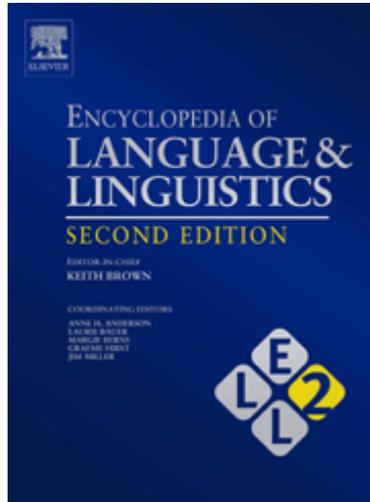


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Any thorough account of natural language understanding uses all three kinds of inference. (It must also recognize defeasible pragmatic inferences of the Gricean kind; see Sperber and Wilson, 1995; Harman, 1999; Levinson, 2000.)

See also: Abduction (01390); Aristotle and Linguistics; Aristotle and the Stoics on Language; Categorical Grammars; Deductive Approaches; Default Semantics; Implicature; Metalinguage versus Object Language; Monotonicity and Generalized Quantifiers; Nonmonotonic Inference.

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Inflection and Derivation

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Introduction

Inflection and derivation are traditional notions in the domain of morphology, the subdiscipline of linguistics that deals with the internal structure of words. Inflection deals with the different forms of a word. For instance, the English words *walk*, *walks*, *walked*, and *walking* are considered different word forms of the lexeme WALK. The notion ‘lexeme’ is used for the more abstract notion ‘word’ and is represented by means of small capitals. In a dictionary of English, these four different word forms do not receive separate lexical entries, but are dealt with in one entry, that for the verbal lexeme WALK. The noun *walker*, on the other hand, is not considered as a form of the lexeme WALK, but as a different lexeme, with a different meaning and a different lexical category (it is a noun). It usually has its own lexical entry in a dictionary. The lexeme WALKER is considered to be the product of derivation, the creation of a new lexeme through the application of a morphological process

of affixation, the attachment of the suffix *-er* to a base lexeme.

The distinction between inflection and derivation is primarily a functional one: it refers to different functions of morphological processes, the creation of different forms of lexemes versus the creation of different lexemes. The formal means for these different functions may be the same, as is the case for the English examples used here: in both inflection and derivation, use is made of the process of suffixation. Another morphological process that may be used in both inflection and derivation is vowel alternation. For instance, vowel alternation is found in the past tense form of *to fall*, which has the form *fell*. The latter form is also that of the related causative verb for *to fall*, the verb *to fell*. Thus, both inflection and derivation are formally different from compounding, the morphological process in which lexemes are concatenated to form new complex words. The cover term for derivation and compounding is word formation.

The English plural noun *walkers* can be decomposed morphologically as follows: *walk-er-s*. This word consists of the stem *walker* and the plural ending *-s*. Thus, the stem of a word is the word form minus its inflectional markers. The stem *walker* in turn consists of a simplex stem (that is, a root) and

the derivational suffix *-er*. The distinction between word and stem is the main formal correlate of the distinction between inflection and derivation. Normally, the creation of new lexemes is performed on the basis of the stem form of a lexeme, not on the basis of one of its inflectional forms. For instance, the Italian noun *macchina* 'car' consists of a stem *macchin-* and an inflectional ending *-a*. The word *macchin-ista* 'driver' is derived by adding the suffix *-ista* to the stem. If we used the full word form *macchina*, the wrong form *macchina-ista* would have been derived.

A consequence of the distinction between inflection and derivation is that we expect inflection to be peripheral to derivation; derivation creates stems from stems, and subsequently, inflection creates concrete word forms from stems. This expectation is confirmed by Greenberg's Universal 28, which reads as follows:

Universal 28. If both the derivation and the inflection follow the root, or they both precede the root, the derivation is always between the root and the inflection (Greenberg, 1963: 93).

Three different issues concerning the distinction between inflection and derivation are topics of debate among linguists. The first issue is that of the formal criteria for distinguishing between these two notions. How do we know whether a certain morphological process belongs to the domain of inflection or to that of derivation? Is there a sharp boundary between the two categories? The second issue is that linguists have discussed which properties are typical for inflection and which ones for derivation. For instance, it has been claimed that inflection is more productive than derivation. The third issue is that of the position of inflection and derivation in the grammar. Do they belong to the same morphological module of the grammar or are they different modules? These three issues will be dealt with in the following sections of this article.

Formal Criteria

Obligatoriness

A first criterion for distinguishing between inflection and derivation is that inflection is obligatory, whereas derivation is optional. For instance, each English noun must be marked as either singular or plural. Hence, the category number is an obligatory category of English, and hence inflectional. Similarly, in languages with case systems, each noun must be marked for a specific case. In most languages, verbs are marked obligatorily for a specific tense and often for person and number of the subject of the clause. Note that this is true even if there is no overt marking for a particular inflectional

feature. For instance, there is no overt number marking for English singular nouns. There are also nouns that, for semantic reasons, do not have plural forms, such as *milk* and *abstractness*. These nouns must nevertheless be considered singular nouns because they trigger singular number agreement with verbs. In contrast, no obligatory morphological expression is involved in using the agent noun for the verb *walk*, that is, the word *walker*, with the suffix *-er* that creates de-verbal agent nouns. The use of this word is a choice made by the language user for purely semantic reasons. Hence, we consider *walker* a case of derivation.

Syntactic Relevance

A second criterion for the demarcation of inflection and derivation is that of syntactic relevance; inflection has been defined as that part of morphology that is relevant to syntax (Anderson, 1992). Particular word forms may be required by syntactic context. This is the case for syntactic configurations in which agreement between constituents is required. The rule of subject-verb agreement in English, for instance, indicates that a specific verb form is required by the subject of the clause, a verb form with the same properties for the categories number and person. In Dutch and German (Standard German), a pre-nominal adjective must agree in gender, number, and definiteness with the nominal phrase of which it forms a part. Noun phrases may have to carry a specific case depending on their syntactic function. In Latin, the subject is marked by nominative case and the direct object by accusative case. In the case of rection (or government), words require a specific form of the words in the phrase that they govern. German prepositions, for instance, require a specific case form of the words in the nominal phrases that they govern.

This does not mean, however, that inflection is always governed by syntax. In Latin, for instance, the accusative form of the word *Roma* 'Rome' is *Romam*. This is the form to be used when this noun functions as the direct object of a clause, but it can also function as an adverbial phrase, with the meaning 'to Rome.' In the latter case, the accusative form is not required by syntactic context, but a choice made by the language user in order to express a particular piece of information. This is called semantic case. The same applies to the use of plural number for the noun *book* in *John read these books*. The choice for the plural form of *book* is not dictated by the syntactic context.

It should be realized, however, that one cannot claim that derivation has no relevance to syntax whatsoever. Since derivation may indicate a change of syntactic category, this fact in itself is already of relevance to syntax. In the case of derivation of verbs, the derived verb may also have a specific syntactic

valence. For instance, the derivation of causative verbs leads to the creation of transitive verbs that indicate the obligatory presence of a direct object, as in *John whitened the walls*. Hence, the derivation of causative verbs has syntactic relevance. The difference with inflection is that the choice of a particular derived word is not governed by syntactic context.

Change of Syntactic Category

A third criterion of demarcation is that derivation may change the syntactic category of its input forms, whereas inflection is always category-neutral. This criterion reflects the idea that inflection creates forms of the same lexeme, unlike derivation, which determines the lexical category of the lexemes it creates. For instance, the Dutch diminutive suffix *-(t)je* is considered to be a derivational suffix since it always creates nouns, whatever the lexical category of its input: *bond* ‘N, dog’ - *bond-je* ‘N, doggy’; *blond* ‘A, blond’ - *blond-je* ‘N, blond girl’; *speel* ‘V, to play’ - *speel-tje* ‘N, toy.’

Note that this does not indicate that derivation must be category-changing. When we add the suffix *-er* to the noun *London*, we derive a word of the same nominal category. Yet, this is a clear case of derivation since *Londoner* and *London* are two different lexemes. They also belong to two different subcategories of nouns: whereas *London* is a proper name that cannot be preceded by a determiner (**the London*), *Londoner* is a count noun (*the Londoners*).

The evaluative morphology of some languages is a problem for this criterion. In Italian, for instance, evaluative suffixes create lexemes of the same lexical category as their inputs: *tavolo* ‘N, table’ - *tavolino* ‘N, small table’; *giallo* ‘A, yellow’ - *giallino* ‘A, yellowish’ (Scalise, 1986). That is, this suffix is transparent to the lexical category of its inputs. Yet it looks like derivation because it creates new words with meanings that are distinct from those of the input words.

Inversely, there are forms of inflection that are not completely category-neutral. This applies, for instance, to the infinite forms of verbs such as participles and infinitives (Haspelmath, 1996). Infinitives, for instance, are forms of verbal lexemes. Yet they exhibit both verbal and nominal properties. They can combine with determiners and adjectives, which is typical of nouns. At the same time, they exhibit verbal properties such as co-occurrence with prepositionless nominal phrases, as in the following Dutch sentence:

- (1) Het je moeder cadeautjes gev-en
 the your mother presents give.INF
 moet afgelopen zijn
 should finished be
 ‘You should stop giving presents to your mother’

Participles can function as pronominal adjectives while at the same time keeping their verbal properties, as illustrated by the following German example (Haspelmath, 1996: 44):

- (2) der im Wald laut singende Wanderer
 the in.the forest loud singing hiker
 ‘the hiker who is singing loud in the forest’

The present participle *singend* is inflected as a pronominal adjective with the inflectional ending *-e*, whereas its co-occurrence with a locative adverbial *im Wald* and the adverbial *laut* indicates that it still has verbal valence as well. Thus, inflection may have effects on syntactic category. In contrast to the situation for derivation, in inflection the syntactic category of its inputs is preserved.

Paradigms

Inflection is typically associated with paradigms. A paradigm is an abstract pattern of cells, with each cell having a particular value for one or more inflectional categories such as number, case, tense, or aspect. For each lexeme of a particular lexical category, the cells of the paradigm are filled with particular word forms. This paradigmatic organization of the inflectional forms of a lexeme reflects the idea that inflection is obligatory in the sense discussed above. Of course, one may also organize the set of derivationally related lexemes into a paradigm. For instance, for English verbs one might assume a paradigmatic cell for ‘agent noun.’ However, there are many English verbs for which this cell might be hard or impossible to fill, as is the case for verbs such as *to die* and *to fall*. This stands in contrast with inflection where the cells of paradigms are (almost) always filled. An exception to this generalization is that nouns may lack plural forms, mainly for semantic reasons. In Russian, some verbs have defective paradigms, with one or more empty cells.

The notions of ‘suppletion’ and ‘periphrasis’ that are used in the analysis of inflectional systems also reflect the idea of obligatoriness and the idea of a paradigmatic organization of inflectional forms. For instance, if we say that *went* is the suppletive past tense form of *to go*, this presupposes that the past-tense cells of the verb *to go* must be filled by some word form. The same applies to *worse*, which is considered the suppletive comparative form of *bad*. On the other hand, there is no particular reason that we would want to consider *thief* as the suppletive agent noun of the verb *to steal*, instead of the derived noun *stealer*.

We speak of periphrasis if one or more cells of a paradigm cannot be filled by a particular word form. Instead, a combination of words must be used. For instance, in Latin there are no synthetic forms for the

passive perfect of verbs. Whereas the third-person singular present-passive form of the verb *laudare* 'to praise' is *laudatur* '(s)he is praised,' the perfect counterpart cannot be created by morphology and is expressed by a combination of a participle and a form of the word *esse* 'to be': *laudatus est* '(s)he has been praised.'

Related to the notion paradigm is the observation on inflection that many languages have different inflectional classes for the paradigms of lexemes. In Latin, for instance, there are five different declensional classes for nouns. This means that there are five different ways of computing the different word forms of the cells of a Latin noun. Many languages have different conjugations for the computation of verbal word forms. This illustrates that the relation between form and morphosyntactic information in the realm of inflection might be quite complicated. Another example of this complex relation between form and meaning in the domain of inflection is that more than one inflectional property is often expressed by one morpheme. In Indo-European languages, case and number are usually expressed by the same morpheme. The morpheme *-i* of Latin *hort-i* 'garden, GEN.SG' expresses both number and case. It is therefore a case of multiple exponence: two morphosyntactic properties are expressed by one and the same morpheme. The derivational morphology of Indo-European languages, on the other hand, is usually agglutinative, with each property being expressed by a separate morpheme. Thus, inflection and derivation may differ as to their formal morphological properties.

These distinguishing formal properties of inflection have led to formal models of inflection in which the paradigm plays a central role such as the Word-and-Paradigm Theory of Matthews (1972) and the realizational theories of inflectional morphology of Anderson (1992) and Stump (2001). In realizational theories, inflectional rules are seen as operations that spell out the phonological form of a lexeme for each combination of morphosyntactic features that may be assigned to that lexeme. That is, they indicate how a particular array of morphosyntactic features is realized. It is an open issue in present-day morphological theory to what extent the realizational model is an appropriate model for derivational morphology as well. In many ways, derivation is structurally similar to compounding, which suggests a primarily syntagmatic analysis of derived words, with affixes being concatenated to stems. For instance, there is a strong structural similarity between compounds and English derived words such as *help-ful* and *category-wise*, and the meaning of these words can be derived straightforwardly from those of their constituent morphemes.

Another characteristic of inflection is that inflectional paradigms may make use of more than one stem for computing the different forms of a lexeme. That is, there is formal variation without concomitant grammatical or semantic differences. The Latin verb *ponere* 'to put' has three different stem forms, *pone-*, *posu-*, and *posit-*, as in *pone-o* 'I put,' *posu-i* 'I have put,' and *posit-us* 'put, past participle.' This is no exclusive property of inflection: stem allomorphy also occurs in derivation, as illustrated by the English word pair *drama/dramatic*, where the adjective has been derived from a second stem form *dramat-* (Aronoff, 1994).

Semantic Differences

Is there any difference between the semantic categories expressed by inflection and those expressed by derivation? Inflection is used cross-linguistically for a number of categories:

- Nouns: number, gender, definiteness, case
- Verbs: valency, tense, aspect, mood, person, number, gender
- Adjectives: degree, number, gender, case, definiteness.

Derivation, on the other hand, is used for a much wider range of semantic categories. In this respect, derivation is closer to the lexical expression of meaning than inflection.

Bybee (1985) has proposed to interpret the semantic difference between inflection and derivation in terms of the notion 'semantic relevance'. "A meaning element is relevant to another meaning element if the semantic content of the first directly affects or modifies the semantic content of the second" (Bybee, 1985: 13). Bybee argued that there are two factors that determine whether a certain notion is expressed inflectionally or derivationally: relevance and generality. The less relevant a category is for the root, and the more general it is, the better it lends itself to inflectional expression. The inverse applies to derivation. For instance, the meaning element 'causative' is usually expressed by derivational means (if not by lexical means) because that meaning is very relevant to the meaning of the stem. On the other hand, an inflectional category, such as tense, is not so much of direct relevance to verbal stems, but locates the state of affairs expressed by a clause with respect to the time of speaking. Hence, tense does not modify the meaning of the verbal stem and has a deictic function instead. Correlating with this semantic distinction, we see that the morphological expression of tense in paradigms is quite general, whereas the morphological expression of causative may be possible for a

restricted number of verbal roots only. Inflection of the agreement type such as person-number marking on verbs and gender marking on adjectives and verbs has no obvious relevance to the meaning of the stem, and hence this kind of contextually determined morphology is the prototypical case of inflection.

According to Bybee (1985), this gradual semantic difference between derivation and the different kinds of inflection correlates with the order in which derivational and inflectional elements occur in a word: derivational elements are closer to the root than inflectional elements because they have a higher semantic relevance. In addition, the order of inflectional elements in an inflectional word form reflects different degrees of relevance. For instance, since the category of aspect is more relevant for the meaning of the stem than tense, tense morphemes tend to be peripheral to aspectual morphemes. Person and number markings on verbs (necessary for reasons of agreement only) are peripheral to tense marking.

Properties of Inflection and Derivation

Inflectional processes are said to be fully productive, whereas derivational processes may exhibit different degrees of productivity. This seems to be a natural corollary of the fact that inflection is obligatory. However, this is not completely true, since there might be competing inflectional processes with the same function, some of which may be unproductive. English plural nouns are created by the productive process of suffixation with one of the allomorphs of the suffix /z/, but there are also closed sets of nouns with a different plural forms, such as nouns of Greek origin in *-on*, as in *prolegomenon/prolegomena*. The past tense of English verbs is normally formed by adding *-ed* to the verbal stem, but there is also a set of verbs of which the past tense form is created by means of vowel change, as in *ride/rode*. Hence, inflectional rules can be unproductive.

Inflectional forms of lexemes are usually semantically regular, whereas derived words may exhibit all sorts of semantic idiosyncrasies. The derived word *baker*, for example, does not just denote 'one who bakes,' but is used to denote a certain profession. The de-verbal noun *dwelling*, as in *my humble dwelling*, does not denote the act of dwelling, but a location. Semantic idiosyncrasies in inflectional forms are much rarer, but do exist. For instance, the English plural form *brethren* is irregular, both formally and semantically, since it does not simply mean 'brothers,' but is used to denote male members of a religious community. In Dutch, the plural form of the noun *letter* 'letter,' *letteren*, is used to denote the scientific domain of arts and humanities.

A psycholinguistic difference that is sometimes claimed to correlate with the distinction between (regular) inflection and derivation is that between computation and storage. The idea is the following. Regular inflectional forms are processed on line: they are created by the speaker and parsed (decomposed) by the hearer. Hence, they may be assumed to be computed. Derived words, on the other hand, are stored as such in the mental lexicon and are retrieved as wholes from that lexicon in production and perception. This assumption concerns the differences in semantic regularity between inflection and derivation observed above; storage is often essential for assigning the right meaning to a derived word or for choosing the correct derived word, whereas regular inflectional word forms can be computed. Irregular inflectional forms, on the other hand, must be stored in the lexicon, for obvious reasons. For instance, the past tense form of *walk* is the regular, and hence predictable, form *walked*, whereas the past tense form of the verb *to fall*, the word form *fell*, is not predictable. This idea is referred to as the Dual Mechanism Theory of morphological processing (Pinker, 1999; Clahsen, 1999).

The Dual Mechanism Theory is based on the role of frequency in lexical decision tasks. In such tasks, subjects must decide whether a particular word (form) is correct. The frequency of occurrence of a word (form) may play a role in performing such tasks. The response latencies in lexical decision tasks correlate with frequency: a more frequent word will be recognized faster and will thus have shorter response latencies than a word of low frequency. This frequency effect is interpreted in terms of activation level. A word with a high frequency has a higher initial level of activation in the mental lexicon than a word with low frequency. Frequency effects presuppose the storage of the word (forms) involved. Hence, if there are no frequency effects for a particular word (form), one may conclude that it is not stored in lexical memory. Pinker (1999) and Clahsen (1999) argued, for English and German, respectively, that regular inflectional forms do not exhibit frequency effects, unlike irregular ones. This is explained by the assumption that only irregular inflectional forms are stored. According to Clahsen *et al.* (2003), derived words always show frequency effects, even the regular ones. Hence, derived words must be assumed to always be stored. Hence, the Dual Mechanism Theory should be restricted to the domain of inflection.

However, it has been shown in more recent psycholinguistic research that regular inflectional forms are also stored in the lexicon when they have a high frequency of occurrence (Stemberger and MacWhinney, 1988; Baayen *et al.*, 1997) since such regular forms also show frequency effects. In other words, the fact

that a correct inflectional form can be computed without lexical information does not necessarily indicate that the language user may not also make use of his or her vast lexical memory in the case of inflection and store and retrieve such complex forms.

A related psycholinguistic distinction between inflection and derivation is the family size effect (Baayen *et al.*, 1997). In the case of derivation, what counts in predicting differences in response latency between derived words is not so much the token frequency of the word forms for that word, but rather the number of morphologically related words (related in terms of derivational processes and compounding), that is, the size of its morphological family. The more family members a word has, the higher its initial level of activation in the mental lexicon.

Differences between inflection and derivation have also been found in studies of language users who suffer from certain forms of aphasia. For instance, Badecker and Caramazza (1989) investigated the language of an Italian aphatic and discovered that he made many inflectional errors, but almost no derivational ones. On the other hand, there are also speakers with agrammatism (aphatics with poor syntax and almost no function words) whose inflectional morphology is not affected and also preserved as their derivational morphology (De Bleser and Bayer, 1988). A survey of possible psycholinguistic differences between inflection and derivation can be found in Bertinetto (1995).

Morpheme Order and the Theory of Split Morphology

The functional differences between inflection and derivation and their formal correlates have led some linguists to propose the Theory of Split Morphology (Perlmutter, 1988; Anderson, 1992). In this theory, derivation is assumed to be accounted for by a pre-syntactic component of the grammar. This component generates derived lexemes in their stem forms, which are then inserted into syntactic structure as created by the syntactic component. Inflection, on the other hand, is accounted for in a post-syntactic component, because the choice of the correct inflectional form of a lexeme depends on the syntactic context in which it occurs. A consequence of this organization of the grammar is that inflectional elements will be peripheral to derivational elements, a prediction that is in accordance with Greenberg's Universal 28 mentioned above.

An earlier variant of Split Morphology is the theory of level ordering, as proposed for English by Kiparsky (1985). In this approach, all morphology is pre-syntactic. However, the set of morphological rules is

ordered in two or more levels. Inflectional rules are located at the last level of the lexical component of the grammar and word formation at a preceding one. Hence, inflection is predicted to be peripheral to derivation. However, irregular inflectional forms such as the plural form *lice* of the noun *louse* may be formed at an earlier level, because in English, irregular plurals may occur within compounds, as in *lice-infested*. Although it may be true for English that only irregular plurals feed word formation, this restriction does not apply to related languages such as Dutch. For instance, Dutch has compounds such as *scholen-gemeenschap* 'lit. school-s community, comprehensive school' with the regular plural noun *scholen* 'schools' in first position. This compound contrasts with the Dutch compound *school-gemeenschap* 'school community,' with the singular or stem form of *school* in first position.

Therefore, the hypothesis of level ordering and, more generally, the hypothesis of Split Morphology are empirically inadequate as a general theory of how inflection and derivation interact, since it categorically excludes inflectional forms to form inputs for derivation, which is empirically incorrect (Booij, 1994, 1996). For instance, in many languages participles, which have both verbal and adjectival properties, can be used as stems for de-adjectival word formation, as in English *excitedness*, in which the past participle feeds derivation of nouns by means of the suffix *-ness*. In Dutch, the comparative forms of adjectives can be used as stems as well, as in the verb *ver-erg-er* 'to worsen' derived from the comparative form *erg-er* of the adjective *erg* 'bad'. Since comparative forms are usually classified as inflectional forms, this also forms a problem for the Split Morphology Hypothesis. It has also been observed that plural forms of nouns may function as stems in derivation. This is, for example, the case in Dutch, where the collective suffix *-dom* is added to plural nouns, as in *held-en-dom* 'heroism' with the morphological structure ROOT-PLURAL-COLLECTIVE. The root form is the noun *held* 'hero', which is followed by the regular plural suffix *-en*. Similar observations on Spanish and Portuguese can be found in Rainer (1996).

Compounding, another major type of word formation, also appears to use plural nouns as building blocks, as in Italian *lava-piatti* 'dish-washer,' a combination of the verbal stem *lava* 'to wash' and the plural noun *piatti* 'dishes.' Note that this compound has a singular meaning even though one of its constituents is plural.

Some linguists deny an absolute distinction between inflection and derivation and consider them to form one continuum (Bybee, 1985; Dressler, 1989). In this

view, interactions between derivation and inflection of the kind discussed above come as no surprise since it is the kind of inflection that is close to derivation that may feed derivation.

Although the Split Morphology Hypothesis faces certain problems, we must somehow account for the fact that derivation usually takes stems as their inputs, that is, words minus their inflectional elements. As pointed out above, that is the main formal reason for keeping inflection and derivation apart. In order to solve this paradoxical situation, we might distinguish between two types of inflection, inherent inflection and contextual inflection. An example of inherent inflection is the formation of plural nouns. In most contexts, the use of the plural form of a noun is not required by syntactic context, but a purely semantic choice based on what the language user wants to convey. The choice of specific finite forms of verbs, and of case forms of nouns, on the other hand, is governed mostly by syntactic context and then qualifies as contextual inflection. Participles and infinitives also qualify as cases of inherent inflection. The crucial observation is that it is only inherent inflection that can feed word formation processes such as derivation and compounding (Booij, 1994, 1996). This suggests that inherent inflection is halfway between derivation and contextual inflection. This is in line with the observation that inherent inflection may have class-changing effects, just like derivation, as observed above. In some psycholinguistic experiments, this distinction between inherent and contextual inflection is reflected by differences in frequency effects. For instance, Dutch verbal plurals are different from noun plurals as to frequency effects in lexical decision tasks. In certain tasks, verbs do not show a frequency effect, unlike nouns (Baayen *et al.*, 1997, 2003).

Yet, even inherent inflection cannot feed derivation, or more generally, word formation, on all occasions. For instance, the Dutch de-nominal suffix *-er*, which forms nouns, cannot be attached to plural nouns. The noun *wetenschapp-er* 'scientist' derived from the noun *wetenschap* 'science' is well formed, but we cannot add this suffix to the plural noun *wetenschapp-en* although this is an existing and well-formed plural noun of Dutch: **wetenschappen-er*. The crucial condition in the case of Dutch appears to be that inflectional elements must appear at the right edge of a prosodic word (Booij, 2002). Hence, plural suffix can appear word-internally before suffixes such as *-achtig* '-like' because the stem of such suffixes forms a prosodic word of its own, as in *boeken-achtig* 'books-like, bookish', which consists of the prosodic words (bukən) and (ɑxtəx). Therefore, the plural noun *boeken* 'books' can appear before the suffix *-achtig*.

In a number of languages, verbs may be preceded by so-called preverbs, which look like derivational prefixes. Classical examples of such word combinations are the particle verbs of Germanic languages. For instance, German *anrufen* 'to phone' looks like a word since it has a specific idiosyncratic meaning. However, the particle *an* can be separated from the verb in main clauses, as in *Johann ruft seine Mutter an* 'John calls his mother.' The past participle of *anrufen* is *an-ge-ruf-en*, with the inflectional prefix *ge-* before the root and after the particle. We might therefore think that this is a case in which a derivational prefix precedes an inflectional one, thus forming an exception to Greenberg's Universal 28. However, *anrufen* is not a word, but a lexicalized word combination, as is clear from the fact that it can be split in main clauses. Consequently, the position of the inflectional prefix *ge-* is as expected. Thus, if inflectional elements appear in between verbal stems and preverbs, this is no counterexample to the generalization that inflection tends to be peripheral with respect to derivation. Detailed studies of such preverb-verb combinations and their interaction with inflection can be found in Booij and van Marle (2003).

In sum, it is only in very specific circumstances that inflectional morphemes can appear inside derivational morphemes. Hence, Greenberg's Universal 28 remains an important generalization about the relation between inflection and derivation.

See also: Affixation; A-Morphous Morphology; Compound; Dual-Mechanism Morphology; Internal Modification; Lexical Phonology and Morphology; Morphology and Language Processing; Morphotactics; Paradigm Function Morphology; Productivity.

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Influence of Literacy on Language Development

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What Is Literacy?

Literacy is a complex phenomenon with linguistic, social, educational, and political aspects. It includes the roles of written language in various social groups and settings, the structure of different types of text, and the tension between nonstandard and standard varieties. A central role belongs to the social capital residing in the mastery of complex written language. Every literate society obliges its children

to spend many years subjected to rigorous formal education in which the teaching of complex written language is central. In spite of this, many literacy practices are at odds with practices found in formal education. The differences between spoken and written language bear directly on theories of first-language acquisition. In grammar and vocabulary, written language is far more complex than unplanned spoken language. Complex constructions are acquired after the age of seven and much later, and the study of literacy and written vs. spoken language does not support theories of rich innate linguistic knowledge.

One view of literacy is that it concerns how children learn to connect letters and sounds and that it is