agreement can be separated by other words, as is frequently the case in Latin texts. In the following example, the complement *mundi* separates the adjective and the head noun with which it agrees in gender, number and case (Virgil, *Georgics* 1.5):

(**24**)	O	clar-issim-a	mund-i	lumin-a
	O	clear-SUPERL-NEUT.PL.VOC	world-GEN.SG	light-NEUT.PL.VOC
	"O, clearest lights of the earth"			

Australian languages such as Warlpiri are also well-known for this kind of freedom in word order, made possible by the case-marking system. Both case marking and agreement patterns make it possible for a language to have more or less free word order because they may serve to find out which words belong together, and which function they have. However, this is not an automatic consequence: the presence of rich inflection does not necessarily imply that a language has free word order. German, for instance, has pretty rigid word order principles notwithstanding its rich case and agreement system.

Contextual inflection introduces a large degree of redundancy, and it may therefore come as no surprise that contextual inflection erodes much more frequently in the course of history than inherent inflection. The Romance languages French, Italian, and Spanish, descendants of Latin, all kept the number distinction for nouns, whereas these languages no longer have case markings on nouns. Afrikaans has lost its verbal endings for number and person (contextual inflection), whereas it has kept the tense distinction between present and past. This shows that the distinction between inherent and contextual inflection is important for understanding patterns of language change.

5.3 Inflection and derivation

As we saw in Chapter 1, the primary distinction between inflection and derivation is a functional one: derivation creates new lexemes, and inflection serves to create different forms of the same lexeme. Yet, this is not always sufficient to determine in concrete cases of morphology to which domain a particular morphological form belongs. Consider English comparatives. How do we know if *bigger* is a different lexeme than *big*, or another form of the lexeme BIG?

We might define inflection as 'the kind of morphology that is relevant to syntax'. According to that demarcation criterion, the morphological

properties that play a role in agreement and government are clear cases of inflection. This comprises all contextual inflection, but also those morphological properties of words that function as controllers for this kind of inflection. The marking of number on nouns is often not an instance of contextual inflection itself, but it may play a role in determining the shape of adjectives and determiners with which it combines. Note, however, that we cannot say that derivation is completely irrelevant to syntax. For example, when we create causative verbs by means of derivation, we create transitive verbs, and transitivity is certainly a property that is relevant to syntax.

A second possible criterion is that inflection is obligatory, whereas derivation is optional. This criterion does apply to contextual inflection, but at first sight not always to inherent inflection. In the case of verbal conjugation, inflection is always obligatory: you have to choose a specific form of a verb in a clause. This seems not to apply to nouns: a noun can be used without any morphological marking for number. In fact, for many nouns the need for a plural form will (almost) never arise, as is the case for the English nouns *attention, accordance*, and *adolescence*. However, one may claim that English words are always inflected for the relevant categories because an English noun is always either singular or plural. After all, these latter three nouns behave as singular nouns in subject–verb agreement. So these nouns are singular "by default". In this sense, inflection for number is indeed obligatory in English.

An important criterion that might distinguish inflection from derivation is the essential role of the paradigm in inflection. The cells of the paradigm are defined by the inflectional categories of a particular word class. In Chapter 6 the role of paradigms in making morphological generalizations is discussed. A clear example of the role of paradigms can be found in **periphrasis**. We have to do with periphrasis if for certain cells of the paradigm no **synthetic** morphological form is available. Instead, a combination of words, an **analytic** or periphrastic form, has to be used. Latin has no synthetic forms for the perfective passive of verbs, as illustrated in Table 5.2 for the 3SG forms of *laudāre* "to praise". The cells for the perfective passive are a combination of the passive participle (that, like adjectives, agrees with the subject of the clause with respect to case, gender, and number) and a form of the verb *esse* "to be". If these word combinations were not considered part of the verbal paradigm, Latin verbs would have a paradigm with a gap for the perfective passive forms. These periphrastic forms have a perfective interpretation, although the forms of the verb *esse* "to be" are that of the imperfect tense.

Table 5.2. *Imperfective and perfective 3* SG *forms of laudāre*

IMPERFECTIVE	ACTIVE	PASSIVE
PRESENT	laudat	laudātur
PAST	laudābat	laudābātur
FUTURE	laudābit	laudābitur
PERFECTIVE	ACTIVE	PASSIVE
PRESENT	laudāvit	laudātus/a/um est
PAST	laudāverat	laudātus/a/um erat
FUTURE	laudāverit	laudātus/a/um erit

An additional argument for considering these word combinations as filling paradigm cells is the following. Latin has a number of so-called **deponent verbs**, verbs with a passive form but an active meaning. For instance, the verb *loquor* ''to speak'' is such a deponent verb. The crucial observation is that a word-sequence such as *locutus est* receives an active interpretation as well, and means ''he has spoken''. This parallelism in interpretation as active forms is to be expected if these analytic forms belong to the inflectional paradigm of verbs.

The notion 'suppletion' also presupposes the idea of a paradigm. We speak about the grammatical words *am, are, is, was*, and *were* as forms of the English lexeme BE although they are quite different in phonological shape, and show (almost) no phonological relatedness. These words fill specific cells in the paradigm of *to be*. The same applies to *worse*, the suppletive comparative form of BAD.

A fourth criterion for distinguishing inflection and derivation is that derivation may feed inflection, but not vice versa. Derivation applies to the stem-forms of words, without their inflectional endings, and creates new, more complex stems to which inflectional rules can be applied. This is the main reason for keeping the two kinds of morphology distinct. It is a cross-linguistic generalization that inflection is peripheral with respect to derivation, formulated by Greenberg as follows:

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

Greenberg's universal excludes the morpheme order patterns *Derivation–Inflection–Root and *Root–Inflection–Derivation. It might also be

interpreted as saying that derivation cannot apply to inflected forms. Yet, there are exceptions to this universal tendency, cases in which inflectional forms appear to feed derivation. For instance, the comparative form of some Dutch adjectives has functioned as the base for derivation with the prefix *ver-*, as in

(**26**) erg-er "worse" [ver-[erg-er]$_A$]$_V$ "to worsen"
oud-er "older" [ver-[oud-er]$_A$]$_V$ "to get older"

Strictly speaking, this morphological pattern is not excluded by Greenberg's Universal 28 because the derivational morpheme is a prefix, and the inflectional morpheme is a suffix. A real exception to this universal is the use of verbal participles (which may function as adjectives) for de-adjectival word-formation, which is quite common in Indo-European languages. For example, English past participles show up in de-adjectival word-formation, as in *affect-ed-ness* and *relat-ed-ness*. Here we find the "wrong" order Root–Inflection–Derivation, since *-ed* is an inflectional suffix, and *-ness* a derivational one. However, this kind of de-inflectional word-formation is only found with instances of inherent inflection such as comparatives and participles as bases.

Another demarcation criterion that might be invoked is that derivation is potentially category-changing, unlike inflection. Although it is true that most cases of inflection do not change syntactic category, there is a change of category involved for infinitives, gerunds, participles, and converbs, which keep their verbal potential, but also have properties of other syntactic categories (section 5.1).

In sum, the best criteria for distinguishing inflection from derivation are the obligatoriness of inflection, the fact that it is organized by means of paradigms, and that it is normally a word without its inflectional endings (= the stem) that forms the basis for word-formation. It will be clear that the boundary between the two is not extremely sharp, and that there are similarities between inherent inflection and derivation.

5.4 Theoretical models

The inflectional phenomena discussed above pose two specific questions for the theory of grammar: (i) what is the best formal representation of inflectional processes, and (ii) where in the grammar should inflectional rules apply?

Let us first focus on the formal nature of inflectional rules. For simple cases, one might think of inflection as the attachment of inflectional morphemes to the stem-forms of lexemes. For instance, in English we create plural forms of nouns by suffixing the stem with the suffix *-s*. Similarly, past tense forms of verbs are made by suffixation of the verbal stem with *-ed*. Such cases of agglutinative morphology can therefore be dealt with in a model in which morphology is seen as the concatenation of morphemes. This model is called **Item-and-Arrangement Morphology**.

There are two basic problems for this model of inflection. The first is that in many languages there is no one-to-one relation between inflectional properties and their expression by morphemes. Consider once more the paradigm of the Polish noun KOT in Chapter 2, repeated as (27) here for

(**27**)

	SINGULAR	PLURAL
NOMINATIVE	kot	kot-y
GENITIVE	kot-a	kot-ów
DATIVE	kot-u	kot-om
ACCUSATIVE	kot-a	kot-y
INSTRUMENTAL	kot-em	kot-ami
LOCATIVE	koci-e	kot-ach
VOCATIVE	koci-e	kot-y

convenience. Each inflectional suffix in this paradigm expresses features (is an **exponent**) for two categories, NUMBER and CASE. There are no distinct morphs for these two categories, and the inflectional endings are portmanteau morphs. This is a case of **cumulative exponence**: each ending in the paradigm of KOT is the expression of more than one inflectional category (the formal correlate of a morphological category is called its **exponence**). There is also the opposite phenomenon that one inflectional category may receive more than one morphological expression. This is illustrated by the Latin word form *laudāvisti* in Table 5.1: the inflectional category PERFECT is expressed by both the morpheme *-vi-* after the stem *laudā* and the selection of a 2SG ending *-isti* that is unique to the PERFECT, and hence also expresses this category. This is called **extended exponence**.

The second problem for an Item-and-Arrangement model of inflection is that inflectional categories may be expressed by other means than morpheme concatenation. In Germanic languages, for instance, the past tense

forms of so-called strong verbs are formed by changing the vowel of the verbal stem (ablaut), not by suffixation.

These problems for the Item-and-Arrangement model have led to a different view of inflection in which inflectional rules are operations of various sorts: affixation, vowel change, reduplication, etc. This process-variant of morphology is called **Item-and-Process Morphology**. Thus, the rule for computing the PL.INSTR. form of Polish nouns like KOT might be formulated as follows:

(**28**) $[x]_N \rightarrow [x\text{-ami}]_{N[+pl.,instr]}$

This rule states that if we add the ending *-ami* to the stem form of a noun, we thus create a noun with the features PLURAL and INSTRUMENTAL.

A third model for inflection, which shares the processual view of morphology with the model of Item-and-Process morphology, is the **Word-and-Paradigm** model. This model takes the lexeme and its paradigm of cells as its starting point. The different forms of the paradigm of a lexeme are computed by a set of **realization rules**. The realization rule for the INSTR.PL. form of nouns like KOT will have the following form:

(**29**) $[x]_{N\,[+pl,\ instr]} \rightarrow [x\text{-ami}]_N$

The difference between rule (28) and rule (29) is the following. Rule (28) introduces a morphosyntactic property hand-in-hand with its exponent, while rule (29) treats the property set as a precondition for the introduction of its exponent. Rules such as (29) are therefore called realization rules or **spell out rules**, and this kind of morphological analysis is called **realizational morphology**.

One advantage of using the format of spell out rules for inflection is that it can easily account for cases in which there is no overt phonological expression for certain morphosyntactic features. In English and Dutch, there is no overt ending for singular nouns. Yet, nouns must be specified for number in order for agreement rules to apply properly. One might therefore assume a zero suffix or prefix for singular nouns, but this is an ad hoc assumption. It is even impossible to determine if the zero is a prefix or a suffix, since you cannot hear it. In a realization approach one can account for this straightforwardly. Since the cell with the feature [– plural] of a Dutch or English noun will not trigger a realization rule, the singular form of the noun will be identical to the stem-form. This makes the introduction of a zero affix superfluous.

The basic analytical problem posed by inflectional systems discussed above is that there is no neat mapping of form and (morphosyntactic) content in a one-to-one-fashion. A related problem is that there is quite often competition between different realization rules for the same morphosyntactic content. In Germanic languages, for instance, the past tense form of verbs is created either by vowel change, or by suffixation. In the case of *sing*, with the past tense form *sang*, we have to take care that the grammar will not specify its past tense form as *singed*. This will be achieved as follows. The rule that applies to ablauting verbs such as *sing* will not only be conditioned by the presence of the feature PAST TENSE, but also by the **diacritic feature** [ablaut] that is assigned to these ablauting verbs in the lexicon. A diacritic feature refers to an arbitrary class of lexical items. From the synchronic point of view it is an arbitrary property of a verb that it belongs to the class of verbs that makes use of vowel alternations to express past tense. The additional presence of the feature [ablaut] in the condition for vowel change makes this rule more specific than the rule for suffixation with *-ed*, which only requires its inputs to be verbs. It is a generally accepted idea in linguistics that, in the case of competition between two or more rules, the more specific rule will be applied first, and then pre-empts the application of the more general rule. This is called **Panini's Principle**, after the Sanskrit grammarian Panini who introduced this idea.

Another theoretical model that should be mentioned here is that of **Distributed Morphology**. This model is not process-based, but morpheme-based: morphemes are the atoms of morphosyntactic representations, and to that extent it is a (sophisticated) variant of Item-and-Arrangement Morphology. At the syntactic level, the structure of a sentence is represented as a syntactic tree that includes abstract morphemes such as [+plural], [+past], etc. These abstract morphemes form terminal nodes in the syntactic tree, just like lexical morphemes. The phonological content of these morphemes is then spelt out through the insertion of vocabulary items that specify the phonological correlate of an abstract morpheme. An example of a vocabulary item is the English plural suffix /z/ for nouns (as in *dog–dogs*):

(30) /z/ ↔ [_,+plural]

This vocabulary item states that the phonological piece /z/ can be inserted in the context of the feature [+plural]. In this approach, there is no lexicon that provides full words, to be used in syntactic structure. The task of

providing fully inflected words is distributed over other components of the grammar, hence the name Distributed Morphology.

How does the model of Distributed Morphology deal with cumulative exponence, the phenomenon that poses a problem for Item-and-Arrangement Morphology? In such situations, in which one phonological piece expresses a set of morphosyntactic features, the morphosyntactic tree will be restructured before lexical insertion takes place. For instance, the abstract morphemes for number and case in Latin and Polish may be fused into one terminal node through a **fusion rule**. Subsequently, the vocabulary item that matches with that feature combination is inserted, for instance the Latin suffix *-i* for the NOM. PL form of second declension nouns:

(**31**) $/\text{i}/ \leftrightarrow [\_, +\text{plural}, +\text{nom}]_{\text{N, class II}}$

In English plural nouns such as *geese* and *men*, the plurality is expressed by vowel change, not by the addition of a morpheme. In Distributed Morphology, this is taken care of by assuming a zero suffix for these plural nouns, followed by the application of **readjustment rules** that perform phonological operations triggered by the presence of the feature [+plural] for a specified number of lexical items.

5.5 Morpheme order

The issue of morpheme order deserves special attention in the domain of inflection. In the case of derivation the basic idea is that each morphological operation adds a new layer of structure, and a corresponding semantic interpretation, as was illustrated in section 1.2 for the word *tranquilizer*, the morphological structure of which could be represented by means of a hierarchical structure. In the domain of inflection, however, a flat structure might be more appropriate. When there are different endings for TENSE and for PERSON, with the second ending being more peripheral, there may be no particular reason for assuming a hierarchy in which PERSON is higher than TENSE. This is why some linguists assume that with respect to inflection we have to do with a set of unordered features, and why the expression "set of morphosyntactic features" is used. The order in which inflectional elements appear is sometimes expressed by means of templates. Well-known examples of languages with such **templatic morphology** (also called **position class morphology**) are the Bantu languages.