... Yet this sort of analysis is much more seldom suggested than the parallel analysis of the inflected forms. (Carstairs-McCarthy 2005: 18).

Instead of saying that *-er*, *-an* and *-ese* are “allomorphs” of an abstract “morpheme”, it is much more usual to call such situations “rule competition” or “rivalry” (Dressler 1989: 6; Gardani et al. 2019), but there does not seem to be any difference in substance (see also Haspelmath (2020a: Section 8–9) for some discussion of suppletive morph sets and “allomorphy”). Aronoff (2019: 40) formulates the explicit goal to “provide a uniform account of both allomorphic variation and the rivalry between affixes”.

Thus, it is quite possible that some (of what appear to us as) salient differences between inflectional and derivational patterns are merely due to the way we have traditionally been speaking about them, and not due to anything in the phenomena. Now there may, of course, be very good reasons for these differences, and Carstairs-McCarthy (2005: 18) claims that “the reason for this is the looser structure of derivation by comparison with inflection”, by which he apparently refers to the completeness and uniqueness criteria that I will discuss in the next section (Section 5.2–5.3). So the question is ultimately empirical, but it is in any way worth examining the way in which our traditional habits of speaking may have influenced how we think about the two types of patterns.

Finally, can we say that only derivation is lexicon enriching? This is certainly not true in the sense that inflected forms are not stored in the mental lexicon, because all psycholinguists agree that at least some inflected forms are stored (e.g., Fábregas and Penke 2020; Stemberger and MacWhinney 1986). On the one hand, it is true that stereotypically inflected forms do not often have the function of providing “names” for nameworthy concepts such as specific types of objects, institutions, or culturally salient actions (cf. Corbett 2010: Section 3.7). Typical name-creating derivational

¹⁶ Incidentally, this semantic class also illustrates both suppletion (*Moscow: Muscovite*) and periphrasis (*Wuhan: inhabitant of Wuhan*).

markers are agent nominalizers (for specialized professions such as *bak-er*), instrument nominalizers (for implements such as *comput-er*), and derived place nouns (e.g., Indonesian *pen-cuci-an* ‘place for washing, laundry’ from (*men-*)*cuci* ‘wash’; Sneddon 1996: 41). So perhaps one can say that some derivational morphology is “name-creating” in some sense that would need to be clarified further. But this is surely not true for all derivational patterns, as event nominalizations and deadjectival abstract nouns (such as *discover-y* or *warm-th*) do not have the same “naming” flavor as patterns that derive names for kinds of people, things or places. The issue of nameworthiness deserves more consideration than it is typically given, but it is certainly not a sufficient criterion for singling out derivational patterns.¹⁷

5 Some differences that are mentioned repeatedly in the literature

In this section, I briefly go over the well-rehearsed potential distinguishing features that have been discussed again and again since Scalise (1988) and Dressler (1989), mainly as a reminder that none of them really work to delimit inflection and derivation as two distinct domains. This conclusion is not new, but as there is no full consensus yet about abandoning this architectural division, the phenomena need to be revisited here briefly. I will consider seven criteria (Section 5.1–5.7).

5.1 Inflection preserves word class, derivation can be transpositional

That derivational patterns typically change the word class (e.g., from noun to verb: *hospital* → *hospitalize*, or from verb to adjective: *read* → *readable*) has often been observed,¹⁸ and it has sometimes been regarded as a sufficient criterion.

But in Haspelmath (1996), I pointed out that “transpositional inflection” would seem to exist if one does not rule it out by definition, and Spencer (2013; 2017) has made this point even more forcefully, providing many additional examples and rich discussion. My favorite example is the Lezgian event noun (Masdar), which is

¹⁷ Bauer (2004) makes the same point and proposes that similarly to the well-known distinction between two types of inflection (contextual and inherent, Booij 1996), one may distinguish four types of derivation: lexicon-expanding, evaluative, transpositional, and valency-changing. Only the first of these corresponds to (what I call here) the “lexicon enriching” function.

¹⁸ E.g., Booij (2000: 361), Fábregas and Scalise (2012: Section 1.3.2), ten Hacken (2014: 19), Štekauer (2015: Section 3.5).

transpositional in that it inflects exactly like a noun (and has the external syntax of a noun) but is always treated as a member of the inflectional paradigm of the verb (e.g., *kis-un* ‘to be silent’, *gatu-n* ‘to beat’, *t’ü-n* ‘to eat’; Haspelmath 1993: Section 9.9.1).

5.2 Inflection is complete, derivation can be incomplete

As inflection is expected to be cell filling, it needs to be complete, whereas derivation can be “gappy” (Carstairs-McCarthy 2005: 19). For example, there must be a genitive case form for all nouns, but there need not be a derived event noun for all verbs (e.g., English lacks a derived event noun for the verbs *follow*, *draw* and *hear*; Bauer et al. 2013: 203). This criterion is called “generality” by Bybee (1985: 87; 99): Derivational patterns need not be fully general.

However, inflection may show gaps, too. In some cases, linguists call the paradigms “defective” when there is no standard way to fill the cells (see Sims 2019), but in others, a gap can be filled standardly by a “periphrastic form” (Chumakina and Corbett 2012; Haspelmath 2000). This is just as with derivational patterns, as we saw in (13) above (*joueur de go* is a periphrastic way to fill the gap of a ‘go player’). Linguists do not call paradigms like the French game practitioner paradigm “defective”, but this seems to be merely a way of speaking. Moreover, some patterns that are usually called *derivational* are not “gappy”. All English adjectives seem to have a corresponding derived abstract noun (*warm/warmth*, *rough/roughness*, *washable/washability*), as well as a corresponding *-ly* adverb, as long as they have the right meaning.

5.3 Inflection provides a unique form, derivation may offer a range of forms

A cell needs to be filled by a form, and it is usually implied that there is only a single form. When an inflected form is not created by a rule but must be stated separately, we often find that the corresponding regular form does not occur. For example, the irregular comparative of Latin *magnus* ‘big’ is *major* ‘bigger’, and the form that would be created by the regular rule (**magn-ior*) is not possible. This can be explained by a “morphological blocking” mechanism if an inflectional cell can only be filled by a single form. By contrast, synonymous derivational forms seem not to be blocked in the same way, so alongside *warm-th*, we may also have *warm-ness*.

However, this picture is greatly oversimplified, and in fact, we do not know whether there is a general tendency for synonymy blocking to occur preferentially in inflectional morphology. On the one hand, many languages have OVERABUNDANT cells

which are filled by two different forms. Thus, English has the irregular past tense form *dreamt*, but the regular form *dreamed* is not blocked by it. Thornton (2019) provides an overview of the phenomena and theoretical assessments of overabundance in inflection.

On the other hand, it has been observed that in derivational morphology, too, frequently occurring forms can block the formation of productive alternatives. Thus, Rainer (1988) observed that Italian *-ità* (corresponding to English *-ity*) is blocked from occurring on adjectives ending in *-oso* (corresponding to English *-ous*) when the corresponding simple abstract noun is highly frequent (e.g., *coraggio*, *pietà*), but not when it is rare (*malizia*, *acrimonia*):

(15)

ADJECTIVE	ABSTRACT IN <i>-ità</i>	SIMPLE ABSTRACT	
<i>coraggioso</i>	* <i>coraggios-ità</i>	<i>coraggio</i>	‘courage’
<i>pietoso</i>	* <i>pietos-ità</i>	<i>pietà</i>	‘pity’
<i>malizioso</i>	<i>malizios-ità</i>	<i>malizia</i>	‘malice’
<i>acrimonioso</i>	<i>acrimonios-ità</i>	<i>acrimonia</i>	‘acrimony’

Thus, the uniqueness that is stereotypically found in inflection is characteristic of some derivational patterns, too, and some inflectional patterns show the kind of rivalry or competition that is seemingly characteristic of derivation.

5.4 Inflection is productive, derivation need not be productive

Productivity (the possibility of creating novel forms) is often mentioned as characteristic of inflectional patterns,¹⁹ and it is indeed a necessary prerequisite of completeness (Section 5.2) for open lexeme classes such as nouns and verbs: If a form must be available for every cell for all nouns and the class of nouns is open, there must be at least one productive pattern. For example, Arabic has a variety of unproductive plural-forming patterns (Ryding 2005: 132–155), but since new nouns can be added, there must be at least one productive way of forming plurals (and indeed, there are several; e.g., *talifuun* ‘telephone’, plural *talifuun-aat*; Ryding 2005: 138).

Spencer (2016: 38) draws a distinction between the productivity of a particular inflectional pattern (e.g., the productivity of the *-ity* abstract noun) and “the more abstract properties of lexical relatedness, independent of the morphological means used to express it” (see also Gaeta 2007). So we might say that the Arabic plural pattern *CuCuC* (e.g., *kitaab* ‘book’, *kutub* ‘books’) is unproductive, but plural

19 E.g., Booij (2000: 363), Aronoff and Fudeman (2011: 169), Fábregas and Scalise (2012: Section 4.1), ten Hacken (2014: 20), Spencer (2016: 37).

formation, in general, is productive in Arabic. In Haspelmath (1996: 47), I understood productivity in the latter (“more abstract”) sense, but this was a mistake: In this sense, it really means the same as completeness or generality (Section 5.2). Thus, the term *productivity* should be used only for the former sense, i.e. for a particular construction. In this sense, there are of course many unproductive inflectional patterns (e.g., English past tense formation with vowel shortening and a *-t* suffix: *keep/kept*, *dream/dreamt*, *sleep/slept*).

And when a lexeme class is not open, there need not be any productive pattern to achieve completeness of inflectional patterns. For example, the Australian language Jaminjung has only 33 Inflecting Verbs showing somewhat different inflecting patterns, and none of the patterns need to be productive because the class of Inflecting Verbs is closed (Schultze-Berndt 2000). Completeness without productivity can be observed in many languages in small closed classes like personal pronouns. In German, one will probably want to say that there is an accusative suffix *-ch* (*ich/mi-ch* ‘I/me’, *du/di-ch* ‘you(SG)’, *ihr/eu-ch* ‘you(PL)’), but it is not productive. Thus, inflectional constructions may be productive or unproductive, just like derivational constructions.

5.5 Inflection is semantically regular, derivation need not be regular

That lexemes formed by derivational patterns are often semantically unpredictable is well known.²⁰ For example, the Italian prefix *ri-* usually has the sense of repetition or reversal (*ri-leggere* ‘reread’, *ri-spedire* ‘send back’), but a few *ri-* verbs have idiosyncratic meanings (e.g., *chiedere* ‘ask’, *ri-chiedere* ‘request’) (Gaeta and Ricca 2005: 102). This property has often been associated with listing in the lexicon. According to Stump (1998: 17), the fact that derived lexemes are listed in the lexicon frees their meanings to “drift” idiosyncratically, while the fact that regularly inflected forms are not listed requires their meanings to remain rule-regulated.

However, inflected forms may also “drift”, both phonologically and semantically. It has long been well known that high-frequency forms tend to become phonologically irregular (apparently because they are stored and not each time recreated on the fly, Bybee 1985: Ch. 5); an example is Luxembourgish *kommen* ‘come’, which has 2nd and 3rd person singular forms *kënn-st*, *kënn-t* (instead of regular **komm-st*, **komm-t*, Nübling 2011: 145; the corresponding verb in German happens to be regular). And examples of semantic drift of inflected forms are also widely cited, e.g., Russian *čas-y* ‘clock’ (plural of *čas* ‘hour’), Germans *Abend-s* ‘in the

²⁰ E.g., Plank (1994: Section 1.5), Haspelmath (2002: 73), Booij (2000: 364); Dressler (1989: 7) says that inflection is “morphosemantically more transparent”.

evening’ (genitive of *Abend* ‘evening’), Russian *leto-m* ‘in the summer’ (instrumental of *leto* ‘summer’; Spencer 2016: 38).

It is probably true that such cases of semantic drift are more isolated in inflectional patterns, while they tend to be very common with certain derivational patterns, at least in the European languages where such patterns have been studied extensively. But until we have a way of quantifying the differences, it is best not to make strong general claims.

5.6 Inflection is determined by the syntax, but derivation is not

According to Štekauer (2015: 222), “while inflectional morphology is obligatory in a syntactic construction, derivational morphology is not.” Baerman (2015: Section 1.1) expresses the same idea as follows:

With inflection, the set of word forms is predetermined, in that a member of a given word class has certain duties to perform ... Derivation for its part has no present list of job duties, and thus no binding obligations. (Baerman 2015: 2,3)

Baerman exemplifies the contrast with contexts such as *She often X₁* and *He X₂ yesterday*, and notes that in these contexts, if $X = ski$, then *ski-s* is required for X_1 and *ski-ed* for X_2 , and all verbs must have corresponding forms for these contexts in order to be able to fill the cells of the paradigm schema.

Another way of putting it is that “inflection, but not derivation, is determined by syntax” (Aronoff and Fudeman 2011: 168), and Spencer (2016: 37) calls this criterion “syntactic determinism”.²¹ It was originally proposed and highlighted by Anderson (1982: 587), but Booij (1996) noted that it applies only to a subset of inflectional patterns, which he called *contextual inflection*. Inflectional meanings such as nominal number and verbal tense are not syntactically determined, and in many languages, they are not involved in agreement relations at all.

Conversely, derivational patterns may be “syntactically determined” in that they are required for particular propositional-act functions. Thus, when the concepts ‘sincere’ and ‘discover’ are used in contexts of reference, derived nouns are syntactically required (*sincer-ity*, *discover-y*):

- (16) a. *I admire Kim’s sincerity.* (**Kim’s sincere*)
 b. *The discovery of Polonium made Marie Curie famous.* (**the discover*)

Syntactic “determination” is also characteristic of voice (or “valency-changing”) markers such as causative or applicative markers. Consider the contrast in

²¹ See also Dressler (1989: 6) and ten Hacken (2014: 22–23).

(17a)–(17b), where the second sentence shows a comitative applicative with ‘wife’ as the object argument (absolute-marked).

- (17) Yidiñ (Dixon 1977: 303)
- a. *Wagu:ḍa ḵinanḵ waga:l-di.*
 man(ABS) sit wife-COM
 ‘The man is sitting with his wife.’
 - b. *Waguḍa-ḵgu wagal ḵina:-ḵal.*
 man-ERG wife(ABS) sit-APPL
 ‘The man is sitting with his wife.’

Bickel and Nichols (2007: 187) mention this example and say that it must be an inflectional form by their criteria because “its occurrence is an obligatory response to at least some syntactic environments”. A similar pattern that is traditionally regarded as derivational but has been found to be syntactically relevant is Dutch *be-*verbs (Booij 2000: 365).

5.7 Inflection is obligatory, but derivation is not

In addition to being required by certain syntactic contexts, inflectional meanings are also sometimes said to be obligatory simply in the sense that we are forced by a language to express them. Bybee (1985: 81) says that “the most successful criterion is obligatoriness” (citing Greenberg 1960): Obligatory features force certain choices upon the speaker. In English, every noun phrase must be either definite or indefinite, and every finite clause either past or present. Derivational patterns are said not to be obligatory in this sense. A very similar idea was expressed famously by Jakobson (1959), who attributed it to Boas, citing the following passage from Boas (1938: 132):²²

When we say, “The man killed the bull”, we understand that a definite single man in the past killed a definite single bull. We cannot express this experience in such a way that we remain in doubt whether a definite or indefinite person or bull, one or more persons or bulls, the present or past time are meant. We have to choose between aspects and one or the other must be chosen. The obligatory aspects are expressed by means of grammatical devices.

But these examples from English are not representative of what happens in the world’s languages. Definite articles are often optional so an articleless nominal is not necessarily indefinite. Past tense markers are often optional so that their absence does not necessarily imply non-past meaning. Plural markers, too, are often optional

²² Greenberg was influenced by Boas and Jakobson; in fact, all three authors worked at Columbia University in New York in the mid-twentieth century.

(Haspelmath 2005), so when they are not present we cannot always infer singular meaning. Likewise, accusative, ergative or locative markers are often optional (e.g., Lestrade 2013), and object indexing is frequently optional as well (e.g., Just 2022). Thus, while it may be typical of inflectional meanings in European languages to be expressed obligatorily, it is not at all clear that this is true (even as a tendency) from a worldwide perspective.

It is well-known that there is often a zero-marked member in an inflectional paradigm, and in many situations, we want to say that there is a specific “zero meaning” associated with it. For example, the Russian word form *ruk-Ø* ‘of the hands’ (an inflected form of *ruk-a* ‘hand’) is clearly associated with a genitive plural meaning, and the English Present tense *they play-Ø* is clearly associated with a habitual meaning (Bybee 1994: 239). In such cases, we can indeed say that the relevant feature values are obligatorily expressed, even if there is no overt marker that codes them. However, this mechanism is not restricted to inflection in the narrow sense: For example, the English Present Progressive construction, which is obligatory (*they are playing right now*, **they play right now*), restricts the Present tense forms to habitual sense. And the creation of a new marker does not have to lead to a new meaning, even if it becomes obligatory. For example, the Persian accusative-case suffix *-râ* is obligatory with definite objects, but this is the only case suffix in the language, and we would not want to say that it has led to the creation of a “non-accusative” grammatical meaning (Arkadiev 2016). Even for the English contrast *book* versus *books*, Booij (2000: 362) says that it may be that *book* simply lacks a specification for number, rather than having a specified meaning.

Thus, we cannot say that inflectional patterns are characterized by their general obligatoriness. On the contrary, one might perhaps say that it is typical for inflectional markers to be optional because they tend to express meanings that can be easily inferred from the context (Dahl 1985: 13), whereas this is not the case for lexicon enriching derivational meanings.

5.8 Difference in “lexical meaning”

Finally, it has often been suggested that inflectional and derivational patterns express different kinds of meanings. Aronoff and Fudeman (2011: 170) say:

Inflectional morphology does not change the core lexical meaning or the lexical category of the word to which it applies. Derivation does the former and may do the latter.

Similarly, Baerman (2015) says that “inflection preserves the lexical meaning while derivation changes it”, and Corbett (2010: 146) says that “a derived word includes an additional semantic predicate in comparison with its base” (see also Spencer 2013: 60).

But what exactly is meant by “lexical meaning” is rarely said explicitly, and it is not clear why “plural reference” or “future time reference” cannot be considered as additional semantic predicates (‘plural’ is treated as a semantic predicate by authors such as Jackendoff and Jenny 2020: 30). Bybee (1985: Section 4.1.1) and Wurzel (1996: Section 2) distinguish between two types of derivational patterns: those that have a lexicon enriching function (called “naming function” by Wurzel), and those that have a “recategorizing” (or transpositional) function (see also Aronoff 2019: Section 7). As we already saw in Section 4 above, the naming or lexicon enriching function is indeed somewhat special, but many traditional derivational patterns are transpositional or valency-changing, and thus cannot be said to be “lexical” (as opposed to “grammatical”) in any clear sense.

A reviewer suggests that the main difference between inflectional and derivational paradigms is that inflected forms are actual words while derivational forms may be actual or potential (cf. Bauer 1997). But it is not clear what it means for a possible word to be “non-actual”, and it appears that this notion is strongly influenced by our habits of recording derived words in dictionaries (making unrecorded possible words seem “non-actual”).

In a distributional-semantic corpus study of French inflectional and derivational patterns, Bonami and Paperno (2018) found that inflectional and derivational patterns are significantly different, in that inflectional forms are much more closely related to each other than derivational forms. However, they did not find any discrete difference, but rather a continuous distribution. If they had not classified their patterns as inflectional and derivational in advance, they would not have detected a bifurcation in their data.

6 Inflection versus derivation as an architectural difference?

We have seen that there are few if any clear substantive differences that can justify a binary subdivision of patterns into “inflection” and “derivation”, but the idea that they have different places in the architecture of grammar seems to be still fairly widespread.

Most notably Anderson (1982; 1992) has proposed that inflectional morphology is part of the syntactic component, while derivational morphology is part of the lexical component of the language system. This idea has sometimes been called the Split Morphology Hypothesis (Booij 1996; Perlmutter 1988). Another prominent author who has emphasized the split is Aronoff.²³

²³ Scalise (1984: 101) and ten Hacken (2014: 15) call this the Weak Lexicalist Hypothesis (contrasting with the Strong Lexicalist Hypothesis, where all of morphology is in the lexicon).

derivation and inflection are not kinds of morphology but rather uses of morphology: inflection is the morphological realization of syntax, while derivation is the morphological realization of lexeme formation. (Aronoff 1994: 126)

If one thinks of inflection in terms of filling the cells of a pre-established grid (as in Section 4), then this view is almost inevitable, because we do not think of derivational patterns as realizations of the cells in a grid.

The grid itself is typically called a “lexeme”, and it is often noted that the notions of “inflection” and “lexeme” are closely related. Stump (1998) and Bonami et al. (2018) are explicit about this, though they differ in which concept they take as foundational. According to Stump (1998: 13), “the notion of inflection rests on the more basic notion of lexeme” (see also Stump 2019: Section 4.1). Bonami et al. (2018: vi–vii) put it the other way around:

Because the definition of a lexeme derives from that of an inflectional paradigm (lexemes abstract away from inflection), using the notion commits one to a particular view of morphology. It presupposes the existence of a split between inflectional and derivational morphology (Matthews 1965: 140, note 4; Anderson 1982; Perlmutter 1988).

Thus, to the extent that there is no good reason to make a substantive distinction between inflection and derivation, we lack a substantive motivation for the “lexeme” concept.

Just as the notions of “inflection” and “lexeme” are intimately bound up with each other, they are closely connected to the notion of a “paradigm”. Textbooks often define “paradigm” as “the set of all the inflected forms that a lexeme assumes” (Aronoff and Fudeman 2011: 44). But again, this seems to be no more than a way of speaking. Derivational relationships can be conceptualized in terms of paradigms if one wants, and the parallels between inflectional paradigms and derivational paradigms have in fact been highlighted repeatedly (e.g., Bauer 1997; Fernández-Domínguez et al. 2020; Štekauer 2014). Bonami and Strnadová (2019: 172) give the French examples in (18a)–(18b) to illustrate the parallels:

- (18) a. ‘equal’ ‘old’
- | | | |
|------|---------------|-----------------|
| M.SG | <i>égal</i> | <i>vieux</i> |
| F.SG | <i>égale</i> | <i>vieille</i> |
| M.PL | <i>égaux</i> | <i>vieux</i> |
| F.PL | <i>égales</i> | <i>vieilles</i> |
- b. ‘wash/washer/washing’ ‘form/former/forming’
- | | | |
|----------|---------------|------------------|
| VERB | <i>laver</i> | <i>former</i> |
| AGENT N. | <i>laveur</i> | <i>formateur</i> |
| EVENT N. | <i>lavage</i> | <i>formation</i> |

Thus, we have seen that inflectional patterns and derivational patterns are very similar in most respects and that there are few if any substantive differences that can be associated with these two classical types of patterns.

This means that we have little support from language systems for the view that inflectional and derivational patterns are distinct in the cognitive architecture. Indeed, we may suspect that the main reason why linguists often assign them different architectural places is the old habit of talking differently about them, and of describing them in tabular form in grammars or in list form in dictionaries.

7 Inflectional and derivational constructional schemas

For further illustration of the similarities between derivation and inflection, I will now give a few examples of formal representations of such patterns, using the notational conventions of Jackendoff and Jenny (2020).

The first example covers adjective derivations such as English *wid-en* ‘become wide’, *black-en* ‘become black’. The derivational pattern consists of two schemas, one for the base (in 19a) and one for the derived word (in 19b).²⁴

(19)	semantics:	a. PROPERTY_α	b. $[\text{BECOME} ([\text{PROPERTY}]_\alpha)]_x$
	syntax:	A_α	$[V_\alpha \text{ aff}_1]_x$
	phonology:	$/\dots/_\alpha$ (e.g., <i>wide</i>)	$/\dots_\alpha \text{ ən}_1/_x$ (e.g., <i>wid-en</i>)

The two constructions which are linked in a “horizontal relation” are called *SISTER SCHEMAS*. The first schema is the schema for adjectives (*wide*, *black*, etc.), and consists of a schematic meaning (‘some property’), a schematic syntax (an element of syntactic category A(djective)), and a schematic phonology (here one can further specify that the pattern concerns only monosyllabic adjectives). The second schema is the schema for the derived inchoative verbs: They have the meaning ‘become’, they are syntactically composed of a verb stem and an affix, and phonologically they end in [ən]. There are three types of subscript indices that indicate links: Number subscripts are used to link specific phonological elements to their syntactic properties (thus [ən] is said to be an affix), and Latin letter subscripts are used as interface links for abstract schemas: Thus, the subscript *x* says that the entire phonological element $/\dots_\alpha \text{ ən}_1/_x$ is linked to the entire syntactic element $[V_\alpha \text{ aff}_1]_x$, and both have the entire

²⁴ Examples (19), (20) and (21) are based on Jackendoff and Audring’s (49), (47), and (31), respectively (p. 109, 108, 149).

meaning [BECOME ([PROPERTY]_α)]. Greek letter subscripts are used to show relational links across two related schemas: The subscript α links the semantic component PROPERTY in the verb schema (19b) to the corresponding component in the adjective schema (19a), and this index is also attached to the relevant parts of the verb schema.

The next example shows how bidirectional derivational patterns (Becker's 1993 CROSS-FORMATIONS) can be represented in this notation, e.g., *pacifism/pacifist, pessimism/pessimist*.

- (20) sem: a. IDEOLOGY_β b. [ADHERENT (IDEOLOGY_β)]_z
 syn: [N – aff₂]_β [N – aff₃]_z
 phon: /... α ɪzəm₂/_β /... α ɪst₃/_z

Again there are three types of subscript indices that show the links: Number subscripts for the suffixes [ɪzəm] (subscript 2) and [ɪst] (subscript 3), the Latin letter subscript z for the second schema, and the Greek letter subscript β that links between the two schemas. While this subscript is linked only to the semantic part of the second schema, it is linked to the entire word in the first schema – this is what we want, because *pacifism* and *pessimism* are the ideologies, so that the affix *-ism* has no independent meaning here.

The final example shows how inflectional patterns are represented. Like derivational cross-formations, they are sister schemas. For example, the partial verb paradigm of German *machen* 'make' in (21a) exemplifies the general schema in (21b).

- (21) a. 1SG *mach-e* b. [Ve]
 2SG *mach-st* [Vst]
 3SG *mach-t* [Vt]

This paradigm of *machen* can be represented more formally as in (22a)–(22c) (Jackendoff and Jenny 2020: Section 5.4.2).

- (22) sem: a. [MAKE (SPEAKER_{4,5})]₆ b. [MAKE (ADDRESSEE_{7,5})]₈ c. [MAKE (ANAPHOR_{9,5})]₁₀
 syn: [V 1₄ SG₅]₆ [V 2₇ SG₅]₈ [V 3₉ SG₅]₁₀
 phon: /max ə_{4,5}/₆ /max st_{7,5}/₈ /max t_{9,5}/₁₀

The abstract inflectional paradigm, corresponding to the short version in (21b), is shown in (23).

- (23) sem: a. [DO (SPEAKER_{4,5})]₆ b. [DO (ADDRESSEE_{7,5})]₈ c. [DO (ANAPHOR_{9,5})]₁₀
 syn: [V 1₄ SG₅]₆ [V 2₇ SG₅]₈ [V 3₉ SG₅]₁₀
 phon: /... ə_{4,5}/₆ /... st_{7,5}/₈ /... t_{9,5}/₁₀

Thus, in the notation proposed by Jackendoff and Audring, there is no essential difference between typical derivational patterns like *wide/widen*, derivational sister constructions in cross-formations like *pacifism/pacifist*, and inflectional sister

constructions like *make/machst/macht*. In all cases, we have words and schemas which are instantiated by several words.

Traditionally, derivational relationships of the type *wide/widen* are not treated as sister constructions, but as a base and a derived lexeme in an asymmetric relation, unlike inflected forms in a paradigm, which tend to be thought of as on an equal footing. However, there is no essential difference between the two. On the one hand, many languages lack zero forms of verbs and nouns, so derived forms cannot be based on actual forms of the base and must be cross-formed like *pacifist* (e.g., Greek *hippó-dromos* ‘hippodrome’ cannot be based on any form of *hippos* ‘horse’, because there is no form **hippo*; Bloomfield 1933: 229). On the other hand, many inflectional patterns do include a zero form, just like stereotypical derivational patterns. In fact, Bybee (1985: 50–58) says that the “basic-derived” relation pervades morphological systems, independently of the inflection-derivation distinction.

8 Defining *inflection*, *derivation* and *lexeme*

We have seen that there is no clear basis in the phenomena of languages for an architectural distinction between inflection and derivation, so it may come as a surprise that in this section, I will propose definitions of these terms. The reason for this is that the terms will continue to be used anyway, even if the non-distinctness of the two kinds of constructions becomes a broad consensus among general linguists. These two terms are deeply entrenched in the discipline and will continue to be presented in textbooks and used in grammatical descriptions. It is thus best if we give clear and simple definitions, even if the concepts that are associated with the terms are not natural parts of languages.²⁵

Here I would like to propose the definitions in (24) and (25).²⁶

(24) **inflection:**

An inflectional construction is a construction in which an inflectional meaning (role, person, number, gender, tense, mood, evidentiality, polarity) is expressed by an affix or nonconcatenatively.

²⁵ Such definitions of well-known established terms are called *retro-definitions* in Haspelmath (2021b).

²⁶ The exact way in which “nonconcatenatively” is understood in these definitions must be left for future work. In any event, it must be clear that both inflectional and derivational constructions are expressed within a word-form (see Haspelmath 2023).

(25) **derivation:**

A derivational construction is a construction in which a meaning other than an inflectional meaning is expressed by an affix or nonconcatenatively.

Thus, instead of defining *inflection* on the basis of the *lexeme*, I propose that it should be defined on the basis of a fixed set of meaning domains, given in (26). Impressionistically, these are the meaning domains that are most commonly regarded as being expressed inflectionally in the world's languages.²⁷

(26) **inflectional meaning domains**

- a. role of participant (agent, patient, recipient, locative, ...)
- b. person of participant or possessor (1, 2, 3, ...)
- c. number (singular, plural, ...)
- d. gender of agreeing element (masculine, feminine, ...)
- e. tense (present, future, past, ...)
- f. mood (indicative, imperative, ...)
- g. evidentiality (visual, hearsay, ...)
- h. polarity (negative, affirmative)

This list is somewhat arbitrary, for example in that it excludes aspect and illocution type, which are sometimes included in inflectional paradigms, for good reasons: Many languages have not only highly general tense marking on verbs but also aspect marking; and some languages mark verbs for interrogative vs. declarative illocution type. But aspect markers are often treated as derivational (e.g., in Slavic languages, Dahl 1985), and markers of illocution type are more often associated with the entire clause or a range of different clause elements (Dryer 2005). The list of eight meaning domains in (26) seems to represent the core of the meanings that are generally included in inflection, so if the definition is based on these meanings, it corresponds fairly closely to the way in which the term *inflection* has generally been understood in the literature.²⁸

Another type of construction that is excluded from inflection here is transpositional constructions (Spencer 2013, 2017), even though some of them have traditionally been included in inflection. Most notably, deverbal participial forms (e.g., (27a)), deverbal event nominalizations (e.g., (27b)), deadjectival adverbs (e.g., (27c)), and deverbal converbal forms (e.g., (27d)) have often been regarded as inflectional forms.

²⁷ There are very probably good reasons for this, in the sense that the meanings in (26a)–(26h) seem to be “less relevant” (in the sense of Bybee 1985) to the stem's meaning than other meanings that are expressed affixally. I do not pursue this further here because the present paper concerns primarily our concepts and terms.

²⁸ Panocová's (2021) chapter on inflectional categories has subsections corresponding to most of these (though she adds voice and aspect, which are traditionally included, but excluded here).

- (27) a. Russian participle (deverbal adjective)
načina-juščij ‘beginning’
 (Spencer 2018)
- b. Lezgian masdar (deverbal nominalization)
gatu-n ‘beating’
 (Haspelmath 1993: Section 9.9.1; see Section 5.1 above)
- c. French deadjectival adverb
lente-ment ‘slowly’
 (Dal 2018)
- d. Turkish converb (deverbal adverb)
gid-ip ‘having gone’
 (Johanson 1995)

Forms such as these have been included in inflectional paradigms in these languages because they occur very generally (with all verbs and adjectives if the meaning allows it) and because they are formed very regularly. For this reason, they need not be included in dictionaries of these languages but can be treated in grammars. But generality and regularity cannot be a basis for distinguishing between inflection and derivation (as we saw in Section 5), so the defining criterion must be semantic. And while the eight semantic domains in (26) are virtually always expressed by constructions that are included in inflection, there are many languages where deverbal adjectives and event nouns are treated as derivational. Thus, transpositional constructions cannot be included in general and hence are best excluded.

This proposal will go against many readers’ intuitions, but there seems to be no way of defining *inflection* and *derivation* in a way that is clear and simple and at the same time corresponds fully to every linguist’s intuitions. Some authors have proposed that the terms should be seen as representing prototypes or poles on a continuum, an alternative view that I will briefly discuss in the next section (Section 9).

The proposal to define inflection and derivation in notional terms also means that it is not possible to say that a given meaning is expressed inflectionally in one language, but derivationally in another language (see Bauer and Bauer 2012: Section 4 for some discussion). Linguists have sometimes said this, e.g., that plurals are derivational in some languages but inflectional in others (e.g., Wiltschko 2008), or that aspect is derivational in some languages but inflectional in others (e.g., Lehmann 2004). But determining the inflectional or derivational character nonsemantically would be possible only if we had morphosyntactic criteria that could be applied uniformly across languages. As we saw, however,

there are no such criteria, and it would be incoherent to use different criteria in different languages.²⁹

Finally, we also need a definition of *lexeme*, because this term is very widely used in the literature, and it should be defined in terms of “inflectional meaning” (rather than the other way round). First, we need to recognize that a lexeme is generally understood as an abstract entity – not as a form that can be perceived and pronounced, but as a SET OF FORMS. That a lexeme is a set of forms is not always made clear, and textbooks often give informal characterizations rather than definitions, e.g.,

We have to make a distinction between the notion ‘word’ in an abstract sense (**lexeme**) and the notion ‘word’ in the sense of ‘concrete word as used in a sentence’. The concrete words *walk*, *walks*, *walked*, and *walking* can be qualified as **word forms** of the lexeme *WALK*. Small capitals are used to denote lexemes when necessary to avoid confusion between these two notions ‘word’. (Booij 2005: 3)

Saying that “*walk*, *walks* ... can be qualified as word forms of the lexeme *WALK*” makes sense only if these forms are members of a set of forms, and if *WALK* is the label for this set. This is made explicit by some authors, e.g., Mel’čuk (2006: 420) and Blevins (2016: Section 3.2.2).³⁰

Thus, a lexeme is a set of forms that have something in common, but what exactly do they have in common? I propose that we define *lexeme* on the basis of the notion of a LEXEME-STEM, as defined in (28).

(28) **lexeme-stem:**

A lexeme-stem is a root, or a compound, plus possibly derivational affixes, that can combine with inflectional affixes if the language has any but does not contain any inflectional affixes.

Informally, we can say that a lexeme-stem is something that we get when we strip an inflected form of its inflectional affixes. A few simple examples are given in (29). German *Auto-bahn* and Spanish *juga-dor* show that lexeme-stems may contain several roots or derivational affixes, but they do not contain inflectional affixes.

²⁹ Volker Gast (p.c.) observes that some markers express both inflectional and derivational meanings simultaneously, e.g., the Spanish Pretérito Indefinido, which is a perfective past construction. According to the current definitions, they would thus fall under both inflection and derivation. That cumulative exponence involving both inflection and derivation is occasionally attested has been noted by Ricca (2005).

³⁰ “A lexeme is a set of wordforms and analytical-form phrases that differ only by inflectional significations” (Mel’čuk 2021: 420). – “Despite the fact that a lexeme may contain just a single grammatical word, treating lexemes as sets of words provides a coherent interpretation for an intuitive but otherwise formally obscure notion” (Blevins 2016: 62).

(29)	language	lexeme	lexeme-stem	some word-forms in the set
	English	WALK	<i>walk-</i>	<i>walk-s</i> , <i>walk-ed</i>
	Latin	LUPUS ‘wolf’	<i>lup-</i>	<i>lup-us</i> ‘NOM.SG’, <i>lup-i</i> ‘NOM.PL’
	German	AUTOBAHN ‘freeway’	<i>Auto-bahn-</i>	<i>Autobahn-en</i> ‘freeways’
	Spanish	JUGADOR ‘player’	<i>juga-dor-</i>	<i>jugador-es</i> ‘players’

Linguists often treat lexemes as if they were forms, not abstract entities,³¹ and when they do this, they seem to have something like the notion of lexeme stem in mind. Informally, one can of course use *lexeme* in the sense of ‘lexeme-stem’, but it should be kept in mind that the more correct term for a kind of form that does not include (but could be combined with) inflectional affixes is *lexeme-stem*.³²

On the basis of this notion of lexeme-stem, we can define a lexeme as in (48).³³

(30) **lexeme:**

A lexeme is the set of forms that minimally contain the same lexeme-stem, or one of its suppletive counterparts, and that may only contain inflectional affixes in addition.

Thus, the set of inflected English forms *walk*, *walk-s*, and *walk-ed* belongs to the lexeme WALK, because they all contain the lexeme-stem *walk-*, and those forms that contain more elements (*walk-s*, *walk-ed*) only contain inflectional affixes. The form *walk-er* additionally contains a derivational affix, so it does not belong to the lexeme WALK. Note that the definitions in (28) and (30) talk about inflectional affixes so that endophonic (stem-changing) expressions of inflectional meaning are ignored. This must be so because such constructions do not create new stems, but rather make use of stem variants. (A more complex formulation of the definitions might take into account reduplication, but this is left aside here.).

The definition in (30) contains the additional concept SUPPLETIVE COUNTERPART, which I will not define here (intuitively, suppletive form sets are characterized by the same semantico-syntactic content but a different morphosyntactic distribution). This concept is meant to accommodate the widespread view that lexemes may include

³¹ For example, Breiter (1994) investigates “the length of lexemes in Chinese”.

³² Occasionally, inflectional affixes occur directly on the root and derivational affixes occur outside of them. Such cases are not covered by this definition, which concentrates on the core phenomena and thus follows the principle that comparative concepts for general linguistics should be “shared-core definitions” (Haspelmath 2021b: Section 5).

³³ Peter Arkadiev (p.c.) suggested that this could be simplified and formulated without reference to lexeme-stem: “A lexeme is a set of word-forms that differ only in inflectional meanings”. But this definition presupposes the notion “word-form” (which is less straightforward to define than *lexeme-stem*), and it does not allow for synonymous lexemes (such as *buy/purchase*, *stop/cease*, *allow/permit*).

forms based on suppletive stems, such as *wen-* in the English lexeme *go* (with its word forms *go*, *go-es*, *go-ing*, *wen-t*). It would take us too far afield here to attempt a simple definition of ‘suppletive counterpart’, but it must be clear that it cannot be defined on the basis of ‘lexeme’. Thus, we cannot say that *wen-(t)* is a suppletive counterpart of *go* because it belongs to the same lexeme; clearly, it must be the other way around.³⁴ Since suppletion is not a major phenomenon in inflectional patterns, it is not so important to pursue this matter here.

To conclude this section, let me remind readers that the definitions given in this section are meant as GENERAL definitions of *inflection*, *derivation* and *lexeme*, i.e. as definitions of these terms when they are used in a general or comparative sense. In language-particular descriptions, the terms can of course be used somewhat differently. It is quite commonly the case that language-particular terms which are homonymous with general terms have a specific language-particular meaning (cf. Haspelmath 2020b: Section 3), so if a description of Lezgian includes the Lezgian Masdar and the Lezgian Converbs in “Lezgian Inflection” (e.g., Haspelmath 1993: 71, 110, 122), this is not a problem. Ideally, the capitalization convention for language-particular terms will remove any ambiguity.

9 Against fuzziness, prototypes, and continua

That inflection and derivation do not fall into clearly delimitable classes has often been said before (perhaps most clearly by Plank 1994), but an idea that is found very widely is that these notions have a justifiable place in linguistics after all, in one of the three ways in (31).

- (31)
- a. Inflection and derivation exist as distinct classes, but with fuzzy boundaries.³⁵
 - b. Inflection and derivation exist as prototypes so it makes sense to ask whether a pattern is more or less prototypically one or the other (e.g., Dressler 1989).
 - c. There is a continuum from extreme inflection to extreme derivation (e.g., Bybee 1985: Ch. 4; van Marle 1996: 69).

³⁴ Spencer (2013: 13; 2018) introduces a notion of “lexemic index”, which is what is shared by *go* and *wen-(t)*. Maybe this is the sort of notion we need in order to express the idea that two different roots may belong to the same inflectional paradigm, though it is not clear to me whether such devices can have a role in a general-comparative context such as the present one.

³⁵ E.g., Körtvélyessy and Štekauer (2018: 352): “It is now generally acknowledged that the borderline is fuzzy and that no strict boundary between derivation and inflection can be drawn.”

In fact, it may well be that in an informed opinion poll of linguists, a majority would prefer this view to the architectural-split view of Section 6, so I should briefly say here why I do not regard it as helpful.

I began this article by noting that our habit of making an inflection–derivation distinction is perhaps primarily due to the way we have traditionally organized our descriptions. This is not more than a suspicion, so how could we find out whether it is correct? Conversely, how could an advocate of an architectural split demonstrate that there is a real contrast between two types of morphological constructions? Clearly, to answer these questions, we need basic notions that do not already presuppose the concepts of inflection and derivation but that are completely independent of them. If we presuppose the relevance of these concepts but define them in a vague way, then we are bound to get fuzzy results (unless the concepts we started out with happened to correspond closely to real phenomena).

Zwicky (1994) discusses the general problem with “clines, squishes and continua”, in an article devoted to clitics (but where he also mentions other “cline hypotheses”, e.g., a scale between derivational affix and compound element). He focuses on two defects of such suggestions:

- (i) that there is no independently definable dimension of variation, so that the cline is an ad hoc creation, and (ii) that there are many different ‘paths’ between the poles – not one dimension, but a number, along which different items can differ in different ways (Zwicky 1994: xiii–iv)

If a dimension is defined by a single measure and if this measure can take an indefinite number of ranked values, then a continuum would be well-defined, but this is not the case for the inflection–derivation contrast.

For this reason, it is generally better to define technical concepts of general grammar in a sharp (i.e., non-fuzzy and discrete) way, and to apply this principle also to retro-definitions (Haspelmath 2021b: 44). It may well be that the old terms that are retro-defined in this way will play no role in our future understanding, and this would, of course, be quite unsurprising (the history of science is littered with terms and concepts that were abandoned because they turned out to be unhelpful). But if we continue to use traditional terms without definitions, we may never find out whether they correspond to distinctions that exists in the phenomena.³⁶

³⁶ Again, the situation is quite similar to the problems with the traditional term *word*: If we simply presuppose that the traditional terms *word* and *affix* are relevant and at the same time define them in a vague way, we will get fuzzy results unless they happen to correspond to real phenomena (Haspelmath 2011: Section 6). Thus, it is better to define *affix* in a sharp but arbitrary way (Haspelmath 2021a: Section 6), thereby making it clear that it is an open question to what extent this traditional term corresponds to anything in the phenomena.

10 Conclusions

This article has drawn attention to the fact that the inflection–derivation distinction is associated with a striking difference in the way we talk about these patterns: Inflectional patterns are treated as “filling cells” in a grid that is defined by abstract dimensions and their values, but derivational patterns are treated as adding new items to the “lexicon”. But there is no corresponding clear contrast in the phenomena, as Joan Bybee noted some time ago:

While linguists seem to have an intuitive understanding of the distinction [between derivation and inflection], the objective criteria behind this intuition have proved difficult to find. (Bybee 1985: 81)

Here I suggest that the intuitions that are shared by linguists working in the Western tradition may be largely due to the way we talk about inflectional and derivational patterns (Sections 2–3), and not based on objective findings. I cannot claim, of course, that this has been demonstrated, because all I did in this article was to point out how we typically conceptualize and verbalize the phenomena, and that the expectations that are raised by this contrast are not evidently borne out by the data. Inflectional patterns are not always clearly cell filling in the idealized sense, and derivational patterns are often very similar to them in that they are “paradigmatic”, too (as seen in Section 5).

What I said in this article is not new, just as it was not new that the traditional habit of talking about “words” and a syntax-morphology division may not be rooted in the phenomena (Haspelmath 2011). The main reason for writing the present article was to point out that without further research that provides a basis for an architectural or other kind of distinction, we cannot rely on the reality of the inflection–derivation distinction. It is best to be conservative and not to assume more than we have evidence for. Thus, I would caution against formulations such as the following:

... it is not always clear where to draw the line between inflection and derivation, and indeed, in the eyes of some theorists, whether to draw such a line at all. Nevertheless, we will proceed on the assumption that the division makes sense (Lieber 2019: 35).

I am not denying that the division “makes sense”, but I would like to suggest that perhaps it makes sense to us for the same reason that word division “makes sense”: It has its roots in deeply entrenched conventions of notation and linguistic description. But whether there is a corresponding contrast in the phenomena of the world’s languages, or in people’s mental grammars, still needs to be seen.

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References

- Anderson, Stephen R. 1982. Where's morphology? *Linguistic Inquiry* 13(4). 571–612.
- Anderson, Stephen R. 1992. *A-morphous morphology*. Cambridge: Cambridge University Press.
- Anderson, Stephen R. 2015. The morpheme: Its nature and use. In Matthew Baerman (ed.), *The Oxford handbook of inflection*, 11–33. Oxford: Oxford University Press.
- Arkadiev, Peter M. 2016. Vozmožny li odnopažežnye sistemy? [Возможны ли однopažeжные системы?]. [Are single-case systems possible?]. In Józefina Piątkowska & Gennadij Zeldowicz (eds.), *Znaki czy nie znaki? Vol. 2: Zbiór prac lingwistycznych*, [Signs or no signs? Vol. 2: Collection of linguistic works], 9–37. Warsaw: Wydawnictwa Uniwersytetu Warszawskiego. Available at: https://inslav.ru/sites/default/files/arkadiev2016_monocausal_znaki.pdf.
- Aronoff, Mark. 1994. *Morphology by itself: Stems and inflectional classes*. Cambridge, MA: MIT Press.
- Aronoff, Mark. 2019. Competitors and alternants in linguistic morphology. In Franz Rainer, Francesco Gardani, Wolfgang U. Dressler & Hans Christian Luschützky (eds.), *Competition in inflection and word-formation*, 39–66. Cham: Springer.
- Aronoff, Mark & Kirsten Anne Fudeman. 2011. *What is morphology*, 2nd edn. Chichester: Wiley-Blackwell.
- Baerman, Matthew. 2015. Introduction. In Matthew Baerman (ed.), *The Oxford handbook of inflection*, 1–10. Oxford: Oxford University Press.
- Bauer, Laurie. 1997. Derivational paradigms. In Geert E. Booij & Jaap van Marle (eds.), *Yearbook of morphology 1996*, 243–256. Dordrecht: Kluwer.
- Bauer, Laurie. 2004. The function of word-formation and the inflection-derivation distinction. In Henk Aertsen, Mike Hannay & Rod Lyall (eds.), *Words in their places: A festschrift for J. Lachlan Mackenzie*, 283–292. Amsterdam: Vrije Universiteit.
- Bauer, Laurie & Winifred Bauer. 2012. The inflection-derivation divide in Maori and its implications. *Te Reo* 55. 3–24.
- Bauer, Laurie, Rochelle Lieber & Ingo Plag. 2013. *The Oxford reference guide to English morphology*. Oxford: Oxford University Press.
- Becker, Thomas. 1993. Back-formation, cross-formation, and ‘bracketing paradoxes’ in paradigmatic morphology. In Geert Booij & Jaap van Marle (eds.) *Yearbook of morphology 1993*, 1–25. Dordrecht: Springer.
- Berg, Thomas. 2015. Locating affixes on the lexicon-grammar continuum. *Cognitive Linguistic Studies* 2(1). 150–180.
- Bickel, Balthasar & Johanna Nichols. 2007. Inflectional morphology. In Timothy Shopen (ed.), *Language typology and syntactic description, vol. III: Grammatical categories and the lexicon*, 169–240. Cambridge: Cambridge University Press.
- Blevins, James P. 2016. *Word and paradigm morphology*. Oxford: Oxford University Press.
- Bloomfield, Leonard. 1933. *Language*. New York: Henry Holt and Company.
- Boas, Franz. 1938. Language. In Franz Boas (ed.), *General anthropology*, 124–145. Boston: Heath and Co. Available at: <http://archive.org/details/generalanthropol031779mbp>.
- Bonami, Olivier, Gilles Boyé, Georgette Dal, Hélène Giraudo & Fiammetta Namer. 2018. Introduction. In Olivier Bonami, Gilles Boyé, Hélène Giraudo Georgette Dal & Fiammetta Namer (eds.), *The lexeme in descriptive and theoretical morphology*, v–xiv. Berlin: Language Science Press. Available at: <https://zenodo.org/record/1406985>.
- Bonami, Olivier & Denis Paperno. 2018. Inflection vs. derivation in a distributional vector space. *Lingue e Linguaggio* 2/2018. 1–23.

- Bonami, Olivier & Jana Strnadová. 2019. Paradigm structure and predictability in derivational morphology. *Morphology* 29(2). 167–197.
- Booij, Geert E. 1996. Inherent versus contextual inflection and the split morphology hypothesis. In Geert E. Booij & Jaap van Marle (eds.), *Yearbook of morphology 1995*, 1–16. Dordrecht: Springer Netherlands.
- Booij, Geert E. 2000. Inflection and derivation. In Geert E. Booij, Christian Lehmann & Joachim Mugdan (eds.) *Morphology: An international handbook on inflection and word-formation*, vol. 1, 360–369. Berlin & New York: Walter de Gruyter.
- Booij, Geert E. 2002. Separable complex verbs in Dutch: A case of periphrastic word formation. In Nicole Dehé, Ray Jackendoff, Andrew McIntyre & Silke Urban (eds.), *Verb-particle explorations*, 21–42. Berlin & New York: Mouton de Gruyter.
- Booij, Geert E. 2005. *The grammar of words: An introduction to linguistic morphology*. Oxford: Oxford University Press.
- Breiter, Maria A. 1994. Length of Chinese words in relation to their other systemic features. *Journal of Quantitative Linguistics* 1(3). 224–231.
- Broccias, Cristiano. 2012. The syntax-lexicon continuum. In Terttu Nevalainen & Elizabeth C. Traugott (eds.), *The Oxford handbook of the history of English*, 735–747. Oxford: Oxford University Press.
- Bybee, Joan L. 1985. *Morphology: A study of the relation between meaning and form*. Amsterdam & Philadelphia: John Benjamins.
- Bybee, Joan L. 1994. The grammaticization of zero: Asymmetries in tense and aspect systems. In William Pagliuca (ed.), *Perspectives on grammaticalization*, vol. 109, 235–254. Amsterdam: Benjamins.
- Carstairs-McCarthy, Andrew. 2005. Basic terminology. In Pavol Štekauer & Rochelle Lieber (eds.), *Handbook of word-formation* (Studies in Natural Language and Linguistic Theory 64), 5–23. Dordrecht: Springer.
- Cawdrey, Robert. 1604. *A table alphabeticall*. London: Edmund Weaver.
- Chumakina, Marina & Greville Corbett (eds.). 2012. *Periphrasis: The role of syntax and morphology in paradigms*. Oxford: British Academy.
- Clajus, Johannes. 1578. *Grammatica germanicae linguae*. [Reedited by Friedrich Weidling; Strassburg: Trübner].
- Comrie, Bernard. 1976. *Aspect: An introduction to the study of verbal aspect and related problems*. Cambridge: Cambridge University Press.
- Corbett, Greville G. 2000. *Number*. Cambridge: Cambridge University Press.
- Corbett, Greville G. 2007. Canonical typology, suppletion, and possible words. *Language* 83(1). 8–42.
- Corbett, Greville G. 2010. Canonical derivational morphology. *Word Structure* 3(2). 141–155.
- Corbett, Greville G. 2012. *Features*. Cambridge: Cambridge University Press.
- Dahl, Östen. 1985. *Tense and aspect systems*. Oxford: Blackwell.
- Dal, Georgette. 2018. Les adverbes en *-ment* du français : lexèmes ou mots-formes? In Olivier Bonami, Gilles Boyé, Hélène Giraudo Georgette Dal & Fiammetta Namer (eds.), *The lexeme in descriptive and theoretical morphology*, 277–301. Berlin: Language Science Press. Available at: <https://langsci-press.org/catalog/view/165/721/1200-1>.
- Dixon, Robert M. W. 1977. *A grammar of Yidiny*. Cambridge: Cambridge University Press.
- Dressler, Wolfgang U. 1989. Prototypical differences between inflection and derivation. *Zeitschrift für Phonetik, Sprachwissenschaft und Kommunikationsforschung* 42(1). 3–10.
- Dryer, Matthew S. 2005. Position of polar question particles. In Matthew S. Martin Haspelmath, David Gil Dryer & Bernard Comrie (eds.), *The world atlas of language structures*, 374–377. Oxford: Oxford University Press. Available at: <https://wals.info/chapter/92A>.

- Fábregas, Antonio & Martina Penke. 2020. Word storage and computation. In Vito Pirrelli, Ingo Plag & Wolfgang U. Dressler (eds.), *Word knowledge and word usage: A crossdisciplinary guide to the mental lexicon*, 455–505. Berlin & Boston: De Gruyter.
- Fábregas, Antonio & Sergio Scalise. 2012. *Morphology: From data to theories*. Edinburgh: Edinburgh University Press.
- Fernández-Domínguez, Jesús, Alexandra Bagasheva & Cristina Lara-Clares. 2020. What paradigms and what for? In Jesús Fernández-Domínguez, Alexandra Bagasheva & Cristina Lara-Clares (eds.), *Paradigmatic relations in word formation*, 1–20. Leiden: Brill.
- Gaeta, Livio. 2007. On the double nature of productivity in inflectional morphology. *Morphology* 17(2). 181–205.
- Gaeta, Livio & Davide Ricca. 2005. Italian prefixes and productivity: A quantitative approach. *Acta Linguistica Hungarica* 50(1–2). 93–112.
- Gardani, Francesco, Franz Rainer & Hans Christian Luschützky. 2019. Competition in morphology: A historical outline. In Franz Rainer, Francesco Gardani, Wolfgang U. Dressler & Hans Christian Luschützky (eds.), *Competition in inflection and word-formation*, 3–36. Cham: Springer.
- Greenberg, Joseph H. 1960. A quantitative approach to the morphological typology of language. *International Journal of American Linguistics* 26(3). 178–194.
- Harley, Heidi. 2006. *English words: A linguistic introduction*. Malden, MA: Blackwell.
- Haspelmath, Martin. 1993. *A grammar of Lezgian* (Mouton Grammar Library 9). Berlin & New York: Mouton de Gruyter.
- Haspelmath, Martin. 1996. Word-class-changing inflection and morphological theory. In Geert Booij & Jaap van Marle (eds.), *Yearbook of morphology 1995*, 43–66. Dordrecht: Kluwer.
- Haspelmath, Martin. 2000. Periphrasis. In Geert E. Booij, Christian Lehmann & Joachim Mugdan (eds.), *Morphology: An international handbook on inflection and word-formation*, Vol. 1, 654–664. Berlin & New York: Walter de Gruyter.
- Haspelmath, Martin. 2002. *Understanding morphology*. London: Arnold. Available at: <https://zenodo.org/record/1236482>.
- Haspelmath, Martin. 2005. Occurrence of nominal plurality. In Martin Haspelmath, Matthew S. Dryer, David Gil & Bernard Comrie (eds.), *The world atlas of language structures*, 142–145. Oxford: Oxford University Press. Available at: <https://wals.info/chapter/34>.
- Haspelmath, Martin. 2011. The indeterminacy of word segmentation and the nature of morphology and syntax. *Folia Linguistica* 45(1). 31–80.
- Haspelmath, Martin. 2020a. The morph as a minimal linguistic form. *Morphology* 30(2). 117–134.
- Haspelmath, Martin. 2020b. The structural uniqueness of languages and the value of comparison for description. *Asian Languages and Linguistics* 1(2). 346–366.
- Haspelmath, Martin. 2021a. Bound forms, welded forms, and affixes: Basic concepts for morphological comparison. *Voprosy Jazykoznanija* 2021(1). 7–28.
- Haspelmath, Martin. 2021b. Towards standardization of morphosyntactic terminology for general linguistics. In Luca Alfieri, Giorgio Francesco Arcodia & Paolo Ramat (eds.), *Linguistic categories, language description and linguistic typology*, 35–57. Amsterdam & Philadelphia: John Benjamins.
- Haspelmath, Martin. 2021c. General linguistics must be based on universals (or nonconventional aspects of language). *Theoretical Linguistics* 47(1/2). 1–31.
- Haspelmath, Martin. 2023. Defining the word. Available at: https://www.academia.edu/91869514/Defining_the_word.
- Hockett, Charles F. 1954. Two models of grammatical description. *Word* 10(2/3). 210–234.
- Jackendoff, Ray & Audring Jenny. 2020. *The texture of the lexicon: Relational morphology and the parallel architecture*. Oxford: Oxford University Press.

- Jakobson, Roman. 1959. Boas' view of grammatical meaning. *American Anthropologist* 61. 139–145.
- Johanson, Lars. 1995. On Turkic converb clauses. In Martin Haspelmath & Ekkehard König (eds.), *Converbs in cross-linguistic perspective*, 313–347. Berlin & New York: Mouton de Gruyter.
- Just, Erika. 2022. *A functional approach to differential indexing: Combining perspectives from typology and corpus linguistics*. Leiden: Leiden University dissertation.
- Kibort, Anna. 2010. Towards a typology of grammatical features. In Greville G. Corbett & Anna Kibort (eds.), *Features: Perspectives on a key notion in linguistics*, 64–106. Oxford: Oxford University Press.
- Körtvélyessy, Lívía & Pavol Štekauer. 2018. Postfixation or inflection inside derivation. *Folia Linguistica* 52(2). 351–381.
- Kruisinga, Etsko. 1932. *A handbook of Present-Day English, Part II: English accidence and syntax*. Groningen: Noordhoff.
- Lehmann, Volkmar. 2004. Grammaticalization via extending derivation. In Walter Bisang, Nikolaus Himmelmann & Björn Wiemer (eds.), *What makes grammaticalization? A look from its fringes and its components*, 169–186. Berlin & New York: Mouton de Gruyter.
- Lestrade, Sander. 2013. The optional use of morphological case. *Linguistic Discovery* 11(1). 84–104.
- Lieber, Rochelle. 2009. *Introducing morphology*. Cambridge: Cambridge University Press.
- Lieber, Rochelle. 2019. Theoretical issues in word formation. In Jenny Audring & Francesca Masini (eds.), *The Oxford handbook of morphological theory*, 34–55. Oxford: Oxford University Press.
- Lyons, John. 1968. *Introduction to theoretical linguistics*. Cambridge: Cambridge University Press.
- van Marle, Jaap. 1996. The unity of morphology: On the interwovenness of the derivational and inflectional dimension of the word. In Geert Booij & Jaap van Marle (eds.), *Yearbook of Morphology 1995*, 67–82. Dordrecht: Springer.
- Matthews, Peter H. 1965. The inflectional component of a word-and-paradigm grammar. *Journal of Linguistics* 1(2). 139–171.
- Matthews, Peter H. 1974. *Morphology*. Cambridge: Cambridge University Press.
- Meľčuk, Igor A. 2006. *Aspects of the theory of morphology*. Berlin & New York: De Gruyter.
- Meľčuk, Igor A. 2021. *Ten studies in dependency syntax*. Berlin & Boston: De Gruyter Mouton.
- Mithun, Marianne. 2014. Morphology: what's in a word? In Carol Genetti (ed.), *How languages work: An introduction to language and linguistics*, 71–99. Cambridge: Cambridge University Press.
- Nübling, Damaris. 2011. How do exceptions arise? On different paths to morphological irregularity. In Horst J. Simon & Heike Wiese (eds.), *Expecting the unexpected: Exceptions in grammar*, 139–162. Berlin & Boston: De Gruyter Mouton.
- Panocová, Renáta. 2021. *Basic concepts of morphology I*. Košice: Šafárik Press.
- Perlmutter, David M. 1988. The split morphology hypothesis: Evidence from Yiddish. In Michael Hammond & Michael Noonan (eds.), *Theoretical morphology*, 79–100. San Diego: Academic Press.
- Peterson, David A. 2007. *Applicative constructions*. Oxford: Oxford University Press.
- Plank, Frans. 1994. Inflection and derivation. In Ron E. Asher (ed.), *Encyclopedia of language and linguistics*, 1671–1678. Oxford: Pergamon.
- Rainer, Franz. 1988. Towards a theory of blocking: The case of Italian and German quality nouns. In Geert E. Booij & Jaap van Marle (eds.), *Yearbook of morphology 1*, 155–185. Dordrecht: Foris.
- Ricca, Davide. 2005. Cumulative exponence involving derivation: Some patterns for an uncommon phenomenon. In Wolfgang U. Dressler, Dieter Kastovsky, Oskar E. Pfeiffer & Franz Rainer (eds.), *Morphology and its demarcations: Selected papers from the 11th Morphology meeting, Vienna, February 2004* (Current Issues in Linguistic Theory 264), 197–213. Amsterdam & Philadelphia: John Benjamins.
- Ryding, Karin C. 2005. *A reference grammar of modern standard Arabic*. Cambridge: Cambridge University Press.
- Scalise, Sergio. 1984. *Generative morphology*. Dordrecht: Foris.

- Scalise, Sergio. 1988. Inflection and derivation. *Linguistics* 26(4). 561–582.
- Schultze-Berndt, Eva. 2000. *Simple and complex verbs in Jaminjung: A study of event categorization in an Australian language*. Nijmegen: University of Nijmegen dissertation.
- Siewierska, Anna. 2004. *Person*. Cambridge: Cambridge University Press.
- Sims, Andrea D. 2019. *Inflectional defectiveness*. Cambridge: Cambridge University Press.
- Sneddon, James N. 1996. *Indonesian: A comprehensive grammar*. London: Routledge.
- Spencer, Andrew. 2013. *Lexical relatedness*. Oxford: Oxford University Press.
- Spencer, Andrew. 2016. Two morphologies or one? Inflection versus word-formation. In Andrew Hippisley & Gregory Stump (eds.), *The Cambridge handbook of morphology*, 27–49. Cambridge: Cambridge University Press.
- Spencer, Andrew. 2017. Split-morphology and lexicalist morphosyntax: The case of transpositions. In Claire Bower, Laurence Horn & Raffaella Zanuttini (eds.), *On looking into words (and beyond): Structures, relations, analyses*, 385–421. Berlin: Language Science Press.
- Spencer, Andrew. 2018. On lexical entries and lexical representations. In Olivier Bonami, Gilles Boyé, Georgette Dal, Hélène Giraudo & Fiammetta Namer (eds.), *The lexeme in descriptive and theoretical morphology*, 277–301. Berlin: Language Science Press. Available at: <https://langsci-press.org/catalog/view/165/721/1200-1>.
- Štekauer, Pavol. 2014. Derivational paradigms. In Rochelle Lieber & Pavol Štekauer (eds.), *The Oxford handbook of derivational morphology*, 354–369. Oxford: Oxford University Press.
- Štekauer, Pavol. 2015. The delimitation of derivation and inflection. In Peter O. Müller, Ingeborg Ohnheiser, Susan Olsen & Franz Rainer (eds.), *Word-formation: An international handbook of the languages of Europe*, vol. 1, 218–235. Berlin & Boston: De Gruyter Mouton.
- Stemberger, Joseph Paul & Brian MacWhinney. 1986. Frequency and the lexical storage of regularly inflected forms. *Memory & Cognition* 14(1). 17–26.
- Stump, Gregory T. 1998. Inflection. In Andrew Spencer & Arnold M. Zwicky (eds.), *The handbook of morphology*, 13–43. Oxford: Blackwell.
- Stump, Gregory T. 2001. *Inflectional morphology: A theory of paradigm structure*. Cambridge: Cambridge University Press.
- Stump, Gregory. 2019. Theoretical issues in inflection. In Jenny Audring & Francesca Masini (eds.), *The Oxford handbook of morphological theory*. Oxford: Oxford University Press.
- ten Hacken, Pius. 2014. Delineating derivation and inflection. In Rochelle Lieber & Pavol Štekauer (eds.), *The Oxford handbook of derivational morphology*, 10–25. Oxford: Oxford University Press.
- Thornton, Anna M. 2019. *Overabundance in morphology*, 1–29. Oxford Research Encyclopedia of Linguistics.
- Wehr, Hans. 1952. *Arabisches Wörterbuch für die Schriftsprache der Gegenwart: Arabisch-Deutsch*. Wiesbaden: Harrassowitz.
- Wiltschko, Martina. 2008. The syntax of non-inflectional plural marking. *Natural Language & Linguistic Theory* 26(3). 639–694.
- Wurzel, Wolfgang Ullrich. 1996. On the similarities and differences between inflectional and derivational morphology. *STUF – Language Typology and Universals* 49(3). 267–279.
- Zwicky, Arnold M. 1985. How to describe inflection. *Annual Meeting of the Berkeley Linguistics Society* 11. 372–386.
- Zwicky, Arnold M. 1994. What is a clitic? In Joel A. Nevis, Brian D. Joseph, Dieter Wanner & Arnold M. Zwicky (eds.), *Clitics: A comprehensive bibliography 1892–1991*, xii–xx. Amsterdam & Philadelphia: John Benjamins.