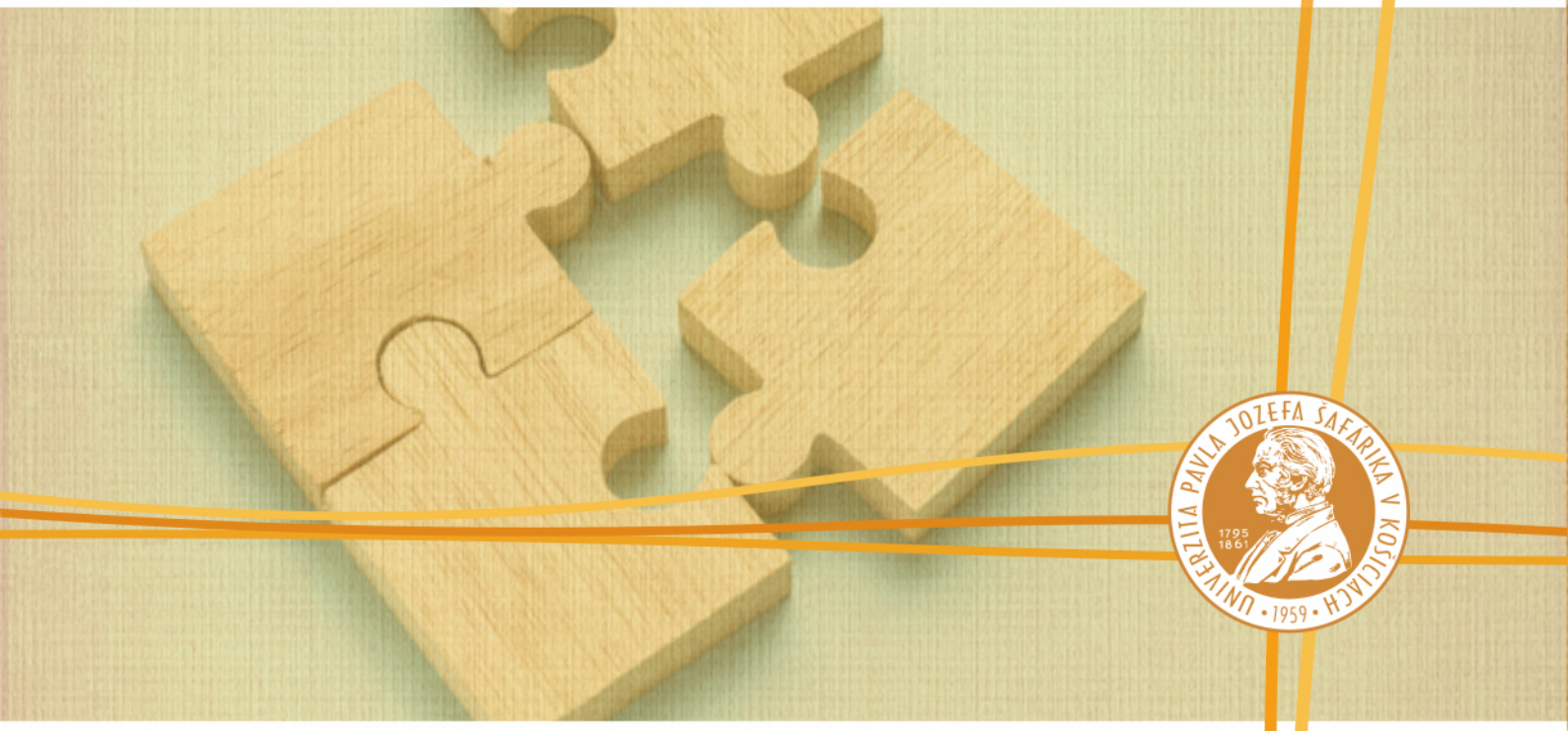
UNIVERZITA PAVLA JOZEFA ŠAFÁRIKA V KOŠICIACH

BASIC CONCEPTS OF MORPHOLOGY I.

Renáta Panocová



Filozofická fakulta

Košice 2021
Vydavateľstvo ŠafárikPress

ACTA FACULTATIS PHILOSOPHICAE UNIVERSITATIS ŠAFARIKIANAE 146

2021

Univerzita Pavla Jozefa Šafárika v Košiciach Filozofická fakulta

Katedra anglistiky a amerikanistiky

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Vysokoškolská učebnica

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Jazyková korektúra:
Andrew Billingham

Umiestnenie: www.unibook.upjs.sk
Dostupné od: 26.01.2021

ISBN 978-80-8152-959-7 (e-publikácia)

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PREFACE

This textbook is an introduction to morphology intended for undergraduate students of *British and American Studies* and students of *English (and French/German) for European Institutions and Economy* and other philology studies in Slovakia. It assumes that students have completed an introductory course in linguistics and in English phonetics and phonology.

The textbook gradually guides students from key terms to concepts and from there to theoretically more challenging phenomena. The textbook is primarily for Slovak students of English, which explains that the majority of the examples presented are English. As the textbook progresses, data from Slovak, German, French, Hungarian and sometimes from slightly more exotic languages are given. It is expected that such an approach will prepare students for carrying out morphological analysis independently. My personal hope is that after this course of morphology students will be interested and well-equipped for "doing" morphology in situations that arise in everyday life as well as reading recent morphological research publications.

There are two people to whom I owe a special debt of gratitude, Prof. Dr. Pavol Štekauer, DrSc. and Univ.-Prof. Dr. Pius ten Hacken, who were willing to read a draft of this textbook. Their constructive comments and positive suggestions helped me to avoid some of the pitfalls in this much-debated area.

Renáta Panocová

CHAPTER 1

THE SCOPE AND PLACE OF MORPHOLOGY

CHAPTER OUTLINE

- This chapter introduces the term **morphology**, explains its origin and its use in linguistics.
- The distinction between **inflection** and **derivation** is presented in order to delimit the scope of morphology.
- Then some views of the **position of morphology** in the system of language are outlined. An overview of the placement of morphology in **European structuralism**, **American structuralism** and **Chomskyan generative grammar** is given.
- In the final section, the relation of the **morphological level** to the **phonological**, **syntactic** and **lexical levels** is presented.

1.1 The scope

The term **morphology** was introduced by the German writer Johan Wolfgang Goethe at the end of the 18th century in the context of biology. The origin is Greek, *morph(o)* means 'shape, form' and *-logy* means 'the study of'. Its meaning in biology is the study of shapes and structures of living organisms. Analogically, in linguistics *morphology* refers to the study of the internal structure of words. Two understandings of what morphology covers are given in (1).

(1) a. Slovak:
rozumiem 'I understand'
rozumieš 'you understand'
rozumie 's/he, it understands'
rozumieme 'we understand'
rozumiete 'you understand'
rozumejú 'they understand'

b. English:
unreasonable
handbook
$\text{cover}_V \rightarrow \text{cover}_N$

In (1a) we have an example of a set of forms of the verb *rozumieť* 'understand' in the present tense called **conjugational paradigm**. Nouns and adjectives in Slovak also have corresponding sets of forms called **declension paradigm**. Morphology in the narrow sense deals with such **inflectional patterns**. This is typical of languages such as Slovak, which are rich in declension and conjugation patterns. In a broader understanding, morphology also deals with forming new words, i.e. **word formation**, as can be seen in (1b). The English examples in (1b) illustrate derivation in *un-reason-able*, compounding in *hand-book*, and conversion in $cover_{V} \rightarrow cover_{N}$. Morphological theories do not agree on whether morphology should cover only inflectional morphology as in (1a), or also word formation as in (1b). The examples in (1a) and (1b) are similar in the sense that in (1a) different morphemes are used to produce different conjugation forms and in (1b) morphemes are used to build up complex words. This means that inflectional morphology and word formation work with the same structural items, i.e. morphemes. On the other hand, the morphemes in (1a) create forms of the verb, whereas the morphemes in (1b) create new words. The precise position of the examples in (1b) with respect to morphology and word formation is a matter of debate. In some theories, morphology is the combination of inflectional and derivational morphology, whereas compounding belongs to word formation or syntax. At present, word formation is often viewed as a separate field of linguistics. In this textbook we will follow the view that morphology deals with both inflection and word formation. Similarities and differences between the two will be presented in more detail in Chapter 4.

1.2 The place of morphology in European structuralism

One of the most prominent currents representing European structuralism is the *Prague School of Linguistics*. The *Prague School* views language as a structured system. The language system is a hierarchically organized set of subsystems. The subsystems are related to each other. The study of language is divided into linguistic disciplines on the basis of the main units of individual **language planes** or **levels**. An example of such modelling of language with the relationship between language planes and their units is given in Table 1.1.

Language plane (level)	Unit at the level of the system	Linguistic discipline
textual	text pattern	stylistics/text linguistics
syntactic	sentence	syntax
lexical	lexeme	lexicology
morphological	morpheme	morphology
phonic (sound)	phoneme	phonetics/phonology

Table 1.1 Language planes.

Table 1.1 shows that the phonic plane is at the bottom of the hierarchy and the textual plane at the top. The morphological plane is above the phonic one and below the lexical plane. Each

plane has a unit at the level of the system, i.e. an abstract unit. For instance, the morpheme is the abstract unit of the morphological plane. The specific realization of the morpheme at the level of speech is called a **morph**. This unit is the object of investigation of the corresponding linguistic field, i.e. morphology. In this tradition, morphology deals with **morphemics**, which is concerned with types of morphemes and the ways how morphemes can combine. It also investigates **grammatical categories** expressed by morphemes, **word classes** (parts of speech) and morphemes that are used to form words. In some theories this is at the boundary with lexicology. Each plane represents a separate component, but the language planes are not researched in isolation. It is assumed that they are linked together by linguistic borderline phenomena.

All language planes in Table 1.1, except the phonic plane, result from the **primary** or **first articulation of language**. This means that their units at the level of the system are signs, consisting of a form and meaning (see Chapter 2). On the other hand, the sound units result from the **second** or **secondary articulation** of language. They are not signs, because a sign is a combination of a form and a meaning and a phoneme is only a form. The structuralist tradition in Europe always considered morphology as a separate component in the language system. In the United States, the autonomy of morphology became more of a controversial issue, especially with the emergence of generative linguistics.

1.3 The place of morphology in American structuralism

American structural linguistics focused on the description and analysis of individual languages and devoted a lot of work to indigenous American languages. It was deemed essential that the linguistic analysis was completed for one level of language structure before moving to the next one. Figure 1.1 shows the organization of different levels.

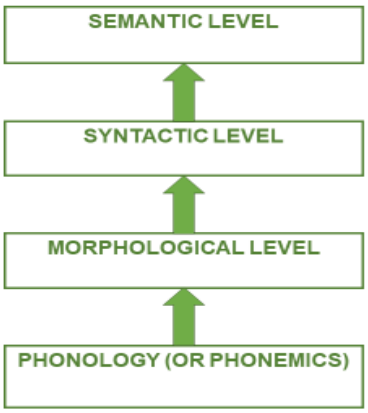

Figure 1.1 Linguistic levels in American structuralism.

Figure 1.1 shows that the levels represent a hierarchy similar to the one in Table 1.1. The bottom level is the sound level and it was considered good practice in describing a language to start

with this level. It was only after the description of the sound system was complete that the investigation of the structure of words at the morphological level started. Then, the syntactic level followed, with the analysis of the structure of sentences. Finally, the meaning was analysed at the semantic level at the top. The most prominent difference to the hierarchy in Table 1.1 is that semantics is a separate level, arrived at only after syntactic analysis. In the Prague School of Linguistics, semantics is represented at each of the levels except for the lowest one.

A rule that determined how linguistic research was carried out was that the findings from a higher level were as a rule not used in the analysis of a lower level, which was called the **separation of levels**. This descriptive analysis of words was adopted by a number of American linguists who contributed significantly to morphological theory. In this textbook you will come across names such as **Leonard Bloomfield** (see Chapter 2), **Zellig Harris** and **Charles Hockett** (see Chapter 3). Their main contribution in the field of morphology was that they worked with the analysis of words into morphemes, which were seen as the smallest units of form with a meaning or grammatical function. As a result, American structuralists generally considered morphology also as a separate subfield of linguistics.

1.4 The place of morphology in generative grammar

The model of **generative grammar** proposed by **Noam Chomsky** changed the views of the position of morphology in the language system quite radically. For Chomsky, a central idea is that knowing a language means being able to produce and understand a large number of utterances that a person may never have heard or said before. Grammar includes the knowledge of the grammar rules of the language that people have in their minds. Such rules will make it possible to identify that saying *this girl* is correct, but **this girls* is not. Figure 1.2 presents how individual components are organized in Chomskyan generative grammar.

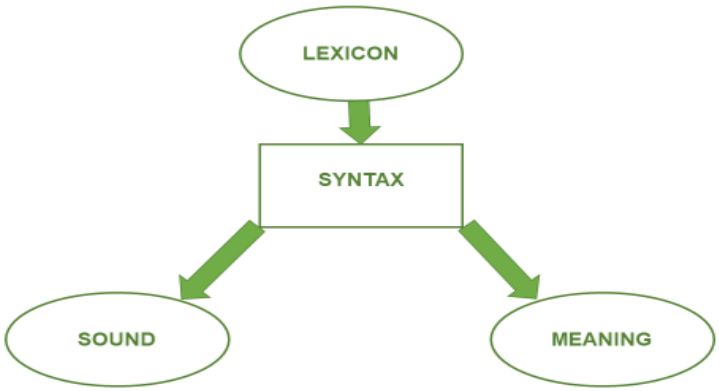

Figure 1.2 Chomskyan organization of grammar.

In Figure 1.2 we can see that the central component of grammar is syntax. It is the syntactic component that includes the rules for generating expressions. This contrasts with sound and meaning, which do not include rules, only representations. Sound is a phonetic representation

and meaning is a semantic representation of the expression. For example, /haʊs/ is a phonetic representation of *house*. The semantic representation is 'a building for human habitation'. Syntactic information includes word class, e.g. noun, which also determines its possible positions in a sentence. Thus, a noun can function as the subject or object of a sentence and be part of a noun phrase, e.g. *the house of my grandparents*. The representation of sound and meaning is derived from syntax. The lexicon contains the items that are inserted into a syntactic tree structure. Figure 1.2 does not include morphology. This is because morphology is not considered as a separate component of grammar. Morphology is explored only in relation to other components as it interacts with phonology, syntax and semantics. It follows that morphology emerges only together with sound, syntactic and semantic aspects of words.

A crucial observation in generative grammar is that syntactic rules are recursive, as illustrated in (2).

(2) a. Sara saw the picture of the dog.
b. Sara saw the picture of the dog on the table.
c. Sara saw the picture of the dog on the table in the bedroom.

In (2) we can see that the constituent *the picture*, called determiner phrase, can be expanded by *of the dog*, called prepositional phrase in (2a), followed by another prepositional phrase *on the table* in (2b) and another one *in the bedroom* in (2c). Some morphological processes are recursive in a similar way, e.g. we can add a prefix *post-* to form *post-modern*, and even add the prefix again to form the adjective *post-post-modern*. Here and in (2), we have a rule that can be reapplied repeatedly. For some generativists, this raised the crucial question of whether morphology is actually different from syntax, if morphological rules that create words are similar to syntactic rules that create sentences. It is not the aim of this textbook to search for the answer to this question, it is presented here only to demonstrate that morphology can be looked at from a number of theoretical perspectives that result in completely different theories.

1.5 Morphology in relation to other language levels

As was mentioned above, in this textbook we will consider morphology as a separate level in the system of language. This section will outline how morphology interacts with other levels of language.

1.5.1 Morphological level and phonological level

The way how morphology and phonology interact can be seen in, for instance, the three different realizations of the plural morpheme *-s* in English. The selection from the three variants, /s/, /z/, and /ɪz/ is determined by their phonological environment. The variant /s/ in *cats* is realized after voiceless consonants, /z/ in *dogs* after voiced consonants and vowels, and /ɪz/ in *houses* is used after the sibilants. These variants are instances of **allomorphy**, which will be presented in more detail in Chapter 2 and Chapter 3. In Chapter 7 we will have a closer look

at Class I and Class II affixes in English. The former can cause alternations of vowels and consonants, e.g. *illustrate* /ˈɪləstreɪt/ → *illustration* /ɪləˈstreɪʃən/. Similar changes occur in a number of other verb-noun pairs, e.g. *abbreviate* → *abbreviation*, *illuminate* → *illumination*, *locate* → *location*. In order to account for the alternation between /t/ and /ʃ/ in these examples, **Nikolaj Trubetzkoy** (1939), a representative of the Prague School of linguistics, introduced the concept of **morphoneme**. In this case, the morphoneme "T" is realized as /t/ in *illustrate* or /ʃ/ in *illustration*. The choice between the two realizations depends on the phonological environment. The morphoneme is a unit of **mor(pho)phonemics** or **mor(pho)phonology**, which is sometimes inserted as a separate **mor(pho)phonological level** between the phonic level and the morphological level in the language system as represented in Table 1.1.

1.5.2 Morphological level and lexical level

In (1b) we saw that some morphological processes result in the formation of new words. It was also mentioned that, for some linguists, the formation of new words does not belong to morphology. For these linguists, word formation is part of lexicology, the field that deals with the word stock of a language. Perhaps you have not come across the English word *obnoxiousness*. Even if you do not know exactly what it means, you can assume that it is a noun. If you turn to a dictionary, you find that it means 'offensiveness, objectionableness'. It may also happen that you encounter the word *marketecture*,[1] you try to look it up in a dictionary, but you do not find it there. Even if this word is not in the dictionary, some speakers formed it and use it. This means that it is in their heads or in their **mental lexicon**. The mental lexicon is not like a paper or online dictionary, typically in alphabetical order. There are a number of different theories focusing on what exactly is in the mental lexicon and how it is organized. Some claim it covers stored items such as morphemes, words, idiomatic expressions, irregular forms and the information about their meaning and phonological realization. For other theoreticians, the lexicon also includes rules about combining morphemes into complex words, e.g. *reason* → *reasonable*, and rules that form, for instance, the regular past tense in English. Even if a native speaker of English has never heard the word *marketecture*, they can say that it is a word of English as long as it was formed by the rules for forming words. These rules and processes will be dealt with in Chapter 6.

1.5.3 Morphological level and syntactic level

The most obvious interaction between morphology and syntax is in the use of inflectional forms of the verb. The contrast between *work* and *works* depends on the syntactic context, i.e. whether the subject of the sentence is 3rd person singular, e.g. *He works in the hospital* but *They work in*

[1] 'a new computer architecture that is being marketed aggressively despite the fact that it doesn't yet exist as a finished product' from The Word Lover's Guide to New Words available at https://wordspy.com/

the hospital. A close relationship between morphology and syntax is also seen in the label **morphosyntactic property**, exemplified by e.g. present tense, singular. As the example above shows, inflection is often required by the syntactic environment. Further discussion is postponed until Chapter 4 and Chapter 5.

CHAPTER 2

SIGNS, WORDS AND MORPHEMES

CHAPTER OUTLINE

- This chapter starts with defining the key units of **word** and **morpheme** from the perspective of the **linguistic sign.**
- In the next section **five models of the linguistic sign** are outlined.
- Different notions of word and contexts in which they are useful are presented. They include **lexeme**, **word-form**, **phonological word**, and **orthographic word**.
- The relevance of the distinction between **type** and **token** especially in corpus analysis is also discussed.
- Different definitions of **morpheme** are introduced and compared.
- Some problems with defining the morpheme as the smallest linguistic sign are described in detail.

2.1 Signs

In Chapter 1 we looked at morphology as the study of the internal structure of words. This raises a question about the nature of words. Although there are several relevant perspectives for defining words in morphological analysis (to be discussed later in this chapter), the best starting point is a semiotic perspective i.e. one related to the theory of the linguistic sign. If you look up **sign** in the *Oxford English Dictionary* (OED, 2020), you will discover that one of its senses is 'something that represents something else'. This explanation can be found in a number of books and textbooks on linguistics when discussing linguistic signs. In a broader sense, this representation is like a map. If you are a tourist in a big city you do not know, you probably buy a map or use the application Google Maps to find your way. The map is a representation of streets in the unknown city. From a linguistic perspective, the linguistic form *map* stands for a drawing or plan of the earth's surface or part of it, showing a city. The interest in modelling of the linguistic sign has resulted in several influential models. Five such models, by Charles S. Peirce, Ferdinand de Saussure, Charles K. Ogden and Ivor A. Richards, Karl L. Bühler and Ján Horecký will be described here in more detail.

Charles S. Peirce is considered the founder of the modern theory of signs. His work covered non-linguistic and linguistic signs. Peirce's model is illustrated in Figure 2.1.

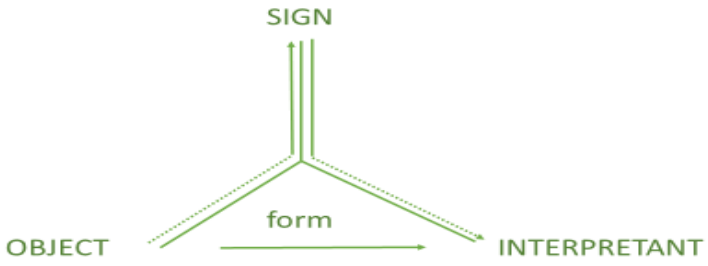

Figure 2.1 Peirce's model of the linguistic sign. Adapted from Trifonas (2015: 205).

Peirce's model of the sign includes three components: the **representamen (sign)**, the **interpretant**, and the **object**. The representamen is the form of the sign or the perceptible object functioning as a sign. The interpretant is the sense made of the sign, and the object is something to which the sign refers. The interaction between these three components is labelled as **semiosis**. This three-part relationship conveys a form from the object to the interpretant through the representamen, which is symbolized by the horizontal arrow in Figure 2.1. The other two arrows represent that the form is conveyed from the object to the interpretant through the determination of the representamen (sign) by the object and through the determination of the interpretant by the representamen (sign). Peirce elaborated an extensive typology of signs, more than 66 types by 1906 (Brown, 2005), but the most important are three types: **icons**, **indexes**, and **symbols**. In this classification the relation to the object is central.

Icons are signs based on similarity of the form with the designated object. For instance, the picture of a book can serve as an icon as it resembles the designated object. Peirce distinguishes three subtypes of icons (so-called hypoicons), ***images***, ***diagrams*** and ***metaphors***. Images represent a direct similarity between the signifier and the signified such as paintings, photographs, or pictograms. Diagrams represent analogy between the relations between the signifier and the signified, often based on conventions. The similarity with the object is based on the internal structure or inner qualities. An example is the curve representing the fluctuation of temperature in one day. Metaphors are iconic metasigns because their similarity is based on similarity with other properties, for instance, when calling someone *a spider in his web*.

Indexes point to objects. For example, smoke is a direct indication of fire, or expressions such as *here*, *there*, *yesterday* indirectly point to spatial and temporal relations of the utterance.

Symbols are based on conventions and unlike icons they do not resemble the objects and do not have a direct relation to the object like indexes. Examples include most linguistic signs such as *book*, *chair*, *table*, etc., as well as mathematical symbols.

Interestingly, approximately at the same time as Peirce was working on his model of the sign in the United States, a prominent figure of modern European linguistics, **Ferdinand de Saussure**, elaborated his model of the linguistic sign. Saussure understood language as a system

of signs. A slightly adapted representation of Saussure's model of the linguistic sign is given in Figure 2.2.

Figure 2.2 Saussure's model of the linguistic sign. Adapted from de Saussure (2011: 66–67).

Figure 2.2 demonstrates that the **linguistic sign** is a **bilateral unit**. It is a link between two abstractions, a **concept** and a **sound image (acoustic image)**. These two sides are represented in an oval shape in Figure 2.2 and the oval stands for the linguistic sign as a whole. A concept is a general idea, a mental representation of essential properties of something. In Figure 2.2 it is realized as a mental representation of a book. It is important to stress that it does not refer to any specific example of a material, tangible book. Similarly, a sound image is an abstract mental representation of a sound, not the physical sound. This is how we can understand different realizations in speech. Saussure compares two sides of a linguistic sign to a sheet of paper where "thought is the front and the sound the back; one cannot cut the front without cutting the back at the same time" (Saussure, 2011: 113). It is possible to consider one of the two, but the other is always there, too. The arrows in Figure 2.2 stand for the relations between concept and sound image and their directions are linked to production and reception of speech. For the term *concept* Saussure also introduced the French term **signifié**, which corresponds to **signified** in English. For *sound image* he also uses **signifiant** in French, corresponding to **signifier** in English. Saussure's signifiant (signifier) is close to Peirce's representamen and his signifié (signified) to Peirce's interpretant. However, there is an important difference, because for Peirce, the interpretant is itself a sign in the mind of the interpreter (Chandler, 2002: 33).

The Saussurean linguistic sign is characterized by two principles: **arbitrariness** and **linearity**. The arbitrariness of a linguistic sign means that there is no causal relation between the concept (signifié, signified), e.g. book in Figure 2.2, and the acoustic image (signifiant, signifier), e.g. a sequence of sounds b-ʊ-k. This explains the existence of different linguistic items in different languages, e.g. *kniha* in Slovak, *Buch* in German, or *livre* in French. Their use is then **conventional**, in other words based on general agreement in a speech community. The principle of arbitrariness can be applied to simple linguistic signs. On the other hand, there are some cases where the arbitrariness is less absolute, as illustrated in (1).

(1) a. miaow EN
b. mňau SK

In (1a) we have an English and in (1b) a Slovak example of the onomatopoeic formations that imitate the sound made by a cat. An obvious question here is why (1a) and (1b) are different when they imitate the same sound, i.e. when they are iconic. The answer is that when speakers of English and speakers of Slovak try to verbalize the sound they hear, they do so on the basis of their respective phonological systems. Therefore, they use a form that fits in with English or Slovak sounds. This means that despite the iconic nature of the words referring to animal sounds, different realizations in individual languages show the balance between the iconic and the arbitrary nature of onomatopoeic expressions.

The linearity of the linguistic sign means that the sound image (signifiant, signifier) consists of a sequence of elements produced one after the other. It is not possible to pronounce all sounds in b-ʊ-k at the same time. This also means that two linguistic signs cannot be realized at the same time. This fact is projected on syntagmatic relations between words in sentences.

An example of a triadic model is the semiotic triangle proposed by **Charles K. Ogden** and **Ivor A. Richards**. Their model of the semiotic triangle was introduced in their book *The Meaning of Meaning* (1923). A slightly adapted version of this model is presented in Figure 2.3.

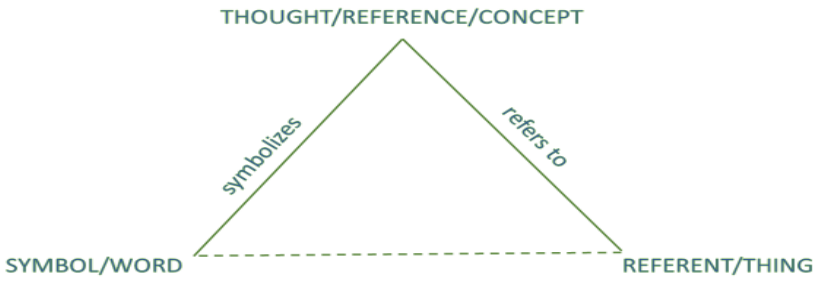

Figure 2.3 Ogden and Richards's semiotic triangle. Adapted from Ogden and Richards (1923: 11).

Ogden and Richards's **semiotic triangle** in Figure 2.3 shows the relations between the **thought** (reference, concept), the **symbol** (word), and the **referent** (thing). The thought is placed at the top of the triangle and it represents the cognitive component of meaning that characterizes the human mind. The symbol (word) is at the bottom left point of the semiotic triangle. The symbol stands for a referent, i.e. a thing or an object of extra-linguistic reality, placed at the bottom right point. Symbols can be represented by speech sounds in spoken language and characters in written form. The broken line between the symbol and the referent indicates the absence of any causal or direct relationship. To put it differently, there is no direct link between the symbol

book and any pieces of written works. This corresponds to Saussure's notion of arbitrariness. The relation between the symbol and the referent is also called **denotation**. The thought is in a causal relationship with the symbol and the referent. The link between the symbol and the thought indicates that humans use language to express what they think of. This relation is also called **signification** (Coseriu, 1970). The link between the referent and the thought is that when humans speak they refer to a thing in extra-linguistic reality. Another term used to describe this causal relation between the referent and the thought is **designation**.

Peirce (1931-1958: 4.537) introduced another classification of signs related to the sign in a narrower sense. He distinguished between **types** and **tokens**. A type is an expression considered as an item belonging to the language system. This contrasts with its individual instances of occurrences in language use labelled as tokens. According to Peirce the word as a type "does not exist, but only determines things that do exist" (CP 2.292, Nöth 2002). This means that the word cannot be treated as a thing. For instance, the word *book* as a type is an abstract entity, which then comes into existence by being used in spoken or written text. This classification is relevant especially for present-day corpus linguistics (for more details see 2.2.)

Neither Saussure's model nor Ogden and Richards's triangle include the speaker and the hearer, who are crucial in communication. **Karl L. Bühler** developed his *Organon model* (1934), which makes up for the absence of language users. A simplified version of his model is given in Figure 2.4.

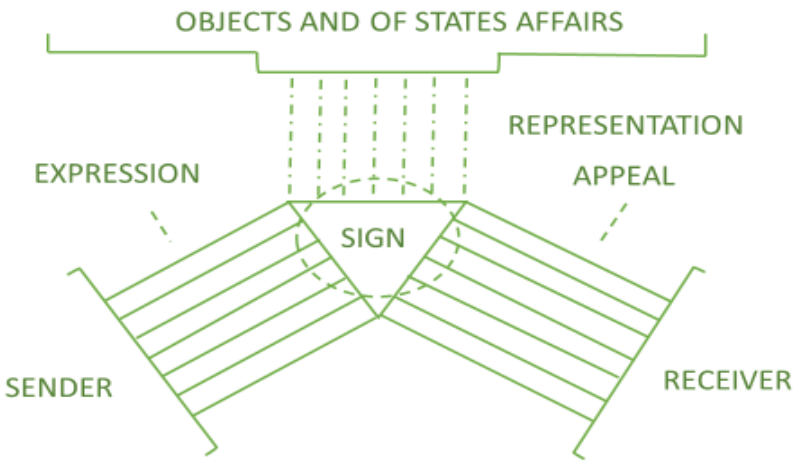

Figure 2.4 Bühler's Organon model. Adapted from Bühler (2011: 34).

The name of the model in Figure 2.4 indicates that individual signs and language constitute a so-called **organon**, i.e. an instrument of thought or knowledge used by language users. Bühler's model in Figure 2.4 places the sign in the centre of the model. It links the sign with a sender and a receiver, or in other words a speaker and a hearer. At the same time, the sign is linked with the objects and relations. These three links correspond to three functions of the language,

i.e. the complex sign: **expression**, **representation**, and **appeal**. The linguistic sign has the role of an instrument used by a sender as a spoken or written expression. Simultaneously, the linguistic sign is a representation of extra-linguistic objects. Linguistic signs are used to appeal to the receiver or hearer/reader. Bühler distinguishes three types of sign on the basis of their function. A **symptom** is associated with an expression as it is dependent on the sender. A **symbol** is linked with a referent of the extra-linguistic reality. A **signal** is related to a receiver who controls the sign. Bühler's model inspired Roman Jakobson, who elaborated it further by adding three more language functions.

The overview of the theories of the linguistic sign would not be complete without the onomasiological model of the linguistic sign by **Ján Horecký**. Horecký's model is based on the Saussurean bilateral linguistic sign. Horecký (1983) makes a distinction between the **ideal linguistic sign** at the level of the system and the **communicative linguistic sign**. The main difference between the two is that the ideal sign cannot carry a signal. This is why the communicative sign is needed with the signified represented by the ideal sign. This distinction is reminiscent of Saussure's opposition between *langue* and *parole*. As with Saussure it does not influence the internal structure of the linguistic sign. Horecký's model is illustrated in Figure 2.5.

	COMPONENTS OF THE LINGUISTIC SIGN	CONTENT	EXAMPLE
	CONCEPTUAL LEVEL	PREDICATES	It is a SUBSTANCE. It is HUMAN. The HUMAN carries out ACTION. etc.
SIGNIFIED ⇦	SEMANTIC LEVEL	SEMANTIC FEATURES	a person with the ability to influence potential buyers
SIGNIFIER	ONOMASIOLOGICAL LEVEL	MOTIVES	Onomasiological base: Agent Onomasiological mark: Action (derivational base)
	ONOMATOLOGICAL LEVEL	MORPHEMES	Action ⇒ influence Agent ⇒ -er
	PHONOLOGICAL LEVEL	PHONOLOGICAL FEATURES	/ˈɪnfluənsə(r)/

Figure 2.5 Horecký's model of the linguistic sign.

The starting point of Horecký's model in Figure 2.5 is a particular object of extra-linguistic reality. Following Saussure also Horecký's linguistic sign has a signifier and a signified. The signifier is a combination of **onomasiological**, **onomatological** and **phonological levels**. The **semantic level** in Figure 2.5 corresponds to the signified. The table in Figure 2.5 begins at the conceptual component of the linguistic sign. It includes a set of logical predicates, which are simple sentences describing characteristic properties of the concept. The semantic level specifies semantic features of the concept. In fact, the semantic features are selected from the

set of abstracted properties based on logical predicates of the concept. In Figure 2.5 the semantic feature 'The HUMAN carries out ACTION' is represented by the constituent *influence* 'to have an effect on the way that somebody behaves or thinks, especially by giving them an example to follow'. In principle, a semantic feature can be assigned to any predicate from the conceptual level. In the example *influencer*, two semantic features are selected to be represented by morphemes. Starting from the onomasiological level we move to the formal part of the linguistic sign. The onomasiological level provides an explanation for the degree of motivation of the selected semantic features in a naming unit. In other words, it is a connection between meaning and word formation constituents. The selected form specifies the relationship between the onomasiological base and the onomasiological mark. In the example *influencer*, the onomasiological base is the suffix *-er* modified by the onomasiological mark *influence*. These reflect the meaning 'a person with the ability to influence potential buyers'. Linguistic representations of individual constituents are assigned at the onomatological level, which is language-specific. The derivational suffix *-er* is specified by the action the verb *influence* denotes. Phonological rules apply at the last level.

Together, the five models presented here give a fairly broad range of possible representations of the linguistic sign. Nevertheless, there are also other models which you may come across in the relevant literature.

2.2 Words

The concept of **word** is central in morphology. As shown in 2.1 it makes sense to define words as linguistic signs. It is clear now that words should not be confused with things. Still the notion of word in morphological analysis remains more complex than it may seem. Two important notions central in morphology are illustrated in Figure 2.6.

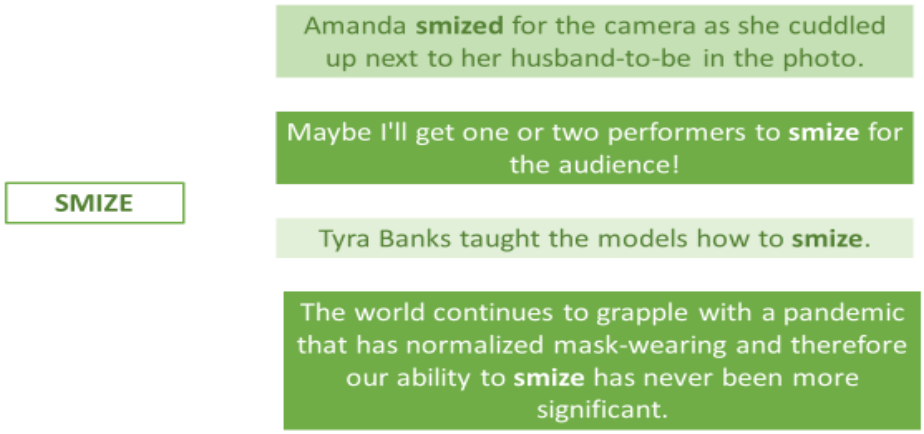

Figure 2.6 Example of a word and corresponding word-forms. Adapted from Buzzword Macmillan Dictionary[2].

Have you ever heard the word *smize*? If not, it is likely that after reading the example sentences in Figure 2.6 you would expect that it is an English verb and you would try to look it up in a dictionary. Buzzword Macmillan Dictionary gives as a definition of *smize*$_v$ 'to smile with your eyes'. The dictionary entry does not list the past tense form *smized* or any other potential form such as *smizes*, or *smizing*. It is also not necessary because these **word-forms** are easily predictable. All of them represent one and the same word. Some morphologists, for instance Matthews (1974: 20-23), use the term **lexeme** in this context. The lexeme is a linguistic sign and an abstract entity. It is also a dictionary word. New words in the sense of lexemes such as SMIZE enrich the lexicon on the level of the language system. The word-forms *smize*, *smized*, *smizing* belong to the lexeme SMIZE. There is a convention to use capital letters to indicate that we refer to a lexeme. Word-forms occur in written text as **orthographic words** or in spoken text as **phonological words**. Sometimes a lexeme/word is realized only by one word-form, e.g. the preposition AT is realized by the single word-form *at*. With SMIZE there are several word-forms.

A set of word-forms representing a lexeme/word is called a **paradigm**. Typically, word-forms in the same paradigm are morphologically related, i.e. they share the same root. Sometimes we find unrelated forms in the same paradigm such as *went* in the paradigm GO. This is referred to as **suppletion**. The forms *go* and *went* have different roots, but belong to the set of inflectional forms of the verb GO.

Another possibility to define *word* is from a syntactic perspective. Di Sciullo and Williams (1987) defined word also as a **syntactic atom**. This means that it is a syntactic item that is understood as a compact and indivisible whole. In case of complex words in the sense of syntactic atoms, this means that their components do not play a role in syntax.

Di Sciullo and Williams (1987) introduced another notion of word, which they call **listeme**. A listeme is any unit whose meaning is not derivable by rule from the meanings of its parts, thus any meaningful unit which has to be memorized and stored in the lexicon (Di Sciullo and Williams, 1987: 3). In this view of the lexicon, it is then a set of irregularities. In other words, the lexicon includes the words that cannot be formed by productive word formation rules. For instance, we expect the idiomatic expression *break a leg* to be memorized and stored in the lexicon, because its meaning of wishing someone good luck, as used among mountaineers, cannot be deduced from its constituents.

At this point we will return to the Peircean distinction between **type** and **token**. These two terms are important especially in corpus linguistics. In order to illustrate this, the examples in Figures 2.7 and 2.8 are taken from the Corpus of Contemporary American English (COCA).

[2] Retrieved from Buzzword Macmillan Dictionary, accessed on 12 October 2020 at https://www.macmillandictionary.com/buzzword/entries/smize.html

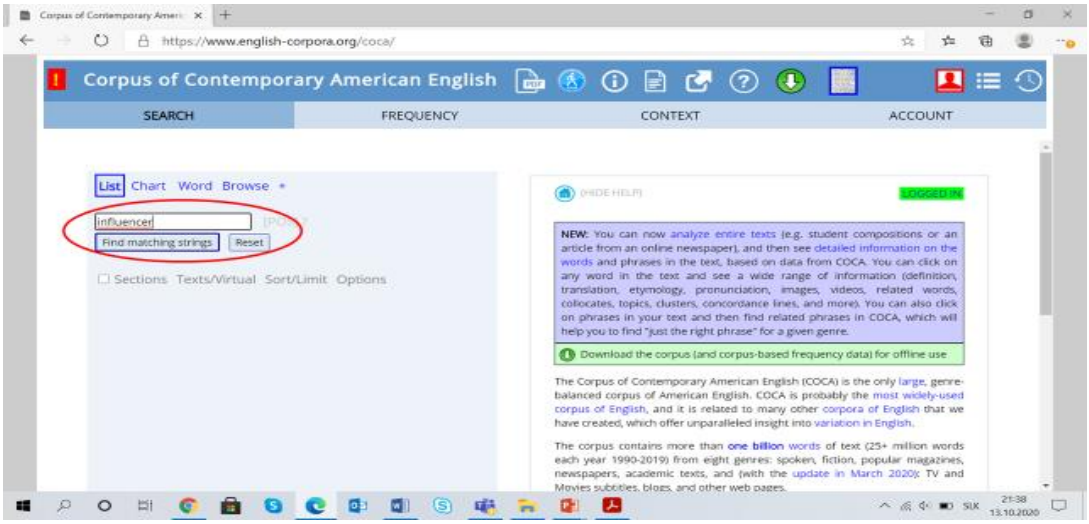

Figure 2.7 Example of corpus query *influencer* in COCA.

In Figure 2.7 we can see the interface in COCA when we start a search. The example in the red circle is *influencer*. Figure 2.8 shows the results of this search.

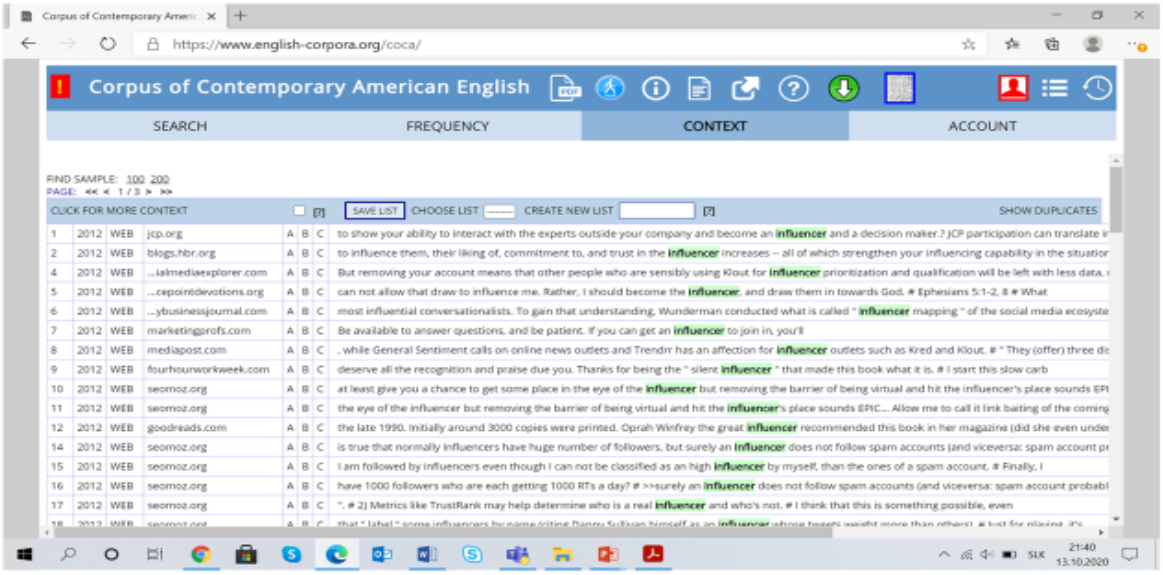

Figure 2.8 Results of the corpus query *influencer* in COCA.

In Figure 2.8 we can see a number of instantiations, i.e. tokens found in COCA. These instantiations represent the type from our corpus search in Figure 2.7. The frequency of occurrence of a type in a file is the number of corresponding tokens in the corpus.

We looked at the word from different perspectives and discovered that this often leads to introducing new labels. The use of different labels is not random and it depends on the purpose

of the analysis. This also reduces the need for a universally valid definition of word. Instead, the more specialized labels are used to avoid confusion.

2.3 Morphemes

Another key unit of morphology is the **morpheme**. Similar to *word*, it is a concept with no generally accepted definition. Several definitions of morpheme are presented in Table 2.1.

Morpheme is	Definition by
that part of a word which is endowed with psychological autonomy and is for the very same reason not further divisible.	Baudouin de Courtenay (1972)
a linguistic form which bears no partial phonetic-semantic resemblance to any other form, an ultimate constituent.	Bloomfield (1933)
a minimum meaningful element.	Hockett (1958)
the smallest part of the word that has its own meaning.	Mathesius (1975)

Table 2.1 Overview of selected definitions of *morpheme*.

Table 2.1 starts with the definition by Jan Baudouin de Courtenay, who was the first to introduce the term *morpheme*. What is central in this definition is that it is the smallest unit with a meaning. Baudouin de Courtenay used *morpheme* as an umbrella term to cover more specific terms such as *root*, *prefix* or *suffix*. Leonard Bloomfield defines *morpheme* in relation to other elements of language. His definition emphasizes the formal aspect of the morpheme. Based on his definition we continue dividing complex words until the point when no part is similar to any other in phonetic shape and meaning. For instance, *government* cannot be considered a morpheme because *govern* is found in *governable*, *governing*, etc. and *-ment* in *agreement*, *procurement*, etc. The elements *govern* and *-ment*, however, are simple forms that do not resemble any other forms.

The definition by Charles F. Hockett is the one you can easily recognize as it is often used in textbooks of linguistics. Vilém Mathesius, a Czech linguist and representative of the Prague School of linguistics, defines morpheme as the smallest linguistic sign in its Saussurean understanding. The morpheme is a bilateral unit with a form and meaning. The form is also sometimes labelled as **formeme** and the meaning as **sememe**.

In Hockett's sense, a morpheme is an abstract unit and its spoken or written realisation is called a **morph**. Sometimes it happens that there are several variants or realizations of one morpheme, e.g. the past tense morpheme in English *-ed* is realized in three spoken forms, as /d/ in *played*, /t/ in *worked*, and /ɪd/ in *wanted*. They are **allomorphs** of the past tense morpheme. These allomorphs are in complementary distribution, which means that only one is used in any particular context. The selection is not random, as it is governed by corresponding rules e.g. the past tense allomorph /t/ is used after voiceless consonants.

We ended the discussion of definitions of morpheme with pointing to its sign nature. However, this is a much debated issue in morphological theory. A majority of linguists strongly argue for treating the morpheme as a linguistic sign, but others treat morphemes only as units of form. Words such as *receive* can be analysed into morphemes, because its components *re-* and *-ceive* occur in several words, e.g. *refer*, *perceive*. For Halle (1973) and Aronoff (1976), this is enough to make items such as *-ceive* morphemes, even if they do not have a specific meaning. Halle analyses, for instance, *believe* as *be-* and *-lieve*, *total* as *tot-* and *-al*, i.e. as consisting of formal units without any meaning on their own. For Aronoff, the relevant unit of morphology is the word, rather than the morpheme. Words are complete bilateral signs. For linguists who assume that morphemes are bilateral signs, *-ceive* is not a morpheme. The sign nature of morpheme suggests that we ideally expect a one-to-one relationship between the form and meaning. The examples in (2) are not entirely in line with this expectation.

(2) a. She **drinks** two espressos every day.
b. **She is drinking** coffee.
c. She **drank** too much coffee yesterday.
d. I **put** a new pack of coffee on the table.

In (2a) one morpheme *-s* represents cumulatively three grammatical meanings, third person, singular number, and present tense. It is not possible to separate the element expressing only one of these grammatical functions, all three are packed into one form. This is called **cumulative exponence**. An alternative term used to refer to cases where a single morph represents several grammatical functions is **portmanteau morph**.

The opposite is illustrated in (2b) where the present continuous is expressed by several elements: a full verb plus the present participle ending plus a corresponding form of *be*. Several formal elements combine to express a single meaning. This is called **extended exponence**. Depending on the concept of morpheme, extended exponence would have to be treated as a morpheme consisting of discontinuous elements.

In Figure 2.6 we saw that from a morphological perspective, the word-form *smized* occupies a certain slot in the verbal paradigm. *Smized* in Figure 2.6 is used to express the past tense. In the sentence *Amanda has just smized at me* the word-form *smized* does not express the past tense but the past participle. Therefore, two identical word-forms can differ in the grammatical function they fulfil and they occupy different slots in the corresponding paradigm. This phenomenon is called **syncretism**.

In (2c) it is not possible to identify the past tense morpheme. The past tense results from internal vowel change called **apophony** or **ablaut**. In (2d) the past tense is not overtly expressed in the verb, but other structures in the sentence, e.g. *yesterday*, indicate that the verb must be in the past tense. At the level of the system it is realized by a **zero morpheme** usually marked as ø. The notion of zero morpheme must be distinguished from **empty morpheme** such as *-o-* in *morph-o-phoneme*. The latter is a **formative** or a **linking element** that does not represent any meaningful unit.

Despite problematic issues, the notion of morpheme continues to be used in morphology, but not necessarily in a single sense or as a theoretically grounded term.

CHAPTER 3

MORPHOLOGICAL MODELS

CHAPTER OUTLINE

- This chapter explores what role the two key units, **word** and **morpheme**, play in morphological descriptions of languages.
- First, the **Item-and-Arrangement model (IA model)** is presented. The starting point is determining what the items are in this model and for which language features this model fits the best. Then, some morphological issues are described that cause difficulties in IA account.
- Second, the **Item-and-Process model (IP model)** is outlined. The main focus is on determining what items actually are and how they interact with processes. The IP model and the IA model are then compared.
- Finally, the **Word-and-Paradigm model (WP model)** is considered, especially the role and function of items in this model, differences to IA and IP models, and which properties of languages are best treated in this model of morphological description.

3.1 Item-and-Arrangement

The basic units of morphology we attempted to define in Chapter 2 are **word** and **morpheme**. The main aim of this chapter is consider how these units affect morphological description of languages. The concept of different models of grammatical description was first introduced by **Charles F. Hockett** in his article *Two models of grammatical description* (1958). Although the title of his study explicitly mentions two models, **Item-and-Arrangement (IA)** and **Item-and-Process (IP)**, the third model, **Word-and-Paradigm (WP)**, is also briefly outlined. The WP model was further elaborated by Robins (1959) and later by Matthews (1972). Hockett (1958: 387) explains the main point of the IA model in (1).

(1) 'The essence of IA is to talk simply of things and the arrangements in which those things occur. One assumes that any utterance in a given language consists wholly of a certain number of minimum grammatically relevant elements, called **morphemes**, in a certain arrangement relative to each other. The structure of the utterance is specified by **stating the morphemes and the arrangement**. The pattern of the language is described if we list the morphemes and the arrangements in which they occur relative to each other in utterances - appending **statements to cover the phonemic shapes which appear** in any concurrent combination.' Hockett (1958: 387, my emphasis, RP)

The quotation in (1) explains that in the IA model it is important to identify morphemes. Morphemes are defined as the minimal meaningful elements of language. The morphemes of a language must be seen in connection to other such elements. This means that the main aim of the IA model is to specify a list or inventory of morphemes in a given language and their possible ways of **distribution**, i.e. the complete set of contexts or environments in which a linguistic form occurs. The IA description is illustrated in (2).

(2) spiralizer 'a kitchen device used for spiralizing (= cutting food into long, curling pieces)'

The complex form in (2) can be divided into three items *spiral+iz(e)+er*. The element *spiral* can stand on its own, it is an independent or **free form**. The verbal suffix *-ize* and the nominal suffix *-er* are **bound forms** incapable of standing on their own. The free form and the two bound forms are minimal meaningful elements, called **morphemes**. Morphemes constitute the items in the IA model. Consequently, both free morphemes and bound morphemes have independent entries in the lexicon. This means that *spiral* has a separate entry, and *-ize* and *-er* also have individual entries in the lexicon. Each lexical entry carries three types of information, **phonological information**, **structural information**, and **semantic information** which are presented in (3).

(3) a. /ˈspaɪə.rəl.aɪ.zər/
b. [[[N]suffix]$_{V}$ suffix]$_{N}$
c. 'a kitchen device used for spiralizing (= cutting food into long, curling pieces)'

In (3a) we find the information about the pronunciation of the word, i.e. phonological information. In (3b) we learn that *spiral* is a noun, *-ize* is the suffix which results in verb formation, and *-er* is a nominal suffix typically selecting a verbal base. Finally, in (3c) we understand the meaning of the resulting output based on the meaning of the individual constituents of the complex word *spiralizer*. In line with the IA model, we should list the individual morphemes and specify the rules accounting for the way these morphemes are arranged. In some cases, there are corresponding phonological changes triggered by morphophonological rules, which can be exemplified by the English plural marker in (4).

(4) a. /z/
b. (N)suffix]$_{N}$
c. 'plural'

In a way similar to (3), in (4a) the phonological information for the plural morpheme is given. The structural information in (4b) indicates that the item is a suffix that takes a noun and produces a noun. Semantic information is specified in (4c). However, the plural morpheme in English is realized in three different phonetic variants. This is illustrated in (5).

(5) a. book**s** /s/
b. key**s** /z/
c. house**s** /ɪz/

All three realizations in (5) have the same meaning ‘plural’. Because they represent a single morpheme ‘plural’, these realizations are called **allomorphs**. The next step in the IA model is to account for the rules of their distribution. In (5a) /s/ is realized after a voiceless consonant, the allomorph in (5b) is used after voiced consonants or vowels. In (5c) /ɪz/ is realized after a sibilant.

The IA model works best when there is a one-to-one correspondence between form and meaning, or in other words between morpheme and morph. For example, the prefix *un-* has no allomorphs and it always has a negative meaning. This property is typical of **agglutinative languages**, where morphemes link or glue together without changing their forms. Prototypical examples of such languages are Turkish, Swahili, or Hungarian. As Hungary is geographically close to Slovakia and there are quite a number of bilingual speakers of Hungarian and Slovak, we will discuss the example of nominal declension shown in Table 3.1.

	BACK VOWEL SINGULAR	**PLURAL**	**FRONT VOWEL SINGULAR**	**PLURAL**
NOMINATIVE	pohár ‘glass’	poharak ‘glasses’	kéz ‘hand’	kezek ‘hands’
ACCUSATIVE	poharat	poharakat	kezet	kezeket

Table 3.1 Example of the declension of nouns in Hungarian. Adapted from Rounds (2001: 297).

Table 3.1 displays nominative and accusative word-forms in singular and plural of two Hungarian nouns. Gluing together is most clearly illustrated by the accusative plural forms. *Poharakat* is made up of a sequence of morphemes, the lexical morpheme *pohar* plus the plural suffix *-ak* and the accusative suffix *-at*. Similarly, *kezeket* is represented by the lexical morpheme *kez* followed by the plural suffix *-ek* and the accusative marker *-et*. These examples are ideal for a morphological description using the IA model. Words are easily segmented into morphemes and the rules accounting for their distribution are then specified.

In Table 3.1 one noun has a back vowel in the stem and the other one a front vowel. This fact determines the selection of the corresponding plural ending, in Table 3.1 either *-ak* or *-ek*, and the accusative ending *-at* or *-et*. The rule is that if a stem contains back vowels, it selects a suffix with a back vowel; if a stem contains only front vowels only a front vowel suffix can be attached. This is called **vowel harmony**. For comparison, Table 3.2 gives some examples of declension in Slovak.

	SINGULAR	PLURAL
NOMINATIVE	žena ‘woman’	ženy ‘women’
ACCUSATIVE	ženu	ženy

Table 3.2 Example of nominal declension in Slovak.

Table 3.2 shows that the situation in Slovak is very different from Hungarian. For instance, the suffix *-u* expresses feminine gender, accusative case and singular. Three grammatical functions are packed into a single marker, which is called **cumulative exponence** (see Chapter 2). In Table 3.2 we also see that there are no allomorphs of the inflectional suffixes available. This is because in Slovak, a declension pattern is based on grammatical gender (masculine, feminine and neuter). This contrasts with Hungarian where gender does not exist. The Slovak examples present a difficulty for the IA model. The reason is that individual morphemes cannot be separated like in Table 3.1 for Hungarian. Another consequence is that it is more difficult to specify distributional rules. Therefore, the IA model is not ideal for the morphological description of languages with complex inflectional paradigms such as Slovak.

For English, we discussed so far only the cases that can be accounted for by the IA model. However, there are also cases which challenge the IA model. Vowel alternations, for instance past tense forms of irregular verbs termed **ablaut**, are not so easily treated in IA. Hockett (1958: 393-394) gives the example of the past tense *took* of *take*. In the past tense form, the morpheme indicating the past tense is impossible to identify. Hockett (1958: 393-394) proposes five solutions for this challenging case, but he himself seems to prefer treating *took* as the combination of a discontinuous allomorph /t...k/ of *take*, and an infixed allomorph /u/. Nevertheless, the problem remains challenging in IA and is solved more easily in IP.

We have seen that IA is a useful model when a systematic description of all attested and possible utterances of the language using discrete minimal units can be produced and their distributional criteria determined. IA is clearly a morpheme-based model. It was the basis for earlier generative theories by Lieber (1980, 1992), Selkirk (1982), Williams (1981) and Di Sciullo and Williams (1987), as well as one of the mainstream morphological theories at present known as **Distributed morphology**, originally proposed by Halle and Marantz (1993).

3.2 Item-and-Process

The main difference between IA and IP is in what counts as an independent item. In IP, only free morphemes have separate entries in the lexicon. Morphological rules are understood as **operations** or **processes** that act on free morphemes. Bound morphemes are then parts of rules. In order to compare both models, we will consider the analysis of the examples (2) and (5b) in the light of the IP model. For convenience I copy example (2) below.

(2) spiralizer ‘a kitchen device used for spiralizing (= cutting food into long, curling pieces)’

In IP, only the free morpheme *spiral* has an independent entry in the lexicon. Neither *-iz(e)* nor *-er* have separate entries. The suffix *-ize* is part of the process 'make verb' with the resulting output *spiralize*. The suffix *-er* is part of the rule 'make instrument noun'. This contrasts with the linear arrangement of individual constituents of (2) in IA. The advantage of IP is that bound morphemes do not necessarily need to be specified because they apply together with a rule. The IP analysis of (5b) is given in (6).

(6) $[key]_N \rightarrow [keys]_N$ [+plural]

The rule in (6) says that we can add /z/ to the noun *key* and create the corresponding word-form of this noun with the feature PLURAL. The bound plural suffix is part of the rule or process 'make plural' which operates on the free item *key*. In order to account for the plural allomorphs /s/, /z/ and /ɪz/ it is necessary to specify a **basic form** or **underlying form**. The underlying form is the most basic allomorph from which other allomorphs can be derived. In the case of the plural, the underlying form is /z/, because it is the form from which the allomorphs /s/ and /ɪz/ are easily derived. The allomorph /s/ is derived from it by the process of **assimilation** where two sounds are made more similar. The allomorph /ɪz/ results from the opposite process of **dissimilation**.

This brings us to the question of how ablaut is accounted for in the IP model. The past tense form *took* is formed from *take* by an **ablaut process**. A basic form plus a past tense process is a combination which results in the change of vowel quality and can be formalized in the following way: $[$ [vowel change] + past tense$]_V$.

The advantage of the IP model is that it emphasizes the processual aspect of morphological description without the need to view bound elements as items with independent entries in the lexicon. This approach makes it possible to propose an elegant solution of a number of cases that are problematic in the IA model. A strong advocate of the IP model is, for instance, Mark Aronoff (1976) in generative linguistics, or Geert Booij with his theory of *Construction Morphology* (2010).

3.3 Word-and-Paradigm

The **Word-and-Paradigm model (WP model)** was presented systematically by Matthews (1972). WP is useful for describing languages with extensive inflectional paradigms such as Slovak, Russian, Spanish or Greek. Inflectional paradigms are central in WP. The main aim of morphological description is to explain patterns identified in different paradigms. The items in WP are words in the sense of word-forms belonging to what Matthews (1974: 20-22) calls a lexeme. The word-form is seen as an unanalysable unit, not as a sequence of morphemes. This is illustrated in Table 3.3.

	Feminine pattern 1	**Feminine pattern 2**	**Feminine pattern 3**	**Feminine pattern 4**

nominative singular	žena ‘woman’	ulica ‘street’	dlaň ‘palm’	kosť ‘bone’
instrumental singular	ženou	ulicou	dlaňou	Kosťou

Table 3.3 Example of syncretism in the instrumental case of feminine declension patterns in Slovak.

Table 3.3 shows the forms of the instrumental case in four feminine declension patterns in Slovak. The nominative singular indicates the declension pattern. In all four pattern the instrumental is formed in the same way. WP makes it possible to introduce a rule for forming different slots in paradigms. The rule for the instrumental singular forms from Table 3.3 is given in (7).

(7) $[x]_{N,\ Fem}\ [+sg, instr] \rightarrow [x\text{-}ou]_{N}$

The rule in (7) tells us that all feminine nouns in Slovak will have an instrumental singular form ending in *-ou*. This rule is called a **realizational rule** and it treats the property set in (7) as a precondition for the introduction of its exponent *-ou*. The suffix itself is not an item in WP. It is more appropriate to state that *ženou* is the instrumental singular of the lexeme ŽENA.

Another advantage of WP is that it also makes it possible to account for **cumulative exponence**. In the instrumental case, marked by *-ou* in the word-form *ženou*, the ending expresses singular number, instrumental case and feminine gender. In WP, the suffix *-ou* does not represent an independent unit. The unit is the word-form *ženou* and this unit as a whole serves as the instrumental singular of the lexeme ŽENA. Its phonological form is predictable and the links between form and meaning are not given any status in WP (Bauer, 2004).

It is important to emphasize that each of these three morphological models, IA, IP and WP, is best understood as a kind of umbrella that covers a number of different theories (Lieber, 2010: 183). Each model is better at providing solutions for a particular set of morphological questions, because they operate from different perspectives. For example, we have seen that IA is useful in describing agglutinating languages but has more problems with inflectional languages. However, it would be counterproductive to attempt to determine the one and only model which is relevant in morphological theory.

CHAPTER 4

INFLECTION AND DERIVATION

CHAPTER OUTLINE

- This chapter begins with the traditional division of morphology into **inflectional morphology** and **derivational morphology**.
- First, prototypical examples of **inflection** and **derivation** are presented.
- Then some problematic examples are described.
- A **cline-like approach** to the distinction between inflection and derivation is presented.
- **Criteria** for differentiating between inflection and derivation are listed, explained and exemplified cross-linguistically. For each criterion, also more problematic cases are discussed.

4.1 Some prototypical examples

Traditionally, morphology is divided into two branches, **inflectional morphology** and **derivational morphology**. In Chapter 2 we introduced the relationship between a word (in the sense of a lexeme) and the word-form or word-forms realizing this word (lexeme) in a sentence. For instance, the word-forms of *talk*, *talks*, *talked*, *talking* represent the lexeme $\text{TALK}_{\text{VERB}}$. Their use is illustrated by the examples in (1), taken from COCA.

(1)
a. I'm sure he'd be happy to **talk** to you.
b. He **talks** about the sluggish recovery and gives his opinions of the reasons why.
c. He is not **talking** from a script.
d. I've **talked** to other lawyers, and they all charge too much.
e. I **talked** to him after the game... and we shook hands and went home.

The examples in (1) show the use of different word-forms in different syntactic contexts. In (1a) it is the infinitive. The third person singular present tense is illustrated in (1b). In (1c) we have the present participle form. The past participle form is used in (1d) and the past tense form in (1e). As we have already seen in Chapter 2, these different word-forms are traditionally labelled as a **paradigm**. In inflectional languages such as Slovak we find much more extensive inflectional paradigms as exemplified in Table 4.1.

	SINGULAR	PLURAL
Nominative	ulic-a ‘street’	ulic-e ‘streets’
Genitive	ulic-e	ulíc
Dative	ulic-i	ulic-iam
Accusative	ulic-u	ulic-e
Locative	ulic-i	ulic-iach
Instrumental	ulic-ou	ulic-ami

Table 4.1 Declension paradigm of feminine noun ULICA in Slovak.

The paradigm in Table 4.1 shows the declension pattern of a class of feminine nouns in Slovak. The endings are also called **inflectional endings/suffixes**. They express grammatical information about the corresponding case. Together all case word-forms represent the paradigm of the lexeme ULICA. Each one is used in particular syntactic constructions. Figure 4.1 gives some examples of the use of the accusative word-form in text.

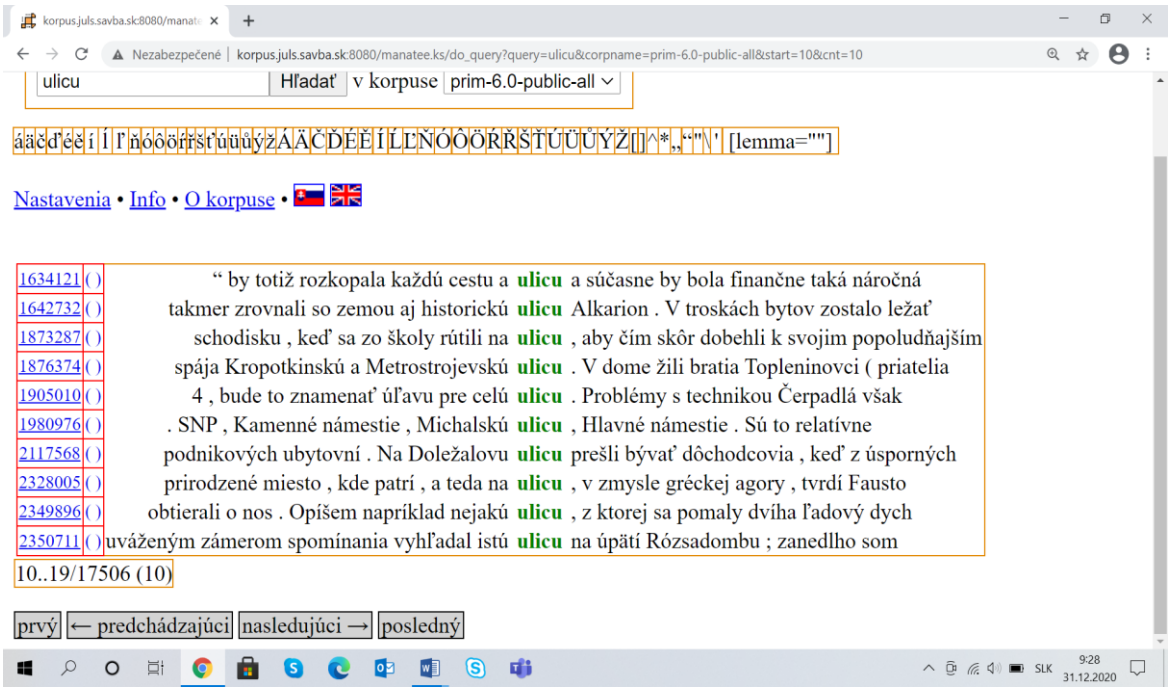

Figure 4.1 Example of query results for *ulicu* ‘street$_{\text{ACCUSATIVE}}$’ in the Slovak National Corpus.

The results of a corpus search in Figure 4.1 illustrate contexts in which the accusative word-form occurs, taken from the Slovak National Corpus (SNC). In all sample clauses, the word-form *ulicu* occupies the position of the object of the main verb or a preposition. Slovak is one of the languages with the subject of the sentence expressed by a nominative case and the object

in the accusative case. The examples in this section clearly demonstrate that adding inflection typically results in creating the word-forms of a particular lexeme, which are then used in appropriate syntactic contexts. An overview of inflectional categories will be presented in Chapter 5.

Derivation or **derivational morphology** produces new words (lexemes). This contrasts with inflectional morphology that produces word-forms of a corresponding lexeme. Some examples of derivation in English are given in (2).

(2) a. smuggle → smuggler (V → N)
b. equal → equality (Adj → N)
c. compose → decompose (V → V)
d. beauty → beautiful (N → Adj)

The examples in (2) show that the output of affixation is a new word naming a new concept. In (2a) the resulting word is an Agent noun, derived from the verbal base. A Quality noun derived from the adjectival base is given in (2b). The output of a negative prefixation to the verb in (2c) is a deverbal verb. Finally, in (2d) an adjective is formed from a nominal base. A few examples of derivation in Slovak are presented in (3).

(3) a. mraziť 'freeze' → mraznička 'freezer' (V → N)
b. dobrý 'good, nice' → dobrák 'good person' (Adj → N)
c. presný 'exact' → nepresný 'not exact' (Adj → Adj)
d. soľ 'salt' → soliť 'to season with salt ' (N → V)

The output words in (3) are new linguistic signs that enrich the lexicon on the level of the system. In (3a) the derived deverbal noun denotes an instrument. In (3b) the output of derivation is a noun or more precisely a person noun. An example of a negative adjective derived from the adjective with a positive meaning is given in (3c). In (3d) we can see an example of a denominal verb with the meaning to 'put into N' or 'cover with N'. More examples of derivational processes will be discussed in Chapter 6.

4.2 The distinction as a challenge

The examples in section 4.1 presented straightforward and easy to determine cases of inflection and derivation. To put it differently, the examples are prototypical. However, there are also examples that are somewhere in between such prototypes of inflection and derivation. Some, taken from COCA, are shown in (4).

(4) a. Yet America is **sleeping** through the alarms, blind to the warning lights.
b. the highways of a **sleeping** America
c. Not all of it is **related** to Western misbehaviour,…..
d. You can get a better answer from someone who works in a **related** field.

In (4a) and (4c) we can see examples of participles. The former is a present participle and the latter a past participle. Both forms are typically included in the inflectional paradigms of the corresponding verbs. These uses contrast with (4b) and (4d) where the same participles modify nouns and function as adjectives. A question that immediately arises is how to treat the examples (4b) and (4d). Are they similar to (2) and (3)? If yes, how are they related to the forms in (4a) and (4c)? The answers are neither simple nor straightforward. For the moment, we will leave these questions open.

The main point of the examples in (4) is to demonstrate that not all cases can be neatly classified as inflectional or derivational. This is true not only from the perspective of English, but also cross-linguistically. For instance, Katamba points out that "[o]ne and the same category may be inflectional in one language and derivational in another. […] To complicate matters further, within the same language the same affix may have both inflectional and derivational uses" (Katamba, 1993: 229). Katamba gives diminutives as a good example of this claim. The formation of diminutives in English such as *pig* → *piglet,* or in German e.g. *Hund* ('dog') → *Hündchen* are obviously derivational whereas their formation in the West Atlantic language Fula is inflectional (Katamba, 1993: 229).

According to Haspelmath (1996: 47), "[t]he inflection/derivation distinction is not absolute but allows for gradience and fuzzy boundaries […] we are dealing with a continuum from clear inflection to clear derivation with ambiguous cases in between". This is illustrated in Figure 4.2.

Figure 4.2 Inflection and derivation as a cline.

In Figure 4.2 we can see Haspelmath's treatment of inflection and derivation as a cline or continuum with inflection on one end and derivation on the other. This approach makes it possible to place a phenomenon on the most appropriate position in a given language. For instance, the English examples in (2) would be very near the derivation pole of the continuum, whereas (1) would be at the opposite end where inflection is placed. In contrast, (4b) and (4d) would be closer to the middle of the cline.

4.3 Criteria for the distinction

In order to be able to determine what is inflection and what is derivation it is necessary to rely on the properties that can be used to differentiate between the two. Sets of such properties or criteria were formulated by a number of morphologists such as Scalise (1984), Bybee (1985), Dressler (1989), Plank (1994), Ten Hacken (2014) and Štekauer (2015). In this section we will have a closer look at some of them. The first criterion is given in (5).

(5) **Inflection has a relational function.**
Derivation has a semiotic function.

Dressler (1989: 6) considers the criterion in (5) fundamental. It emphasizes the difference in **function** of inflection and derivation. The main function of inflection is to indicate relations between words in a sentence as in (6).

(6) Jano pije kávu.
'John is drinking coffee$_{\text{ACCUSATIVE}}$'

In (6), *kávu* is in the accusative case as the object of the verb. This contrasts with the main function of derivation, to form new names for new concepts. Derivation enriches the lexicon on the system level. New words such as *blogger*$_{\text{N}}$, or *defriend*$_{\text{V}}$ are new linguistic signs, which explains their semiotic function. In this sense words are linked to extra-linguistic reality. Inflection applies automatically without any obvious connection to extra-linguistic reality. *Kávu* does not designate a new concept.

While these generalizations are valid in many languages, problematic cases also occur. In Slavic languages there are cases when new words result from a change of inflectional paradigm e.g. *vyšetriť* 'investigate$_{\text{PERF}}$'→ *vyšetrovať* 'investigate$_{\text{IMPERF}}$', *vyrobiť* 'make$_{\text{PERF}}$'→ *vyrábať* 'make$_{\text{IMPERF}}$', *pomôcť* 'help$_{\text{PERF}}$'→ *pomáhať* 'help$_{\text{IMPERF}}$'. In all these examples verbs are imperfectivized. Such a process is considered derivational in the Slavic linguistic tradition, similar to conversion, and is called **transflexion** (cf. Dokulil, 1982; Furdík, 2008). Another criterion, also closely related to the function, is presented in (7).

(7) **Inflection is obligatory in a syntactic construction.**
Derivation is optional.

Obligatoriness of inflection required by syntax is a crucial component of the criterion in (7). Similar to (5), we can illustrate it with another example from Slovak. In the sentence *Pracuje v reštaurácii*. 'He works in a restaurant$_{\text{LOCATIVE}}$', the locative case is obligatory. It is determined by the syntactic environment, i.e. by the preposition *v* 'in'. Prototypical derivation is not determined by syntax. For instance, in the expression *a singer in the city centre*, the noun *singer* can easily be replaced by simplex words such as *poet* or by a descriptive phrase *a man who sings*. There is no syntactic rule requiring a specific derivative in a particular position in a

sentence or phrase. On the other hand, Booij (2006: 655-656) shows that sometimes derivation can be syntactically relevant because a change of category can have consequences in syntax, e.g. causative verbs derived from adjectives *whiten, blacken* are transitive verbs that require a direct object as in *Snow had whitened the tops of the trees*. These examples illustrate that derivation is not affected by syntax, it is rather the other way round, derivation affects syntax (Booij, 2006: 655−656; Štekauer, 2015: 222). For instance, when the noun *singer* is derived from the verb *sing*, the inflectional paradigm and the possible positions in a sentence are those of the noun rather than of the verb.

Although prototypical inflection is obligatory, in many languages we find the inflectional paradigms with gaps. For example, nouns such as *information*, *luggage*, or *knowledge*, which lack plural forms, have incomplete paradigms. In Russian, some verbs e.g. *pobedit'* 'win', *ubedit'* 'convince', *zatmit'* 'eclipse' do not have the first person singular form.

The criterion in (8) appears completely different from (7), but as we will see, it also brings us to what is syntactically relevant.

(8) **Inflection cannot be replaced by simple words.**
Derivation can be replaced by simple words.

The criterion in (8) tells us that we can replace a derived word in a sentence with a simple, monomorphemic word and the resulting output will still be meaningful. This is illustrated in (9).

(9) a. The governor plans to raise everyone's taxes. (COCA)
b. The state plans to raise everyone's taxes.
c. * The governor want to raise everyone's taxes.
d. The boys stayed at home.

The complex word *governor* (govern + -or) in (9a) can be substituted by a simple word *state* and the sentence in (9b) still makes sense. However, we cannot replace the third person singular verb form *plans* by a simple form *want.* The resulting sentence given in (9c) is ungrammatical. Counterexamples to this generalization are easily found, also in English. For example, in (9d), it is possible to replace the plural form by a singular form *boy.* In the past tense it is not necessary for a noun to agree with a verb.

A different kind of criterion is that of transparency, as presented in (10).

(10) **Inflection is usually more semantically and formally transparent.**
Derivation is usually less semantically and formally transparent.

Inflectional morphology is typically semantically transparent. This means that if we add the plural inflection *-s* to a regular noun in English, it will express only this grammatical meaning of plural. In such cases, the principle of compositionality holds, i.e. the overall meaning is based on the meanings of the individual parts. For example, in the plural *boys*, the meaning 'more

than one boy' is the sum of the meanings 'boy' + PLURAL. In derivational morphology, the meaning of the suffix *-ment* can be 'thing which VERBs' like in *payment*, 'act of VERBing' in *encouragement*, or 'state of being VERBed' in *employment* (Bauer, 2003: 97). Cases of extensive syncretism (see Chapter 2), especially in inflectional languages, go against semantic transparency. For instance, in Slovak the inflectional morpheme *-e* in *ulic-e* expresses either genitive singular of the feminine pattern *ulica* 'street', or nominative or accusative plural of the same pattern. A similar situation occurs in the declension pattern *dlaň*, where the inflectional morpheme *-e* also expresses either genitive singular, *dlan-e* 'palms', or nominative or accusative plural. If we return to the plural inflection of nouns in English, we can see that there also are some problematic cases. In the examples *damages* or *airs* the meaning added by *-s* is not plural as *damages* means 'an amount of money that a court decides should be paid to somebody by the person, company, etc. that has caused them harm or injury' and *airs* means 'a way of behaving that shows that somebody thinks that they are more important, etc. than they really are'.

The criterion of transparency is related to the criterion of productivity in (11).

(11) **Inflection is typically more productive.**
Productivity in derivation is restricted.

Support for the criterion in (11) is provided by the formation of present participles that can be formed out of all full verbs in English, e.g. *driving*, *talking*, *using*, *cooking*, *walking*, *eating*, *drinking*, *testing*. Another example is regular plural formation of nouns in English, which involves the plural inflection *-s*. In derivation, more constraints play a role. For instance, the suffix *-al* forms adjectives such as *personal*, *seasonal*, *doctoral*, but not **teacheral* or **monthal*. There are also different ways of how to create Agent nouns in English. The suffix *-er* is often used, e.g. *teacher*, but we also find other suffixes, as in *scientist*. Štekauer (1998: 83-85) points out that the most important point is that such a name for an Agent can be created if needed. Although inflection tends to be productive, there are many exceptions to the rule. For example, contrary to the examples of productive inflection given above, modal verbs in English do not form *-ing* participles, and a small number of nouns do not form their plural by adding *-s* e.g. *women*, *geese*, *oxen*, *sheep* or singularia tantum *information*, *knowledge*, *luggage*.

The criterion in (12) considers how word class can be useful in making the distinction between inflection and derivation.

(12) **Inflection typically does not change word class.**
Derivation often changes word class.

Word classes as referred to in (12) are nouns, verbs, and adjectives. As we have seen in (1), prototypical inflection does not result in changing the word class. The examples in (2) and (3) demonstrate that derivation often does. Counterexamples to this generalization are derivations with class-maintaining affixes, for instance *tolerant*$_{ADJ}$ → *intolerant*$_{ADJ}$, *garden*$_{N}$ → *gardener*$_{N}$, *write*$_{V}$ → *rewrite*$_{V}$. The examples of transflexion given in the explanation of the criterion in (5)

are at the same time counterexamples to the assumption that inflection does not trigger a change of word class, if transflexion belongs to inflection and perfective and imperfective verbs are different word classes. Szymanek (2010: 234) uses the term **paradigmatic derivation** as a parallel term to Dokulil's transflexion and gives the Polish example in Table 4.2.

	Adjective ZŁY 'bad'			**Noun ZŁO 'badness'**
	masculine	feminine	Neuter	
nominative	zł-y	zł-a	zł-e	zł-o
genitive	zł-ego	zł-ej	zł-ego	zł-a
dative	zł-emu	zł-ej	zł-emu	zł-u
accusative	zł-y/ego	zł-ą	zł-e	zł-o
instrumental	zł-ym	zł-ą	zł-ym	zł-em
locative	zł-ym	zł-ej	zł-ym	zł-u

Table 4.2 Example of paradigmatic derivation in Polish. Adapted from Szymanek (2010: 234).

Table 4.2 shows declension patterns of the Polish adjective *zły/zła/ złe* 'bad' and the noun *zło* 'badness'. The stems in all declension patterns are the same. Table 4.2 shows two paradigms, adjectival and nominal. The change of the paradigm here results in the change of the word class *zły*$_{\text{ADJ}}$/*zła*$_{\text{ADJ}}$/ *złe*$_{\text{ADJ}}$ → *zło*$_{\text{N}}$, which is typical of paradigmatic derivation.

At this point we can also return to the question we raised concerning (4b) and (4d), where the present and past participles are used as attributive adjectives. These examples show that the inflectional category can influence the word class. In addition, the form *sleeping* can also function as a noun such as in *Sleeping is important for everybody* (COCA). The criteria of word class change and function are linked to the criterion of recursiveness in (13).

(13) **Inflection cannot be reapplied.**
Derivation can reapply.

The application of the same rule in the sense of (13) can be understood in two ways (Ten Hacken, 1994: 156). First, it may refer to multiple application of different inflectional or derivational rules. For instance, *globalization* is the resulting output of a sequence of suffixes -*al*, -*ize*, and - *ation* applied to the base *globe*. The second interpretation is the application of the same rule more than once. A good example is diminutive formation in Slovak. The rule allows the formation of *drobulinký* out of *drobný* 'tiny' and consequently *drobulilinký* 'extremely tiny'. COCA gives some examples in English *mini-mini vote*, *multi-multi millionaire*. Inflection in English applies once. If we make the past tense *walked* once, we cannot reapply the rule again. The same holds for inflection in Slovak. In agglutinative languages some obvious counterexamples can be found. Hungarian *poharakat* 'glass$_{\text{PL ACC}}$' has two inflections applied one after another, the plural suffix -*ak* and the accusative suffix -*at*. It should be noted that such examples are systematic in agglutinative languages, which are characterized by a separated

morpheme expressing a corresponding inflectional category. Systematic violations of this criterion also occur in polysynthetic languages, i.e. languages with words that can be extremely complex, consisting of a large number of morphemes (see Chapter 8). This can be illustrated by an example from West Greenlandic (Fortescue, 1984: 316) given in (14).

(14) aamaruti-ssar-siur-vi-ssar-siur-tu-tua-a-sug
coal future look-for place future look-for intr.-part. only be intr.-part
'who is the only one looking for a place to look/prospect for coal'

In (14) we can see that in West Greenlandic the same suffix *-siur* 'look for' can occur more than once in complex derivations. On the basis of the examples given above, it is obvious that this criterion holds when the same inflectional or derivational rule is applied repeatedly. The position of inflection and derivation is addressed in (15).

(15) **Inflection is typically expressed at the periphery of words.**
Derivation is expressed closer to the root.

The criterion in (15) can be illustrated by *arrivals*. The verbal root *arrive* is followed by a nominal suffix *-al* and the plural suffix *-s*. The former suffix is derivational and is closer to the root. Plural inflection is attached after the derivational suffix. There are three reasons why inflection tends to occur in final position (Dressler, 1989: 8). First, derivational morphology creates words whereas inflectional morphology does not. Second, roots have more concrete meanings, e.g. *arrive* means 'to reach a place', whereas inflectional affixes have a more abstract meaning, e.g. *-s* is the plural inflection. Derivational affixes are in between these two. Thus, the formation of an action noun by *-al* is halfway between the concrete meaning of the root and the abstract meaning of the inflectional affix. Third, inflectional affixes indicate (indexically, see indexes in Chapter 2) how words are related in a syntactic construction. The peripheral position of inflection is more advantageous, because it points to relations with other words in a syntactic construction. The main disadvantage of this criterion is that it is not always helpful in determining if a suffix is inflectional or derivational. The division of affixes must be based on a prior classification. Apparent English counterexamples are *betterment*, *worsen*, or *mostly*, where derivational suffixes attach to inflected forms. The inflected forms in these examples are not regular formations. Numerous similar counterexamples occur cross-linguistically as shown by Körtvélyessy and Štekauer (2018: 375-376), e.g. comparative forms of adjectives often serve as bases for the formation of verbs as in Polish *pogorszyć* 'to worsen' (cf. *gorszy* 'worse' from *zły* 'bad'), in Dutch *verbeter* 'to improve' (cf. *beter* 'better'), or Slovak *zmenšiť* 'to make smaller' (cf. *menší* 'smaller').

(16) **Inflection is typically organized in paradigms.**
The paradigmatic organization of derivational morphology is much weaker.

The criterion in (16) points to the fact that inflected forms are usually organized in patterns. A typical example of an inflectional paradigm was given in Table 4.1. It shows the paradigm for the inflectional class of feminine nouns belonging to the declension pattern *ulica* 'street'. Individual word-forms in each position in the table together constitute a paradigm.

Sometimes, the term paradigm is also used in derivational morphology to refer to a set of derivationally related words with the same base, for example *nation*, *national*, *nationally*, *nationalism*, *nationalist*, *nationalize*, or *home*, *homeless*, *homelessness*. Such sets of related words are called **derivational paradigms** or **word families**. The opinions of linguists vary from denying the existence and role of paradigms in derivation, e.g. Van Marle (1994), to linguists who argue for the relevance of paradigms in derivational morphology, e.g. Dokulil (1962), Furdík (2004), Körtvélyessy, Bagasheva and Štekauer (2020). Figure 4.3 gives an example of a derivational paradigm by Furdík (2004).

ŠKOLA 'SCHOOL'

ŠKOL-ÁK	'SCHOOLBOY'
ŠKOL-NÍK	'SCHOOL JANITOR'
ŠKÔL-KA	'KINDERGARTEN'
ŠKOL-STVO	'EDUCATIONAL SYSTEM'
ŠKOL-IČKA	'SMALL SCHOOL'

Figure 4.3 Derivational paradigm of *škola* 'school'. Adapted from Furdík (2004: 74).

Figure 4.3 illustrates how paradigms operate in derivational morphology. We can see that the Slovak word *škola* 'school' is at the top of a set of related words. *Škola* has the role of a motivating word from which other, motivated words like *školák* 'school boy' or *školník* 'school janitor' are derived. This brings us to what Furdík calls a derivational paradigm, i.e. an ordered system consisting of motivated words grouped around a motivating word.

The presentation of the criteria differentiating between inflection and derivation in (5) to (16) shows that in many cases, valid generalizations are made, but there are always cases going against the claim made by a corresponding criterion. This brings us to the conclusion that the criteria are valid prototypically, but counterexamples exist cross-linguistically (Štekauer, 2015: 222). Therefore, the continuum-like approach with fuzzy boundaries between inflection and derivation (see Figure 4.2) seems a plausible option.

CHAPTER 5

INFLECTIONAL CATEGORIES IN ENGLISH AND IN OTHER LANGUAGES

CHAPTER OUTLINE

- This chapter starts with explaining **inflection** as an expression of **morphosyntactic properties**.
- The distinction between **inherent inflection** and **contextual inflection** is introduced.
- Then some **inflectional categories** that frequently occur in many languages are presented from a comparative perspective.
- First, the nominal inflectional categories of **number**, **gender** and **case** are outlined.
- Second, the verbal inflectional categories of **tense**, **person**, **aspect**, **voice** and **mood** are described.
- Finally, an overview of **inflection in English** is given.

5.1 Types of inflection

In Chapter 4 we dealt with the traditional division between two branches of morphology, inflectional morphology and derivational morphology. We saw that drawing a clear-cut boundary is not always straightforward. Here, we will concentrate on **inflection**, sometimes also written as **inflexion,** viewed as the modification of the form of a word to express the different grammatical relations into which it may enter. The root *flect-* comes from Latin and it means 'bend'. This means that inflection changes the shape of the word to make it fit in a certain position in a phrase or a sentence as in (1).

(1) In the old days journalists presented facts. (COCA)

In (1) we can see that inflections are the morphological expression of information that is relevant for the syntactic context. *Days*, *journalists*, and *facts* are inflected with *-s* for plural. In other words, inflection provides us with morphosyntactic information i.e. a morphological plural marker gives us information about the category of number. The value plural in (1) is then called a **morphosyntactic property** in line with Matthews (1991). The inflectional ending *-ed* in (1) is a morphological marker of the category of tense. The specific value of 'past' it expresses is another example of a morphosyntactic property.

Booij (1994) introduced the distinction between **contextual inflection** and **inherent inflection** illustrated in (2).

(2) a. sukň-a ‘skirt’
b. krátk-a sukň-a ‘short skirt’

In (2a) we have an example of a Slovak feminine noun. The fact that it is feminine is given and not determined by the context in which it occurs. Therefore, the feminine gender of (2a) is **inherent inflection**. Since the gender of the adjective in (2b) is determined by the context in which it occurs, i.e. the noun *sukňa*, it is an example of **contextual inflection.** This occurs in Slovak, but not in English. Gender is an example of an inflectional category that is inherent for one syntactic category, nouns, but contextual for others, such as adjectives.

In general, there are two ways how contextual inflection can be assigned, by **agreement**, also called **concord**, and by **government**. In (2b) we saw an example of how agreement works. The noun and the modifying adjective agree in gender, number and case. Both are feminine gender, singular and nominative case. More examples of agreement are presented in (3).

(3) a. He walks a mile and a half a day. (COCA)
b. Novinárka ho prerušila. (SNC)
‘The journalist$_{\text{FEM}}$ interrupted$_{\text{FEM}}$ him.’

In (3a) we see that the verb agrees with the subject. The basic rule in English is that when the subject is third person, a singular subject takes a singular verb and a plural subject takes a plural verb. In (3b), the subject and the verb also agree. However, in this case they agree not only in number but also in gender.

Another way in which inflection can be assigned, called **government**, is given in (4).

(4) a. I really like them as a couple. (COCA)
b. Mával vlajkou svojej druhej vlasti. (SNC)
‘He waved the flag$_{\text{INSTR}}$ of his second$_{\text{GEN}}$ home-country$_{\text{GEN}}$.’

Government means that one word dictates a particular form in which another word must appear. In (4a) the accusative form of the pronoun *them* is required by the verb. In the Slovak sentence in (4b) the verb dictates that the following noun *vlajkou* is in the instrumental case. In (4) it is not possible to say that verbs agree with the nouns in the object position because verbs are not inflected for case. Therefore, inflections in (4) have been assigned on the basis of government.

Languages differ a lot in their inventories of inflectional categories. In Chapter 4 we saw that English has a relatively small range of inflectional morphemes, especially in comparison to Slovak. On the other hand, languages such as Vietnamese or Mandarin Chinese have almost no inflection. Despite this diversity, there are several inflectional categories that are common in many languages. These include number, gender, case, person, tense, aspect, voice and mood.

5.2 Number

Number is an inflectional category basically distinguishing reference to one individual from reference to more than one (Matthews, 2007). The simplest number systems work with a division between **singular**, denoting a single entity, and **plural**, denoting more than one entity. Number is usually marked on nouns, as presented in (5).

(5) a. tables, cups, plates
b. oxen, criteria, women
c. ženy 'women', stroje 'machines', chlapi 'men', mestá 'cities', hrdinovia 'heroes'

In (5a) we see some examples of the regular plural in English formed by the inflectional suffix *-s*. This contrasts with (5b), which gives examples of irregular plurals formed by the suffixes *-en*, *-a*, and a vowel change. In (5c) we have examples of regular plurals in Slovak, formed by the plural suffixes *-y*, *-e*, *-á*, *-ovia*. These suffixes simultaneously express nominative case and feminine, masculine or neuter gender.

Some languages also distinguish a **dual number**, which refers to exactly two entities. This can be exemplified by Slovene, a South-Slavic language. Some examples adapted from Jakop (2008: 5) are presented in (6).

(6) a. stol 'chair$_{\text{NOM SG}}$', stola 'chair$_{\text{NOM DU}}$', stoli 'chair$_{\text{NOM PL}}$'
b. knjiga 'book$_{\text{NOM SG}}$', knjigi 'book$_{\text{NOM DU}}$', knjige 'book$_{\text{NOM PL}}$'

In (6a) we can see that the nominative singular form of the masculine noun *stol* is unmarked. The nominative plural is represented by the inflectional ending *-i*. This contrasts with the nominative dual marker *-a*. In (6b) we have an example of a feminine noun with a specific inflection *-i* marking nominative dual. Old English used to have the dual pronouns *wit* 'the two of us$_{\text{NOM}}$' and *ġit* 'the two of you$_{\text{NOM}}$'. In Modern English, remnants of duals are *both*, *either*, and *neither*, which have a strict dual reference. Old Slavic also distinguished a dual number. It should be noted that the dual occurs in a language only along with the singular and the plural. Then the meaning of the plural in a language like Slovene is in fact 'more than two', as opposed to 'more than one' in number systems with singular and plural only.

Some languages distinguish also a **trial number** referring to precisely three entities. Pronouns in Tok Pisin, a creole[3] language spoken in Papua New Guinea, based on English, illustrate this number system in Table 5.1.

[3] A creole is a pidgin that has become a mother tongue. A pidgin is a grammatically simplified form of a language, e.g. English, that is used as a means of communication between people not sharing a common language and which is no one's mother tongue (Chalker and Weiner, 1998). A creole is a language used as a mother tongue that was originally based on contact between colonial and indigenous languages.

	1st person	2nd person	3rd person
plural	yumi 'we'	yupela 'you'	ol 'they'
dual	yumitupela 'we two' 'the two of us'	yutupela 'you two' 'the two of you'	tupela 'the two of them'
trial	yumitripela 'we three' 'the three of us'	yutripela 'you three' 'the three of you'	tripela 'the three of them'

Table 5.1 Some forms of personal pronouns in Tok Pisin. Adapted from Verhaar (1995: 354).

Table 5.1 gives an overview of plural, dual and trial forms of pronouns in Tok Pisin. Cross-linguistically, the personal pronouns in Tok Pisin are in line with a generalization that a language has a trial number only if it also has a dual number, and a language has a dual number only if it also has a plural (Greenberg, 1963). If such correlations occur in a vast number of languages, they can be captured in generalizations called **universals**.

From the perspective of the distinction between inherent and contextual inflection, number in general tends to be contextual, but it is inherent in pronouns as we saw in Table 5.1. It is also inherent in singularia tantum, e.g. *news*, *linguistics*, *information*, and pluralia tantum, e.g. *pants*, *shorts*, *tights*. This contrasts with number in verbs where it must be assigned on the basis of agreement and is therefore contextual, e.g. *She works in a hospital*.

5.3 Gender

Gender is a morphological category which in some languages, such as Slovak, Russian, and German, distinguishes classes of nouns and pronouns, usually masculine, feminine, and neuter, by the different inflections words in their environment have. Slovak is a typical example of a language with three **grammatical genders** illustrated in (7).

(7) a. chlapec 'boy$_{MASC}$'
b. učiteľka 'teacher$_{FEM}$'
c. dievča 'girl$_{NEU}$'
d. nôž 'knife$_{MASC}$'
e. tabuľa 'blackboard$_{FEM}$'

All nouns in Slovak are assigned one of the three genders. In (7a) the masculine gender also refers to a male being, in (7b) the feminine gender is in line with a reference to a female being. However, in (7c) the noun is grammatically neuter, but naturally it refers to a female being. In (7d) we have a noun of masculine gender and in (7e) one of feminine gender, both referring to entities that are neither male nor female. Therefore, **grammatical gender** is a kind of gender which in some cases may be but in many other cases is not determined by the real or attributed sex of the referent. German also distinguishes three grammatical genders. Frequently, the

grammatical gender of a German noun is different from the grammatical gender assigned to the Slovak equivalent, e.g. *Buch* 'book' is neuter but *kniha* 'book' is feminine, *Flughafen* 'airport' is masculine but *letisko* 'airport' is neuter. While in Slovak it is generally possible to predict gender assignment, for instance, nouns ending in *-o* are neuter, in German it is rather arbitrary. Although there are some suffixes, for instance, *-heit, -keit* which form feminine nouns, *Gesundheit* 'health', or *Natürlichkeit* 'naturalness', in general it is not possible to produce a set of systematic rules which would be helpful in determining grammatical gender in German.

Some languages have only two grammatical genders, for example Spanish, French or Portuguese distinguish only masculine gender and feminine gender. This contrasts with the situation in English, where gender is close to biological sex and is called **natural gender**, or sometimes also **referential gender**, as presented in (8).

(8) a. daughter
b. son
c. parent
d. dog
e. table

In English we use the pronouns *he, she* to refer to male and female beings and *it* to inanimate objects or non-personal objects (animals). In (8a) the reference is to a female, based on biological gender, and it can be substituted by *she*. In (8b) the reference is to a male and the noun can be substituted by a pronoun *he*. In (8c) we can choose a reference *she* or *he* depending on the context. In (8d) we have a non-personal noun, which can be referred to by the pronoun *it*.[4] In (8e) we have an example of an inanimate noun, which is always referred to by *it*. However, there is no gender agreement of nouns with modifiers in English. Adjectives and determiners do not express gender.

Languages may have different gender systems based on animacy or shape or other natural properties. For instance, Abau is for us an exotic language spoken in Papua New Guinea, primarily along the border with Indonesia. It distinguishes masculine gender and feminine gender. In Abau concrete inanimate objects and animals are assigned gender on the basis of their shape and size. For instance, large and long objects are assigned masculine gender, e.g. *su* 'coconut' and *now* 'tree', whereas small, thin and round objects are assigned feminine gender, e.g. *hne* 'bird's nest' and *iha* 'hand' (Lock, 2011: 47-50). As we saw in the above-mentioned examples, gender of nouns and pronouns is inherent. For verbs or adjectives gender is a category that must be assigned and it is therefore contextual.

5.4 Case

Case is another grammatical category which is used to identify the syntactic relationship between words in a sentence. In many languages including Slovak, case is shown by inflectional

[4] It is possible to use *he* or *she* in cases in which the dog is represented as having a personality.

affixes and determines the role of the corresponding word-form in the sentence. This is shown in (9).

(9) a. Mama mojej priateľky mi dala novú knihu o Taliansku.
b. The mother$_{\text{NOM SG}}$ of my$_{\text{GEN SG}}$ friend$_{\text{GEN SG}}$ gave me$_{\text{DAT SG}}$ a new$_{\text{ACC SG}}$ book$_{\text{ACC SG}}$ about Italy$_{\text{LOC}}$.

In (9) we see that the subject of the sentence *mama* is in the nominative singular. It is modified by *mojej priateľky* in the genitive case. The pronoun *mi* is the indirect object in the dative case. Dative is typically used for the indirect object of the verb. The direct object *knihu* modified by *novú* is expressed by the accusative case. Finally, the book is about Italy, which is expressed by a preposition with the locative case. The meaning of the locative in Slovak is always determined by the preposition it occurs with. Standard Slovak distinguishes six cases: **nominative**, **genitive**, **dative**, **accusative**, **locative** and **instrumental** (see e.g. Table 4.1). Typically, declension patterns have different inflections for individual cases.

The situation in English is completely different. English nouns have a two-case system: **common case** and **genitive case**. The common case is morphologically unmarked, e.g. *father*, *girl.* As there are no inflections to mark the relations expressed in Slovak by individual cases, the relations are expressed by **prepositions**, e.g. *with my father*, *to the father*, and **word order**, as shown in (10).

(10) a. The daughter saw her father.
b. The father saw his daughter.
c. His daughter saw him.
d. He saw his daughter.

In (10a) and (10b), the subject and object roles are given by the positions of the nouns in the sentences. *Father* is the object in (10a), but the subject in (10b). The roles of *daughter* are also reversed in (10a) and (10b). In (10c) and (10d) we can see the contrast between the nominative and accusative case shown only in English personal pronouns. It is not possible to replace these forms by the nominative forms *he* or *she*.

The genitive case, sometimes called the possessive case, is the only case expressed in English. It has the marker *'s*, e.g. *father's book*, *girl's bag*. Quirk and Greenbaum (1973) treat this apostrophe *'s* form as genitive case, others such as Matthews (1974) or Spencer and Luís (2012) claim that it is not a morphological unit. This is illustrated in (11).

(11) a. that beautiful girl's bag
b. that beautiful girl you talked to yesterday's bag

In (11a) the ending *'s* attaches to the noun and it can be understood as an inflectional suffix (morpheme). This contrasts with (11b) where *'s* clearly attaches to the whole noun phrase *that beautiful girl you talked to yesterday* and not only to the noun. This is the main reason that

some linguistic authorities consider the apostrophe *'s* a **clitic** and not a case ending. As we saw in (11b), a **clitic** is a grammatical element that occurs independently but is not so closely connected to the elements it attaches to. Other examples of clitics are contracted forms in English, for instance, *'s* in *he's been here* stands for the full word *has*, but phonologically it depends on the preceding pronoun *he*. This type of clitic, which follows its host or base, is called **enclitic**. Those that are placed before their host or base are called **proclitics**, e.g. *je t'aime* 'I love you' in French where *t'* stands for *te*, which is the accusative form of *tu* 'you'. Clitics then belong to syntax and phonology, not to morphology.

5.5 Tense

Tense is a morphological category frequently marked on the verb. It relates the time of action denoted by the verb to the moment of speaking or some other time point. Quirk and Greenbaum (1973: 40) understand **time** as a universal and non-linguistic concept divided into past, present, and future. They understand **tense** as the corresponding morphological category expressing the concept of time on verbs (Quirk and Greenbaum, 1973: 40). This correspondence is given in Table 5.2.

PRESENT TENSE	the time of the event and the time of speaking are approximately the same
PAST TENSE	the time of the event is before the time of speaking
FUTURE TENSE	the time of the event is after the time of speaking

Table 5.2 The correspondence between the time and tense. Based on Quirk and Greenbaum (1973: 40).

In Table 5.2 we can clearly see the relation between the grammatical category of tense and the time of speaking. In English, the present tense, e.g. *she sings*, and the past tense, e.g. *they walked*, are marked morphologically. There is no inflection to mark the future tense in English, only a separate form *will*, as in *will go*, *will fly*. This means that future is expressed **analytically** or **periphrastically**. Periphrastic forms belong to syntax, not to morphology. In English and in many other languages, it is also possible to use the present tense to refer to future events e.g. *The train to Bratislava leaves at 7*. These reasons lead to the use of the label **non-past** for the present tense.

Slovak has much more extensive verbal paradigms than English. The present tense is expressed morphologically, by synthetic inflectional forms, e.g. *varím* 'I cook', *variš* 'you cook', *varí* 's/he cooks'. The past tense is formed by the morpheme *-l-* e.g. *varil som* 'I cooked', *varil si* 'you cooked', *varil* 'he cooked'. As opposed to English, the future tense is formed morphologically with prefixes, for instance, the prefix *u-* in perfective verbs, *uvarím* 'I will cook', the prefix *po-* in verbs of motion, *poletím* 'I will fly'. However, imperfective verbs form

future tense analytically, e.g. *budem čítať* 'I will read', *budeš čítať* 'you will read', *bude čítať* 's/he will read'. Tense is inherent in verbs, but number and person are contextual, they must be assigned depending on the nouns and pronouns with which verbs occur in a sentence.

5.6 Person

Person is a morphological category which makes a distinction between the speaker, the hearer and other participants. In most languages, only three persons are distinguished. The example taken from Slovak is given in Table 5.3.

Slovak: čítať 'read'		**present tense**			
singular	1st person	čítam 'I read'	**plural**	1st person	čítame 'we read'
	2nd person	čítaš 'you read'		2nd person	čítate 'you read'
	3rd person	číta 's/he reads'		3rd person	čítajú 'they read'

Table 5.3 The present tense of the Slovak verb *čítať* 'read'.

Table 5.3 shows that the first person refers to the speaker or a group of speakers. The second person refers to the hearer or individual or group of individuals who are directly addressed. The third person refers to other individuals to whom reference is made. Table 5.3 also indicates that person and number are expressed together.

Some languages make a distinction in the first person plural between a form meaning 'me and others, but not you', called **exclusive**, and one meaning 'me and others, including you', called **inclusive**. For instance, Tok Pisin has an inclusive pronoun *yumi* 'we', i.e. 'me and others, including you', and an exclusive pronoun *mipela* 'we', in the sense of 'me and others, but not you'.

In English, person is normally not expressed on the verb. An exception is the third person singular present tense *-s*. The third person singular present tense *-s* is a good example of cumulative exponence (see chapter 4). Arguably, it is not a person marker as such but is used to contrast the third person singular with all other combinations of person and number.

5.7 Aspect

Aspect is another morphological category usually marked on verbs. Aspect gives us information about the way in which we see how an event unfolds. Many languages distinguish **perfective aspect** and **imperfective aspect**. Perfective aspect denotes an action which was completed, whereas imperfective aspect denotes an action which is still in progress. This is illustrated in (12).

(12) a. I have been saving for three years.
b. I have saved 10 000 Euros.

c. Písal celé roky. ‘He was writing for many years.’
d. Napísal dve knihy. ‘He wrote two books.’

In (12a) the focus of the statement is a process that is still continuing. At the same time there is a connection with the past when the action started and with the present as obviously the action continues. This contrasts with (12b) where the action is viewed as complete and the result of the focus is the action. These examples also show that in English it is not possible to separate tense and aspect. In the Slovak example (12c) the action is unfolding in the past. In (12d) the prefix *na-*, which perfectivizes the action denoted by the verb, indicates that the action was completed. Aspect in (12d) is also an example of inherent inflection. In Slovak, aspect is typically expressed by prefixes whereas in English it is expressed by auxiliaries.

5.8 Voice

Voice is linked to the role of the subject as either agent or patient. In many languages it gives two different ways, **active** and **passive**, of understanding of the action of the verb as in (13).

(13) a. John gave a book to her.
b. A book was given to her (by John).

In (13a), the subject of the verb is also the agent of the verbal action, in this context *giving a book*. This is an example of the active voice. In (13b) this is different, as the subject is passively acted upon. The subject from (13b) is the patient in (13a). In English the passive is periphrastic as we can see in (13b). It is formed by the auxiliary verb form *was* and the passive expressed by the participle *given*. The passive is formed periphrastically also in Slovak. In Latin, the distinction between passive and active is expressed inflectionally on the verb, e.g. active *amo* ‘I love’ and passive *amor* ‘I am loved’.

5.9 Mood

Mood shows a speaker’s attitude and commitment to what is said. Languages frequently distinguish three moods, **declarative mood** to make statements, **interrogative mood** to ask questions, and **imperative mood** to give orders or commands. In English, interrogative is not recognized as a separate mood and questions are formed syntactically by the use of auxiliaries. Some examples are presented in (14).

(14) a. She came.
b. Did she come?
c. Turn off your computer!
d. If I had known this, I would have never come.
e. I recommended he come.

In (14a) we have an example of declarative or indicative mood. Forming questions by auxiliaries is shown in (14b). Imperative mood is illustrated in (14c). In English we also find rudiments of the conditional mood which indicates that the action is hypothetical such as in (14d), and the subjunctive expressing a suggestion, as in (14e). In languages such as German and French they are realized more fully.

5.10 Overview of inflection in English

In this chapter we have seen that English has some inflection, but in comparison with Slovak, the range is much smaller, as shown in Table 5.4.

NOUNS	**Plural:** bags, wishes, ladies
VERBS	**Present tense 3rd p sg:** plays, gets, wants, watches
	Past tense: loved, wanted, studied
	Past participle: (had) loved, (had) wanted
	Present participle: loving, coming, shooting
ADJECTIVES	**Positive:** high
	Comparative: higher
	Superlative: highest

Table 5.4 Overview of regular inflection in English.

Table 5.4 shows that nominal inflection in English includes marking the plural on nouns. Another nominal inflection is a case marking limited only to the remnants of the genitive case, which is used for showing possession. As discussed in section 5.5, it should rather be analysed as a clitic. Table 5.4 does not include the forms of pronouns which show a case distinction which has disappeared in nouns. The nominative and accusative forms of pronouns are **suppletive** (with different roots, see Chapter 2), *I/me*, *she/her*, *he/him*, *we/us*, and *they/them*. Suppletion typically occurs in common words that are used frequently (Carstairs-McCarthy, 2002: 38). In Table 5.4 we can see that the only number marker in verbs occurs in the third person singular present tense. English verbs are inflected for the past tense. The present and past participles together with auxiliary verbs are used to make a distinction between perfective and imperfective aspect. The past participle together with the auxiliary verb *be* is used to form the passive voice in English.

Adjectives in English are inflected for comparison as shown in Table 5.4. The comparative is formed morphologically by *-er*, e.g. *nicer*, *larger*, and the superlative by *-est*, e.g. *nicest*, *largest*. Many adjectives form comparatives and superlatives periphrastically with *more* and *most*, e.g. *expensive*, *beautiful*. For some adjectives both forms are possible e.g. *serene*. This contrasts with inflectional languages, for instance Slovak, where adjectives are also inflected for number, gender and case, in which they agree with the following noun as in (2b). It is often

the case that we find a combination of grammatical categories of number, gender, case and comparison, e.g. *kratšia sukňa* ‘shorter$_{FEM}$ skirt$_{FEM}$’, but *kratší koniec* ‘shorter$_{MASC}$ end$_{MASC}$’.

Apart from the regular inflection in Table 5.4, English also has **irregular inflection**. Irregular forms often include **internal stem changes** such as **ablaut**, e.g. *drank, sang*, and **umlaut**, e.g. *mice, feet, women.* It is important to note that no new irregular plurals or irregular verbs are formed in English. This means that all new nouns are inflected for plural by *-s* and the past tense of new verbs is formed by the suffix *-ed*.

CHAPTER 6

WORD FORMATION PROCESSES

CHAPTER OUTLINE

- This chapter gives an overview of **common ways of creating new words**.
- It starts with derivational **affixation**. It gives examples of various **types of affixes** occurring in different languages.
- Then the process of **compounding** is described. The problematic issue of distinguishing between compounds and phrases is outlined. An overview of commonly used classifications of compounds is presented.
- Other word formation processes such as **conversion**, **backformation**, and **blending** are introduced briefly.
- Different ways of **shortening** of complex words are described.

6.1 Affixation

Affixation is the process of adding an affix to a base. In this chapter we will focus on affixation as a way of forming new words. Cross-linguistically, affixation is probably the most frequent word formation process. Štekauer, Valera and Körtvélyessy (2012: 212) show that in a large number of the world languages "suffixation is the most frequent affixation process, followed by prefixation". Figure 6.1, inspired by Szymanek (1989: 69), gives an overview of the main types of affixes found in various languages.

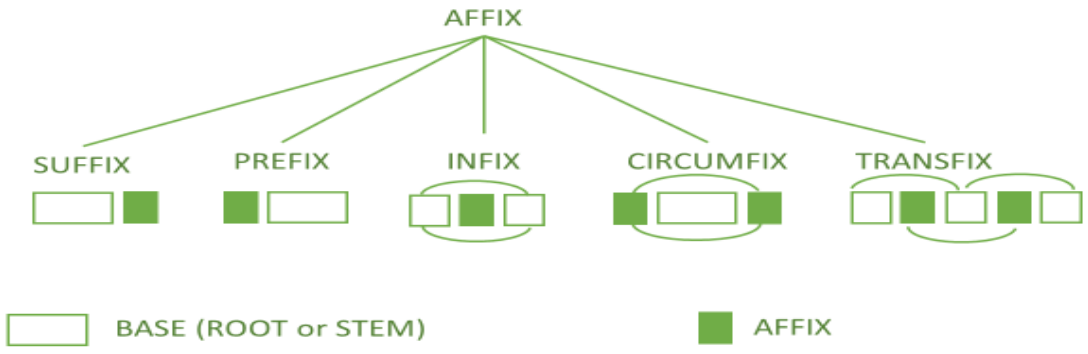

Figure 6.1 Overview of the main types of affixes.

Figure 6.1 represents the main types of affixes based on the position of an affix and their frequency in different languages. A **suffix** follows the base to which it attaches. As mentioned above, suffixation is the most frequently occurring type of affixation across languages. Some examples are presented in (1).

(1) a. English: teach**er**
b. Slovak: učit**el'** 'teacher'
c. German: Lehr**er** 'teacher'
d. French: enseign**ant** 'teacher'

In (1a) we have an example of the agentive suffix *-er*. Agentive suffixes in some other languages are given in (1b) for Slovak, (1c) for German and (1d) for French.

A **prefix** precedes the base to which it attaches. Some examples from English, Slovak, German and French are given in (2).

(2) a. English: **over**weight$_N$, **dis**place$_V$, **un**happy$_{ADJ}$
b. Slovak: **nad**váha 'overweight$_N$', **od**baliť 'unwrap$_V$' **ne**moderný 'not modern$_{ADJ}$'
c. German: **Über**gewicht 'overweight$_N$', **ver**kaufen, 'sell$_V$', **un**fähig$_{ADJ}$ 'incapable$_{ADJ}$'
d. French: **dys**lexique 'dyslexia$_N$', **mé**connaître 'ignore$_V$', **in**grat$_{ADJ}$ 'ungrateful$_{ADJ}$'

In (2a) we have three examples of prefixed words in English. *Dis-* is a negative or adversative prefix resulting in the meaning 'remove out of usual place'. The prefix *un-* usually attaches to adjectives and adds a negative or reversive meaning. In (2b) we have another example of a reversive prefix, *ne-*, which selects adjectival bases in Slovak. The prefix *od-* attaches to verbs and also has a reversive meaning in Slovak. The meanings of the German prefix *un-* in (2c) and the French prefixes *mé-* and *in-* in (2d) are also opposite or reversive. Cross-linguistically, there are some languages that do not make use of prefixation, e.g. Turkish, Nootka, and Yana (Sapir, 1921: 67).

Suffixation and prefixation are usually viewed as examples of derivation when it comes to creating new words. It is interesting to note that Marchand (1969) treats only **suffixation** as **derivation**. He groups **prefixation** and **compounding** together as **expansions**. In order to understand the difference between expansion and derivation, more background information is needed. Based on Saussure, Marchand introduced the notion of **word formation syntagma** which is a complex form consisting of two constituents, **determinans** and **determinatum**. The former narrows down the scope of the latter. In current word formation theories, the terms **head**, corresponding to determinatum, and **modifier**, corresponding to determinans, are used. For instance, *teacher* can be analysed into determinatum (or head) *-er* and determinans (or modifier) *teach*. The suffix identifies the class of agentive nouns. The determinans (modifier) *teach* specifies the activity the agent noun performs. For Marchand, a **transposition** is any combination with a bound morpheme functioning as determinatum (or head). As *-er* in *teacher* is a bound morpheme, a suffix, it is an example of transposition. Suffixation is then treated as

a subclass of transposition. In a transposition, a word is used in a different function than its typical one. For instance, nouns usually function as determinata (heads), e.g. *green-house* and verbs function as predicates, e.g. *she teaches*. However, in *teacher*, *teach* is a determinans (modifier), which means it is transposed to a less usual position. This contrasts with **expansion**, defined as a unit analysable into determinans and determinatum and belonging to the same word class as the determinatum. Only complex units with free morphemes functioning as determinatum are expansions. For instance, *intolerant* is analysed into the determinatum *tolerant* and the determinans *in-*. The resulting output *intolerant* is an adjective, the same category as the determinatum *tolerant*. This analysis makes it possible to treat prefixation as expansion and suffixation as transposition.

Figure 6.1 shows that an **infix** cuts across the base or in other words is inserted into a base or a root. This means that infixes divide their bases, which results in creating discontinuous bases. Some examples from Khmer, the official language of Cambodia, by Gerner (2017: 354) are in (3).

(3) a. ches 'learn$_V$' → ch-**omn**-es 'knowledge$_N$'
b. chang 'want$_V$' → ch-**omn**-ang 'desire$_N$, interest$_N$'

In (3a) we see how the root *ches* is interrupted by the infix *-omn-*. The infix derives a noun from a verb. Similarly, in (3b) the same infix splits the verbal root and produces a noun. Marginal cases of infixation in English are represented by the so-called Homeric infixation or *ma-*infixation (Yu, 2003: 249) as in (4).

(4) a. saxophone: sáxo-ma-phone
b. secretary: sécre-ma-tary
c. Mississippi: Missi-ma-ssíppi

The examples of infixation in (4) are colloquial expressions that indicate "attitudes of sarcasm and distastefulness" (Yu, 2003: 249). The expressions with *-ma-* are colloquialisms and *-ma-* is usually inserted to the right of a trochaic foot, where the main stress is on the first syllable as in (4a) and (4b). In (4c) the stress is on the third syllable.

There are also some expletives in English that are formed by inserting an expletive element into the word, e.g. *fan-fucking-tastic*, *abso-bloody-lutely*. The insertion of an expletive makes the emotional value of the final output much stronger. From a phonological perspective, such a process is regular. Hammond (1999: 41-44) shows that the expletive is always inserted in the same prosodic position, i.e. there must be a stressed syllable on the right and another stressed syllable on the left. This is why the forms **fantas-fucking-tic* or **ab-bloody-solutely* are not possible. The question which immediately arises is whether expletive infixation should be considered part of word formation. Some morphologists, e.g. Dressler and Merlini Barbaresi (1994: 41), exclude expletive infixation in English from word formation, but others, e.g. Plag, argue for "the inclusion of expletive infixation into our morphological grammar" (Plag, 2003: 104). As opposed to the infixes in (3) and (4), the English expletive markers are full words.

Figure 6.1 shows that a **circumfix** consists of two parts which surround the base. This also means that a circumfix is a discontinuous morpheme (see chapter 2). Some examples of circumfixation are given in (5).

(5) a. German: **Ge**bäu**de** 'building$_N$' (Fleischer and Barz, 2012: 266-267)
b. Dutch: **ge**been**te** 'skeleton$_N$' (Bauer, 2004: 29; Ten Hacken, 1994: 214)

In (5a) we see a German example with *ge-* and *-de* attached simultaneously to the base *bauen* 'build$_V$'. Both parts must be added at the same time; the forms with one element only are ungrammatical **Gebäu* or **Bäude*. Only two parts *ge-* and *-de* act together to give a meaning which neither has independently. A similar example in German is *Gemälde* 'painting$_N$' where the circumfixal elements *ge-* and *-de* attach to the base *malen* 'paint$_V$'. The Dutch example in (5b) shows how the elements *ge-* and *-te* derive the noun *gebeente* meaning 'skeleton' from the noun *been* 'bone'. In the same way as for German in (5a), both elements *ge-* and *te-* must be added at the same time. Circumfixation does not occur in English. Examples such as *enliven* or *embolden* are rather examples of prefixal-suffixal derivation because *en-* and *-en* occur on their own, e.g. *enfeeble* or *whiten*.

The last type of affix shown in Figure 6.1 is the **transfix**. As indicated in Figure 6.1, a transfix involves not only a discontinuous affix but also a discontinuous base. Transfixes typically occur in Semitic languages e.g. Hebrew or Arabic. Such languages have **consonantal roots**, usually consisting of three, sometimes four consonants, and vowels are inserted in various patterns to create specific meanings. The roots give the core meaning to the word, as illustrated in (6) taken from Modern Hebrew (Mugdan, 2015: 267).

(6) a. /g-d-l/ 'grow'
b. /ga'dol/ 'big$_{ADJ}$'
c. /'godel/ 'size$_N$'

In (6a) we see a consonantal root comprising three consonants. Such roots do not occur on their own. The core meaning of this root is 'grow'. In (6b) the root from (6a) is combined with *-a-o-* to form an adjective. In (6c) we see another pattern, *-o-e-*, the root in (6a) combines with to form a noun. Such a pattern is sometimes called a **template** or **binyan**, in line with traditional Hebrew grammar.

Other types of affixes that we find in the literature on morphology include **interfixes**, **postfixes**, and **superfixes**. Interfixes are linking elements or empty morphs we already introduced in chapter 2, e.g. *-s-* in *Geburtstag* 'birthday' in German, or the second *-o-* in *morphology*. They are merely formal elements.

The term **postfix** is often used in the Slavic linguistic tradition (Szymanek, 1989; Furdík, 2004). It refers to a derivational affix that follows an inflectional suffix, as illustrated in (7).

(7) a. Slovak: ktor-ý-koľvek 'anyone' (Furdík, 2004: 35)
b. Polish: komu-kolwiek 'anyone$_{DAT}$' (Szymanek, 1989: 70)

c. Slovak: z-menši-ť ‘to reduce, make smaller’ (Körtvélyessy and Štekauer, 2018: 376)
d. Russian: myťsja ‘wash oneself’ (Uluhanov, 2016: 2966).

In (7a) we see that the derivational element *-koľvek* attaches after the grammatical morpheme *-ý*. In (7b) we have a similar example in Polish where the element *-kolwiek* combines with the dative form *komu*. In (7c) there is a verb derived from the irregular comparative form *menší* ‘smaller’ of the adjective *malý* ‘small’. The Russian example in (7d) illustrates a common postfix, reflexive *-sja* ‘self’. In Russian it is expressed synthetically, i.e. by means of inflection, whereas in Slovak the reflexive *sa, si* in *umývať sa* ‘wash oneself’ or *variť si* ‘cook for oneself’ is analytical. Cross-linguistic research into postfixation by Körtvélyessy and Štekauer (2018) revealed that postfixation is quite frequent and not limited only to Slavic languages.

Superfix or **suprafix** is a label used for certain types of internal modification where a morphological change is linked to a change in the suprasegmental structure of the base. Some examples are given in (8).

(8)

'import$_N$	im'port$_V$
'permit$_N$	per'mit$_V$
'transport$_N$	trans'port$_V$

The noun-verb pairs in (8) differ in stress pattern and changes in vowel quality. The terms superfixation or suprafixation are somewhat outdated at present as such changes are generally no longer viewed as affixation (Bauer, 2004: 98). They are now rather subsumed under conversion (cf. section 6.3).

6.2 Compounding

Apart from affixation, **compounding** is another frequent way of forming words. In English it is considered the most productive word formation process. A compound is a word composed of at least two constituents. These constituents can be words, roots, or stems, as illustrated in (9).[5]

(9) a. English: home office
b. German: Schreibtisch ‘writing table’
c. Slovak: veľkoobchodník ‘wholesaler’

[5] **Roots** and **stems** are subtypes of what is called a **base**. The **base** is the part of the word to which an affix can be added or another morphological process can apply, e.g. in the formation of *predictable* the base is *predict*, the base of *unpredictable* is *predictable*. The **root** is the part of the word that remains when all affixes are removed, e.g. *help* is the root of *unhelpful*. The **stem** is the part of the word to which inflectional affixes attach, e.g. *friend* is the stem for the plural form *friends*. There are also other understandings of these basic terms and therefore it is necessary to verify the senses in which these terms are used in other sources before we start working with them.

In (9a) we have an example of a compound in English. It is made up of two free roots or words, *home* and *office*. Generally, in English free roots or words are used to create compounds. This contrasts with the German example in (9b) where the element *schreib-* is the stem of the verb *schreiben* 'write'. In German, *schreib-* cannot be used as a word without adding an affix. In (9c) we have a Slovak example with the first element being the stem *veľk-* of the adjective *veľký* 'big' followed by a linking element *-o-*, typically used in Slovak compounds, and a derivative *obchodník* composed of the two morphemes *obchod-ník* 'business-man'. In English and a number of other languages we also find compounds consisting of bound roots such as in (10).

(10) a. dactyloscopy
b. sociology

In (10) we have some examples of formations called **neoclassical compounds**. The constituents of neoclassical compounds are originally from Ancient Greek and Latin. Both constituents *dactyl*(o) 'finger' and *-scop*(y) 'scientific examination' come from Greek. Such constituents are bound bases often called **combining forms**. The fact that a combining form is bound makes it similar to an affix. On the other hand, a combining form can easily combine with other combining forms, e.g. *arachnodactyly*, , *neurobiochemistry*, which makes it distinct from affixes. As shown in Panocová (2015) such neoclassical compounds are generally borrowed between different languages, e.g. *Daktyloskopie* in German or *daktyloskopia* in Slovak, so that it is not easy to determine in which language they originate. However, in all languages they are analysed into constituents, even if they were borrowed first.

At the start of this section it was mentioned that compounding is the most productive word formation process in English. One of the reasons is that compounding may be **recursive**. Thus, a nominal compound with two constituents can be compounded with another constituent, e.g. *handbook → morphology handbook → Slavic morphology handbook → Slavic morphology handbook cover*.

For the interpretation of compounds, an important concept to be introduced is the **head**. The head of a compound is the constituent that determines the word class of the compound as a whole. For instance, *solar panel* is a noun as the right-hand constituent *panel* is a noun, *dry-clean* is a verb as the right-hand constituent *clean* is a verb. Most English compounds are **right-headed**. This contrasts with the situation in languages like French, where compounds tend to be **left-headed**, e.g. *centre-ville* 'city centre', literally 'centre city'. The whole compound is masculine following *centre* 'centre' not feminine, as *ville* 'city'.

When we return to the examples in (9), we can see that the compounds in (9b) and (9c) are written together. In German and Slovak, orthographic rules require that compounds are written together. This contrasts with English. Nowadays, nominal compounds are usually written as separate words, as in (9a), but this depends on the compound. Thus *textbook* is written as one word.There are even a number of compounds which occur written together, with a hyphen and written separately, e.g. *teapot, tea-pot, tea pot, boyfriend, boy-friend, boy friend*. In some contexts, this contrast distinguishes different senses, e.g. *a green house* 'a house that is green' and a *greenhouse* 'a building with glass sides and a glass roof for growing plants in'. The former

is a syntactic phrase, whereas the latter is a compound. Distinguishing between compounds and syntactic phrases has been the subject of intensive research for a long time. However, the problem of delimitation still remains unsolved. As we see in the example of *teapot*, the **orthographic criterion** is not prove useful in English. It works relatively well in languages such as Slovak, Czech, Russian and German, but in English it is definitely not a reliable criterion for the delimitation of compounds. We will now have a look at some other criteria that have been proposed for English and more generally to make this distinction.

6.2.1 Phonological criteria

Stress is a slightly better criterion than orthography. In English, compounds are frequently stressed on their first constituent e.g. *'greenhouse* whereas syntactic phrases are stressed on their last constituents e.g. *green 'house*. Although this criterion is often valid, numerous exceptions undermine its general use. For instance, a number of linguists observe that many speakers put stress on the first element in *'apple cake* but on the second in *apple 'pie*, but it would be illogical to consider only one of them as a compound. There are also combinations with two main stresses, e.g. *grass-green*, *easy-going*, which are generally recognized as compounds. Stress is a difficult criterion also due to the different position of stress when items are pronounced in isolation and in a sentence flow as demonstrated by Roach (1983), Bauer (1983), Štekauer et al. (2007). In some languages vowel harmony (see chapter 3) can play a role in the delimitation of compounds, e.g. Chuckchee spoken in Siberia (Bauer, 2017: 9), but for English this criterion cannot be used.

6.2.2 Morphosyntactic criteria

Uninterruptability or **inseparability** of a compound is another criterion that has been proposed. It is a test whether it is possible to insert another modifying word between the constituents. For instance, the expression *high school* can be interpreted as a compound or as a phrase. As a compound it refers to a type of school, as a phrase it describes the building. However, when we add a modifier, e.g. *high modern school*, it can only be a phrase.

Fixed order of elements in compounds means that we cannot change the position of the constituents, e.g. *high school* vs **school high*. Compounds of the type *actor-author*, *doctor-patient* (as in *doctor-patient communication*), *singer-songwriter* are exceptions as reversing the order of constituents does not affect the meaning. Such compounds are called copulative compounds. We will return to them in section 6.2.4.

Compounds are expected to be **inflected as a whole** i.e. inflectional morphemes are added to the head, e.g. *morphology textbook**s***, *armchair**s***, *face cream**s***. These examples show that plural inflections refer to the whole compound, not only *textbooks* but *morphology textbooks*, not only *chairs* but *armchairs*, and not only *creams* but *face creams*. On the other hand, in

English there are some cases with the plural marker attached to the left-hand constituent, e.g. *overseas investor, programs coordinator, sales-oriented* (Selkirk, 1982: 52). In section 6.1 we presented the German example *Geburtstag* 'birthday' where the element *-s* is analysed as a linking element. In other compounds, e.g. *Sonnenschein* 'sunshine', the linking element *-en* is homonymous to the plural marker, but the meaning shows that there is no plural. Allen (1978) also treats *-s* in e.g. *craftsman, tradesman, helmsman* as a linking element and not a plural marker.

6.2.3 Semantic criteria

Sometimes it is said that a compound tends to have a meaning that is more or less **idiosyncratic or unpredictable**. This can be illustrated by the compound *greenhouse* 'a building with glass sides and a glass roof for growing plants in'. This meaning cannot be deduced from the meaning of the two constituents. Obviously, the building is made of glass and it is certainly not green in colour. Some degree of lexicalisation[6] is sometimes viewed as a criterion for delimiting compounding. Although this assumption is valid in some cases, e.g. *blackboard* 'a board for writing on' is not necessarily black, there are a number of examples where the meaning of a compound can be understood from the meanings of its constituents, e.g. *bus driver*, *ballet dancer*, *purpose-designed*. These examples indicate that the principle of compositionality, i.e. that the meaning is the sum of the meanings of individual constituents (see Chapter 4), which can always be applied to syntactic phrases, but not always to compounds.

It is important to emphasize that compounds are names for established concepts, they are naming units characterized by conceptual unity. A good example illustrating that the meaning of a compound is determined by the concept it names is *piano trio*, discussed in ten Hacken (2021). *Piano trio* is used in two senses, it can refer either to a piece of music or to an ensemble. If we have a closer look at the latter, we find that *piano trio* means 'trio consisting of a piano, a violin and a cello'. However, *piano trio* does not mean 'a group of three pianos'. *Piano trio* is a well-established concept in music, which has been used since the 18th century. If we started searching for the meaning of *piano trio* from its form, we would be easily misled. However, starting from the concept seems a better alternative.

6.2.4 Classifications of compounds

There are a number of different ways of classifying compounds in English and other languages. The Anglo-Saxon linguistic tradition was mainly concerned with two classes of compounds, **primary** or **root compounds** and **secondary** or **synthetic compounds**, illustrated in (11).

[6] **Lexicalisation** is the process that takes place when the structure of the word becomes less clear and gradually turns into an unanalysable unit, e.g. a *watchmaker* does not usually make watches any more (Kastovsky, 1982: 166).

(11) a. garden party, home office, door-bell
b. property holder, computer-assisted, humour-loving

In (11a) we have examples of primary or root compounds and in (11b) of secondary or synthetic compounds. The compounds in (11b) all have a verbal element (*hold*, *assist*, *love*) in their second constituent. Therefore they are also called **verbal compounds**. The meaning of synthetic compounds is easily predictable and regular, e.g. *property holder* 'a person who holds or owns a property'. This is not the case of root compounds that can often have several interpretations. However, Allen (1978) explains that the number of meanings is not unlimited, but constrained by semantic features of the constituents, as illustrated by her example *water-mill* given in (12).

(12) a. water-mill 'a mill powered by water'
b. water-mill 'a mill located near water'
c. water-mill *mill which lives near water
d. water-mill *mill which grinds water

In (12a) and (12b) we see two meanings that are perfectly acceptable. In (12c) we have a meaning which is not possible. The reason is that *mill* is inanimate and therefore cannot combine with *live*. In (12d) we have another impossible interpretation as water is a liquid and liquids are not grindable. According to Allen (1978) the relation between the two constituents of a compound depends on the semantics of the constituents, not on any rules for the formation of compounds. The semantic feature 'powered by' in (12a) is a dominant feature in the meaning of *mill*. This principle is called the **Variable R Condition**. It applies both to root compounds and synthetic compounds but is more prominent in the former.

Another common classification of compounds is that of **endocentric compounds** and **exocentric compounds** proposed by Bloomfield (1933: 235). Some examples are in (13).

(13) a. tea-pot, beach house, primary school
b. redskin, lazybones, pickpocket

In (13a) each compound denotes a hyponym of the head element (or determinatum), *tea-pot* is a kind of *pot*, *beach house* is a kind of *house* and *primary school* is a kind of *school*. Such compounds are called endocentric compounds. The compounds in (13b) are different. Their head (determinatum) is unexpressed, i.e. it is a zero determinatum (Marchand, 1969), and it is outside the compound. *Redskin* is not a hyponym of *skin* as *redskin* is not a kind of *skin*, but a person or a potato with a red skin. Similarly, *lazybones* is not a kind of *bone*, but a lazy person and *pickpocket* is someone who steals from or picks pockets. Such compounds are called exocentric compounds. It should be stressed that this does not mean that exocentric compounds do not have a determinant (or head), it is only not overtly expressed.

An elaborate classification of compounds was available already in Sanskrit[7]. Bloomfield (1933: 235) mentions three main classes of compounds to which he gives the Sanskrit names of **dvandva**, **tatpurusha**, and **bahuvrihi**. The English equivalents he gives for them are **copulative**, **determinative**, and **exocentric**. An overview of this classification with examples is given in Table 6.1.

Type of compound	Sanskrit name	Examples in English
exocentric	**bahuvrihi**	**lazybones**
determinative	**tatpurusha**	**beach house**
copulative	**dvandva**	**artist-author**

Table 6.1 Classification of compounds with Sanskrit names by Bloomfield (1933).

Table 6.1 shows that for Bloomfield exocentric compounds correspond to bahuvrihi compounds. For Marchand (1969: 42) bahuvrihi compounds are a subclass of exocentric compounds and they denote a person or a thing that can be characterized by a feature expressed by the compound e.g. *hunchback, paleface, scatterbrain*. The literal meaning of bahuvrihi is 'much rice', i.e. rich, and they were primarily used for giving names, although they often served as adjectives. This also means that *pickpocket* is exocentric but not bahuvrihi (Selkirk, 1982). On the other hand, *lazybones* and *redskin* follow the model of bahuvrihi. **Determinative compounds** or **tatpurusha** are **attributive**, e.g. *greenhouse, icy cold, blue flag beach*, or **subordinative**, e.g. *bus driver, hand washing, course instructor*. **Copulative**, sometimes also called **coordinative**, or in Sanskrit terminology **dvandva compounds**, have semantically equal constituents. The meaning is compositional i.e. based on the sum of the meanings of the constituents e.g. *actor-manager, singer-writer, bitter-sweet*. In English, copulative compounds refer to one item in two roles as these examples illustrate.

6.3 Conversion

Another productive process of forming new words in English is **conversion**. We speak of **conversion** in cases when a word which belongs to one word class (part of speech) shifts to another word class without adding an affix. Some examples are given in (14).

(14) a. $\text{lunch}_N \rightarrow \text{lunch}_V$
$\text{forest}_N \rightarrow \text{forest}_V$
$\text{cloud}_N \rightarrow \text{cloud}_V$
$\text{hammer}_N \rightarrow \text{hammer}_V$

[7] **Sanskrit** is an ancient language of India that is used nowadays mainly in literature and Hindu religious writings.

b. $\text{hunt}_{V} \rightarrow \text{hunt}_{N}$
$\text{click}_{V} \rightarrow \text{click}_{N}$
$\text{break}_{V} \rightarrow \text{break}_{N}$

c. $\text{clean}_{ADJ} \rightarrow \text{clean}_{V}$
$\text{yellow}_{ADJ} \rightarrow \text{yellow}_{V}$
$\text{clear}_{ADJ} \rightarrow \text{clear}_{V}$

In (14a) we see examples of verbs converted from nouns. The meanings of converted verbs can vary, e.g. *lunch* means 'to have lunch', *forest* 'to plant with trees', *cloud* 'to cover with clouds' and *hammer* 'to strike, beat as with a hammer'. In (14b) we have nouns converted from verbs. The meanings of nouns are more predictable, they often denote the action or act of what X denotes, e.g. *hunt* 'act of hunting'. In (14c) we see verbs converted from adjectives. They often mean 'cause to become A', where A is the meaning of the adjective.

From the perspective of morphological theory several analyses of conversion have been proposed. One approach is called **zero derivation** or **derivation by a zero morpheme** (see chapter 2). It is based on the parallel with affixation. This means that the basic assumption is that if *terrorize* is composed of *terror* and *-ize*, the verb *lunch* is composed of *lunch* + ø (zero morpheme). Such an analysis is problematic because it leads to quite a number of zero morphemes. If $clean_{ADJ}$ has no affix, then the structure of $clean_{V}$ is $clean_{ADJ}$ + ø (zero morpheme). But then $hunt_{N}$ must also have a structure with a ø (zero morpheme), which however is a different zero morpheme, as a verbal zero must be different from a nominal zero. In chapter 2 we illustrated the notion of zero morpheme in the inflectional paradigm in Slovak. For instance, the masculine singular of *stroj* 'machine' has the inflectional forms $stroj_{NOM}$, $stroj\text{-}a_{GEN}$, $stroj\text{-}u_{DAT}$, $stroj\text{-}ø_{ACC}$, $stroj\text{-}i_{LOC}$, $stroj\text{-}om_{INSTR}$. The zero morpheme here is in contrast with other inflections. However, with the zero morphemes in the verb *clean* and in the noun *clean* the contrast is not of the same type. The zero morpheme in the verb *clean* changes the syntactic category and adds a meaning component. In *stroj*, the zero morpheme only expresses the contrast between nominative/accusative and the other cases.

6.4 Backformation

Backformation is the process of forming new words not by adding, but by deleting an element that actually is or appears to be an affix. This can be illustrated by *edit*, which was back-formed from *editor* by deleting of the suffix *-or* analogically modelled on pairs such as *actor* and *act* (Plag, 2003: 37). The formation of *burgle* corresponding to *burglar* is an example of a slightly different process. Historically, *burglar* was a simplex word consisting of one morpheme, which some English speakers started to perceive as a complex word with the structure *burgle* and *-er* based on analogy with many other words of the type Verb + *-er*. Such a process is called **reanalysis** or **folk (popular) etymology**. Marchand (1969: 260) notes that in English for nouns in *-ation* "which go with verbs in *-ate*, the noun is as a rule, older than the verb". This implies

that there are many verb-noun pairs in which the verb is a backformation. Some are presented in Table 6.2.

Noun *-ation*	Date noun	Verb *-ate*	Date verb
alternation	**c1443**	**alternate**	**1595**
calculation	**1393**	**calculate**	**1570**
compensation	**1387**	**compensate**	**1646**
illumination	**c1340**	**illuminate**	**1535**

Table 6.2 OED attestation dates of some *-ation* nouns with corresponding verbs in *-ate*.

Table 6.2 gives some examples of nouns in *-ation* for which the OED gives much earlier dates of attestation than for the corresponding verbs in *-ate*. The first attestation dates from OED are useful in establishing a possible analysis of backformation in English from a diachronic perspective. Historically, the nouns in *-ation* in Table 6.2 were borrowed from French or Latin. For current speakers, this does not play a role in their perception of the relation between the noun and the verb. In English, backformation is relevant only from a diachronic perspective. From a synchronic perspective, the backformations in Table 6.2 are analysed in the same way as suffixations.

6.5 Blending

Blends or **portmanteau words** result from the combining of parts of two words into a single one. The parts of the two words are not necessarily morphemes, e.g. *vlog* from *video* and *blog*, *brunch* from *breakfast* and *lunch*. This word formation process is a minor one in English, but it is quite frequent in the playful language of advertising and internet communication. Some more recent examples taken from the Word Spy website[8] are given in Table 6.3.

BLEND	MEANING	COMBINATION
restify	'to restore something to its original state and then modify it with new or improved features'	**restore + modify**
dramality	'a television show or series that includes elements of both drama and reality programming'	**drama + reality**
marketecture	'a new computer architecture that is being marketed aggressively despite the fact that it doesn't yet exist as a finished product; the design and structure of a market or a marketing campaign'	**market + architecture**
hackerazzi	'a person who breaks into a celebrity's email account or computer'	**hacker + paparazzi**

[8] Word Spy - The Word Lover's Guide to New Words available at https://wordspy.com/

scanlation	'the pirating of a foreign language comic book or similar graphic work by scanning the images and then translating the text'	**scan + translation**

Table 6.3 Some recent blends adapted from Word Spy.

The examples in Table 6.3 demonstrate that blending is indeed a creative way of adding new words in English. Blending is also found in Slovak. Some typical examples are *kamaláska* resulting from a combination of *kamarátka* 'friend$_{FEM}$' + *láska* 'love', *čižmáky* from *čižmy* 'boots' + *gumáky* 'wellingtons', *mliekomat* from *mlieko* 'milk' + *automat* 'automatic machine'. However, in Slovak it is only a marginal word formation process.

6.6 Shortening

Shortening of complex words includes the processes of **clipping** and **acronymization**. A **clipping** is a shortened word that does not semantically differ from its longer version, e.g. *lab* from *laboratory*, *info* from *information*, *flu* from *influenza*. Clippings are often used in less formal contexts. An **acronym** is formed from the initial letters of the words in a name and is pronounced as a word, e.g. *NATO* /ˈneɪtəʊ/ 'North Atlantic Treaty Organization', *NASA* /ˈnasə/ 'National Aeronautics and Space Administration, *ASAP* /ˈeɪsap/ 'as soon as possible', *gif* /gɪf/ or /dʒɪf/ 'Graphics Interchange Format'. **Initialisms** are also composed from the first letters of the words in a name, but they are pronounced as a series of letters, e.g. *CIA* 'Central Intelligence Agency', *ABS* 'Anti-lock Braking System', *FAQ* 'Frequently Asked Questions'. Internet chatting is a good source of numerous examples, e.g. *AFK* 'Away From Keyboard', *BRB* 'Be Right Back', *IMO* 'In My Opinion', *POS* 'Parents Over Shoulder'. Some linguists consider clipping and acronymization word formation processes. However, it should be emphasized again that the outputs are not new words.

CHAPTER 7

LEVEL-ORDERING THEORIES OF MORPHOLOGY

CHAPTER OUTLINE

- This chapter starts with explaining what is understood by **level-ordering**.
- As a basis, Chomsky and Halle's (1968) distinction between **morpheme boundary** or **weak boundary** (symbolized +) and **word boundary** or **strong boundary** (symbolized #) is presented.
- Then theoretical models of **level-ordering** proposed by **Siegel** (1974), **Allen** (1978), and **Kiparsky** (1982) are briefly outlined. The models are compared in order to highlight similarities and differences between them.
- **Bracketing paradoxes** are introduced as they represent a serious challenge for level-ordering theories.

7.1 What is level-ordering

Level-ordering, sometimes also called **stratal ordering**, is the idea of ordering morphological rules into a hierarchy of **levels** or **strata**. Each level comprises a set of morphological rules and a set of phonological rules. Such rules operate strictly on one level. Level-ordering aims to explain how affixes are ordered in complex words in English and perhaps in some other languages. Different models of level-ordering have been proposed, some of which also include compounding, as we will see later in this chapter.

In Chapter 4 we saw that inflectional affixes tend to occupy a position after derivational affixes. When we have a closer look at the complex words in (1), we can also observe that derivational affixes in English show different behaviours.

(1) a. icon_{N} /ˈʌɪkɒn/ → iconic_{ADJ} /ʌɪˈkɒnɪk/
b. motion_{N} /ˈməʊʃn/ → motionless_{ADJ} /ˈməʊʃnləs/

In (1a) we see that the output adjective is stressed on the second syllable as opposed to the first one in the input noun. The attachment of the suffix *-ic* triggers a stress shift. This contrasts with (1b) where no such change takes place. Chomsky and Halle (1968) associated the type of affixes like *-ic* in (1a) with a so-called **morpheme boundary** or **weak boundary** (symbolized +). Affixes of the type like *-less* in (1b) were associated with a **word boundary** or **strong boundary** (symbolized #). Chomsky and Halle's distinction corresponds to the more traditional distinction between **primary** and **secondary affixes** (Bloomfield, 1933). For Chomsky and

Halle (1968) the difference between the two types of boundary was based on phonological properties. The set of affixes with a weak boundary was characterized by different phonological properties than the set of strong boundary affixes. In level-ordering theories of morphology the central question is how these phonologically based boundaries correspond to morphological boundaries. In the following sections, basic features of three theoretical models of level-ordering, by **Dorothy Siegel**, **Margaret Allen** and **Paul Kiparsky**, will be presented. These theories were designed primarily for English, but some scholars applied them also to other languages.

7.2 Siegel's model

Siegel outlined her stratal model in *Topics in English Morphology* (1974). She divided affixes in English into **Class I affixes** and **Class II affixes**. Class I affixes correspond to Chomsky and Halle's + boundary and Class II to their # boundary. Siegel distinguishes Class I affixes and Class II affixes in terms of their **phonological** and **morphological properties**. Table 7.1 gives examples of phonological properties of Class I affixes.

Affix	Origin	Stress shift	Vowel /consonant change
-ity	non-native	similar → similarity /ˈsɪm(ɨ)lə/ → /ˌsɪmɨˈlarɨti/	agile → agility /ˈadʒʌɪl/→/əˈdʒɪlɨti/
-ian	non-native	grammar → grammarian /ˈgramə/ → /grəˈmɛːrɪən/	music → musician /ˈmjuːzɪk/→/mjuːˈzɪʃn/
-ive	non-native	product → productive /ˈprɒdʌkt/ → /prəˈdʌktɪv/	decide → decisive /dɨˈsʌɪd/ → /dɨˈsʌɪsɪv/
-ic	non-native	symbol → symbolic /ˈsɪmbəl/ → /sɪmˈbɒlɪk/	dialogue → dialogic /ˈdʌɪəlɒg/ → /ˌdʌɪəˈlɒdʒɪk/
in-	non-native	finite → infinite /ˈfʌɪnʌɪt/ → /ˈɪnfɪnɪt/	finite → infinite /ˈfʌɪnʌɪt/ → /ˈɪnfɪnɪt/

Table 7.1 Phonological properties of some Class I affixes.

Table 7.1 shows that Class I affixes often come from non-native sources, mostly from Latin, either directly or via French. Class I suffixes typically move stress to the penultimate (second to last) syllable, as can be seen in the examples in the third column of Table 7.1. Class I prefixes are stressed as shown in the last row of the table. Another phonological property is that Class I affixes often display complex patterns of allomorphy, e.g. after adding a suffix in *music* /ˈmjuːzɪk/ → *musician* /mjuːˈzɪʃn/, the final consonant of the base /k/ changes to /ʃ/, or the final /d/ in *decide* /dɨˈsʌɪd/ changes to /s/. Vowel segments of the base are also sometimes affected, e.g. attaching the suffix *-ity* causes shortening of the diphthong /ʌɪ/ to /ɪ/ in *agile* /ˈadʒʌɪl/ → *agility* /əˈdʒɪlɨti/. Changes in vowel quality correlate with stress. Such alternations are the result of **trisyllabic laxing**, a rule that changes a tense vowel, i.e. a long vowel or a diphthong, in a

base to a lax vowel, i.e. a short vowel. This rule has its origin in the Great Vowel Shift.[9] Table 7.2 gives examples of Class II affixes.

Affix	Origin	No stress shift	No vowel /consonant change
-er	native	traffic /ˈtrafɪk/ → trafficker /ˈtrafɪkə/	traffic /ˈtrafɪk/ → trafficker /ˈtrafɪkə/
-ful	native	fancy /ˈfænsɪ/→ fanciful /ˈfænsɪfʊl/	fancy /ˈfænsɪ/→ fanciful /ˈfænsɪfʊl/
-less	native	power /ˈpaʊə/→ powerless /ˈpaʊələs/	power /ˈpaʊə/→ powerless /ˈpaʊələs/
-ness	native	quiet /ˈkwʌɪət/→ quietness /ˈkwʌɪətnəs/	quiet /ˈkwʌɪət/→ quietness /ˈkwʌɪətnəs/
un-	native	reliable /rɪˈlʌɪəbl/→ unreliable /ʌnrɪˈlʌɪəbl/	reliable /rɪˈlʌɪəbl/→ unreliable /ʌnrɪˈlʌɪəbl/

Table 7.2 Phonological properties of some Class II affixes.

In Table 7.2 we can see that Class II affixes are of Germanic origin. Their phonological properties are different from Class I affixes. No stress shift takes place after adding, for instance, *-less* in *powerless*. In addition, no vowel or consonant alternations occur when Class II affixes attach. This is why Class II affixes are also called **neutral affixes** as opposed to Class I affixes also called **non-neutral affixes**. Class I and Class II affixes also differ in their morphological properties as illustrated in Table 7.3.

Affix	Origin	Attaches to bound stems	Attaches to words
-ity	non-native	veloc-ity	absurd-ity
-ian	non-native	pedestr-ian	academic-ian
-ive	non-native	agress-ive	progress-ive
-ic	non-native	trag-ic	acid-ic
in-	non-native	in-evit-able	in-tolerant

Table 7.3 Morphological properties of some Class I affixes.

Siegel makes a distinction between two kinds of base to which affixes can attach. First, affixes are added to **words**, i.e. free forms either simple or complex. Second, affixes can attach to **stems**, which are bound monomorphemic elements such as *agress-* or *trag-* in Table 7.3. Stems do not belong to any word class. The examples in Table 7.3 show that Class I affixes can attach not only to words (last column) but also to bound stems (column 3). Not for all bound stems is it possible to determine their actual meaning, because they only occur in combinations. This is most obvious in cases such as *-ceive* in *receive*, *deceive*, *perceive*. This contrasts with Class II affixes presented in Table 7.4.

[9] The **Great Vowel Shift** was a dramatic series of changes in the pronunciation of long vowels in English. It took place between 1400 and 1600, during the Late Middle English period.

Affix	Origin	Attaches to bound stems	Attaches to words
-er	native	X	write-er
-ful	native	X	spoon-ful
-less	native	X	home-less
-ness	native	X	natural-ness
un-	native	X	un-tidy

Table 7.4 Morphological properties of some Class II affixes.

The examples in Table 7.4 show that Class II affixes attach only to words, never to bound stems. In fact, Siegel (1974: 148-151) observes that since there are two classes of suffixes, two classes of prefixes and two types of base, words and bound stems, there are eight possible base-affix combinations, given in (2).

(2) a. Class I prefix plus stem: deduce, recede
b. Class II prefix plus stem: unattested
c. Stem plus Class I suffix: probity, legible
d. Stem plus Class II suffix: gruesome, feckless
e. Class I prefix plus word: inequality, degenerate
f. Class II prefix plus word: rewash, autoimmune
g. Word plus Class I suffix: metallic, acidify
h. Word plus Class II suffix: peaceful, kindness

In (2) we can see that out of eight possible combinations, only six occur regularly. For Siegel (2b) is unattested, although *uncouth* and *unkempt* may be examples. For (2d) there are only very few examples. For Siegel (1974: 151), these observations lead to the discovery of "deeper principles of grammatical organization", which are summarized in her simplified model given in Figure 7.1.

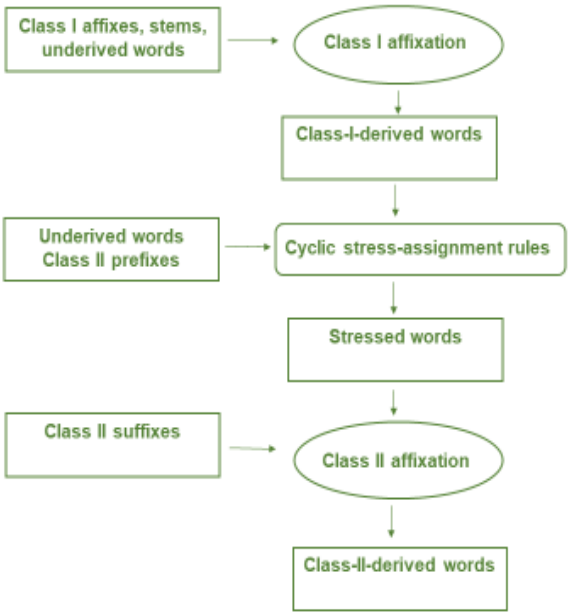

Figure 7.1 Siegel's Level Ordering Hypothesis. as represented by Carstairs-McCarthy (1993: 62).

Siegel's model in Figure 7.1 gives an explanation why (3b) is not attested in English and (3d) is rare. Siegel's ordering predicts that Class I affixation precedes Class II affixation and stress-assignment rules must take place before Class II affixation. As we saw in Table 7.3 and Table 7.4, Class I affixes can attach to bound stems and words whereas Class II affixes always attach to words. Siegel's model also explains the ordering of affixes in multiply affixed words in English as presented in (3).

(3) a. Class I suffix plus Class I suffix: collect-iv-ity, histor-ic-ity
b. Class II suffix plus Class II suffix: hope-less-ness, cheer-ful-ness
c. Class I suffix plus Class II suffix: product-ive-ness, hero-ic-ism
d. *Class II suffix plus Class I suffix: *hope-ful-ity, *Canad-ism-ian

Siegel's model clearly shows that Class I and Class II affixes are distinguished not only on the basis of their phonological properties, but also because they are layered or stratified. Thus, the examples in (3a) are formed on the same level or stratum and the same is true for the complex words in (3b). In (3c) *productive* is formed at the level where Class I affixation takes place. As a next step the stress rule is assigned, *product* /ˈprɒdʌkt/ → *productive* /prəˈdʌktɪv/. Only after the stress shift is the Class II suffix *-ness* attached to form *productiveness* /prəˈdʌktɪvnɪs/. The correctness of the prediction in (3d) became a matter of numerous linguistic debates and we will return to it in section 7.5.

7.3 Allen' s model

Allen (1978) included compounding into the scope of level-ordering and proposed the **Extended Ordering Hypothesis** represented in Figure 7.2.

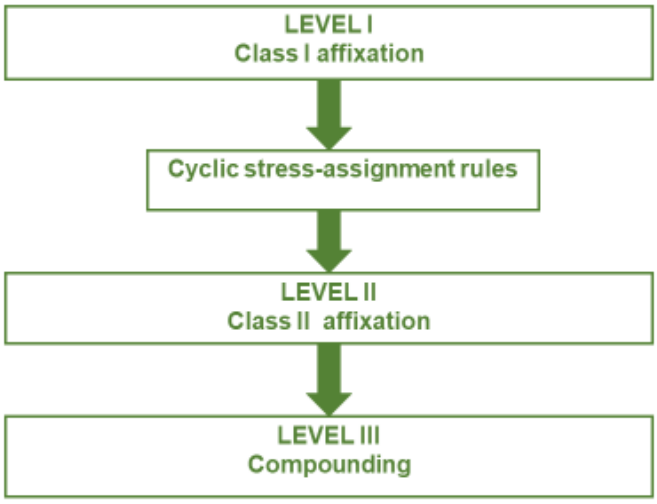

Figure 7.2 Allen's Extended Level Ordering Hypothesis.

Figure 7.2 shows that Allen's model has three levels. Level I with Class I affixation and Level II with Class II affixation correspond to Siegel's conception of level-ordering. Allen adds Level III, where she places the rules of compounding. Allen' s model predicts that no affixation takes place after compounding. She shows that Class I affixation does not occur outside compounds, only inside compounds. Thus, from the compound *street music* it is not possible to form an adjective **street musical*. It is possible to have Class I within a compound as in the adjective *musical sounding*, but here the adjective *musical* was formed before it was included in the compound. The relationship between Class II affixation and compounding is more complex. Allen shows that Class II prefix *re-* does not attach to compounds e.g. **re-vacuum-clean*, **re-black-mail*. On the other hand, Allen (1978: 222-223) also observes some counterexamples, based on the contrast given in (4).

(4) a. non-[home-made], non-[hand-washable], non-[chocolate-covered]
b. *un-[home-made], *un-[hand-washable], *un-[chocolate-covered]

In (4a) we can see that the Class II prefix *non-* can attach to compounds, which contrasts with (4b), where the Class II prefix *un-* cannot appear after compounding. Allen solves this problem by making the *non*-rule equivalent to compounding. This means that the *non*-rule, compounding and some other rules are placed at Level III.

Selkirk (1982) argues against the inclusion of compounding as a separate level. She gives examples of Class II affixes attached to compounds e.g. *un-self-sufficient*, *pre-underline*, *ex-*

frogman. For *pre-* and *ex-*, a solution similar to Allen's analysis for *non-* can be proposed. However, her first *un-* example contrasts directly with (4b). Selkirk formulates a generalization that Class I affixes cannot appear outside compounds, while some Class II affixes may appear both inside and outside compounds. In other words, only Class II affixes may attach to compounds. Selkirk calls this principle the **Compound Affix Ordering Generalization**.

7.4 Kiparsky's model

Lexical Phonology and Morphology proposed by Kiparsky (1982) represents an elaborated version of level-ordering theory. The model elaborated by Kiparsky (1982) is given in Figure 7.3.

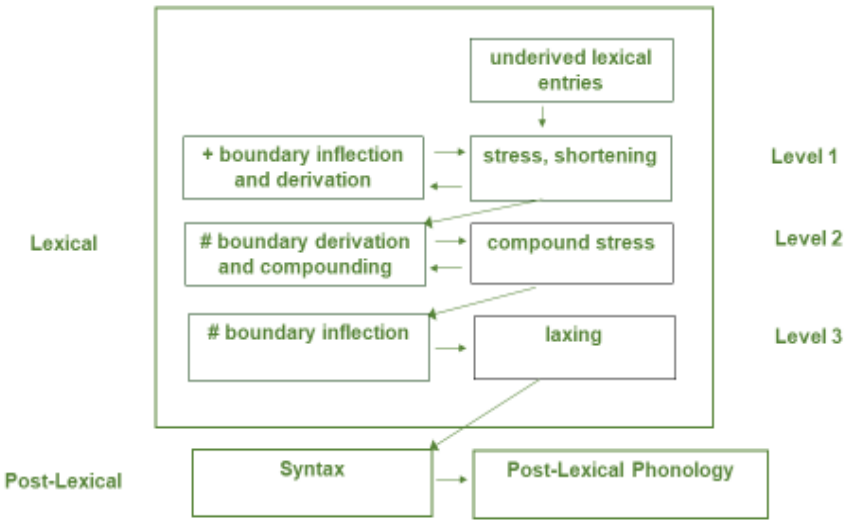

Figure 7.3 Kiparsky's Lexical Phonology and Morphology model.

The model of grammar in Figure 7.3 is divided into two main parts, **lexical** and **post-lexical**. Lexical rules, i.e. phonological rules of lexical phonology, are linked with morphological rules. When a morphological rule applies, it is followed by a phonological rule operating at the same level. The output of each level is a legitimate word. Kiparsky (1982) distinguishes three levels or strata in his model. Each level has a set of morphological rules and a set of phonological rules.

Level 1 includes Class I affixation, e.g. *-ity*, *-ive*, *-th*, which is similar to Siegel's and Allen's models. Kiparsky's innovative element is that he also places irregular inflection there, e.g. the irregular plurals *mice*, *feet*, or the irregular past tense forms *sang*, *drove*. **Level 2** covers Class II affixation, forms such as *-ness*, *-less*, *un-*, and compounding, e.g. *tea bag*, *washing*

machine, which makes it distinct from the model proposed by Allen. **Level 3** deals with regular inflection.

A principle called the **Elsewhere condition** plays an important role in level-ordering. It is a blocking principle which ensures that the more specific rule applies first or at lower levels, whereas the general rule applies by default in all other cases, i.e. elsewhere. In level-ordering it means that the more general rule operates at higher (i.e. later) levels. For instance, *judge*$_{N}$ is formed by conversion of *judge*$_{V}$ at Level 1. Conversion is a more specific rule of forming agent nouns derived from verbs than suffixation with *-er*. It applies at Level 1 whereas *-er* applies at Level 2. As a consequence, the formation of the noun **judger* at Level 2 is blocked. Another example is the agent noun *applicant.* The suffix *-ant* is a Class I suffix attached by means of a more specific rule at Level 1. Then the Class II suffixation by *-er* resulting in **applier* is blocked. Sometimes we find two nouns, one formed at Level 1, the other formed at Level 2, e.g. *cook*$_{N}$ and *cooker*$_{N}$, but their meanings are different. The former is a person, the latter an instrument. If there is a new meaning, blocking no longer applies.

Now we will have a look at an example of inflection. The irregular plural *feet* is formed at Level 1 and the more general rule of forming the plural with *-s*, which would result in **foots* at Level 3, is blocked. It should be noted that blocking is not absolute, it is only an important tendency. The failure of blocking results in doublets, e.g. *syllabi/syllabuses*, *formulae/formulas*. Often, individual speakers have only one of these forms in their active lexicon.

The main role of lexical rules is to produce a well-formed word, which can then be used in syntax. This brings us to the part of the model where post-lexical rules, i.e. phonological rules that apply when words are used in syntax, are placed. The division into two sets raises the question of how to differentiate lexical and post-lexical rules. The main differences recognized by Kiparsky are summarized in Table 7.5.

LEXICAL RULES	**POST-LEXICAL RULES**
apply only within words	apply within words and across word boundaries
cyclic	**not cyclic**
structure-preserving	not necessarily structure-preserving
apply first	**apply later**
admit exceptions	exceptionless (automatic)

Table 7.5 Differences between lexical and post-lexical rules.

Table 7.5 shows that **lexical rules can only apply within words**. In (1a) we saw that after the attachment of the Class I suffix *-ic* to *icon*$_{N}$ /ˈʌɪkɒn/, the application of lexical rules, i.e. phonological rules of lexical phonology, triggers a stress shift, resulting in *iconic*$_{ADJ}$ /ʌɪˈkɒnɪk/. The stress shift applies within the word. **Post-lexical rules**, i.e. phonological rules operating in syntax, can **apply across word boundaries**. For instance, in the flow of speech, *last trip* can be pronounced not only as /lɑːst trɪp/, but due to a post-lexical rule applying to phrases, a final alveolar stop can be deleted, resulting in the pronunciation /lɑːs trɪp/ (Katamba, 2006: 107).

In Figure 7.3 we saw that at each level it is necessary that both morphological rules and phonological rules apply, i.e. these rules are **cyclic**. For example, the Class I suffix *-al* attaches to *office*$_{N}$ at Level 1. Then appropriate phonological rules apply that cause a stress shift and consonant alternation, resulting in *official*$_{ADJ}$ /əˈfɪʃl/. Then, the word *official*$_{ADJ}$ can move to Level 2 where the adverbial suffix *-ly* is attached to form *officially*$_{ADV}$ with no stress shift. There is no such a relationship between syntactic and phonological rules, which means that post-lexical rules are **acyclic** and apply only once.

Lexical rules are **structure-preserving**, which means that the output of each level must be a well-formed word of English. It must follow the morphological rules and phonological rules operating in English. Post-lexical rules are not necessarily structure-preserving. For instance, it is known that words in English do not start with a combination of consonants /ts/. However, when two words are together in speech, especially in informal speech, the unstressed vowels may be omitted, e.g. *it's not* can be pronounced /tsnɒt/ (Katamba, 2006: 108).

Lexical rules apply **first**, which is natural, for the words must first be formed and can only then be used in syntax, where post-lexical rules apply. Lexical rules **admit exceptions**. For instance, it is sometimes difficult to predict which verbs can serve as bases for the derivation of nouns with the suffix *-al*, e.g. *arrival*, *refusal*, *proposal*, *approval*, but not **describal*, **deprival*. Post-lexical rules are **automatic** in the sense that they apply whenever appropriate conditions are met and no blocking rule exists.

7.5 Problems with level-ordering

In section 7.2 it was already mentioned that the discussion of Siegel's claim that Class I affixation must precede Class II affixation triggered doubts about its correctness. Aronoff (1976) observed systematic violations of this claim. Some are given in (5).

(5) a. atomization, palatalization
b. acceptability, predictability

In (5a) *-ation* is a Class I suffix because it attracts stress. The same applies to *-ity* in (5b). For the suffixes *-ize* and *-able*, Aronoff (1976) and Aronoff and Sridhar (1983, 1987) demonstrate that they are Class II suffixes. Therefore, in (5) we have examples of Class I suffixes following Class II suffixes. Selkirk (1982: 100-106) proposes that some affixes have dual membership in Class I and Class II. On the basis of a large number of corpus-based examples, Bauer, Lieber and Plag (2015: 583-615) argue that most affixes in English have such dual membership.

Bracketing paradoxes arise when different analyses of the structure of a word are required by different components of the grammar. Bracketing paradoxes pose another problem to level-ordering theories as one structure violates the principles of level-ordering. A well-known example of a bracketing paradox is illustrated in (6).

(6) a. [un- [grammatical-ity]]
b. [[un-grammatical] -ity]

The analysis in (6a) follows the principles of level-ordering. *Grammatical* and *grammaticality* are formed at Level 1 as *-al* and *-ity* are Class I suffixes. The Class II prefix *un-* is added at Level 2. The problem with this analysis is that semantically, the word is rather derived from *ungrammatical*. The meaning of *ungrammaticality* is 'the state of being ungrammatical', which corresponds to the structure in (6b). In addition, the prefix *un-* normally attaches to adjectives or verbs, not to nouns. Another example is given in (7).

(7) a. [atomic [scient-ist]]
b. [[atomic science] -ist]

The suffix *-ist* belongs to Class I because it changes the final consonant of *science*. Level-ordering requires the structure in (7a), as compounding takes place at Level 2 in Kiparsky's model. However, semantically (7a) is incorrect as *atomic scientist* does not refer to a scientist who is atomic. That *atomic scientist* is an expert in atomic science is represented in (7b). The structure in (7b) then violates level-ordering because Class I affixation occurs after compounding, which is placed at a later level.

The main contribution of level-ordering was the insight "that morphology may be stratified into two or more levels, each of which is associated with a set of morphological rules and an accompanying set of phonological rules" (Bauer, Lieber and Plag, 2015: 637). As a consequence of the problems noted in this section, the importance of this theoretical framework gradually declined after the 1980s.

CHAPTER 8

MORPHOLOGICAL TYPOLOGY

CHAPTER OUTLINE

- This chapter begins with explaining what is understood by **morphological typology**.
- Then the basic four-fold classification of **isolating** (or **analytic**), **agglutinative**, **fusional**, and **polysynthetic** language types is introduced.
- Sapir's approach to morphological types is presented and his three main criteria: **morphological technique**, **index of synthesis** and **index of fusion**.
- This conception is contrasted with Skalička's morphological types based on **lists of features** that co-occur in language types.
- The final section compares **English**, **Slovak** and **Hungarian** from a typological perspective.

8.1 What is morphological typology

Earlier chapters in this textbook presented some similarities and differences in the morphology of English, Slovak, German, Hungarian and some other languages. Morphological systems of different languages can be described in terms of patterns. Such patterns are interesting as they can tell us what morphological properties and rules are likely to co-occur in a particular language. The patterns can be used as a basis for a **typology** or classification of languages. In this chapter we will focus on **morphological typology**, which represents a classification of languages based on their morphological structure. The development of morphological typology started in the early 19th century. Intensive research of language types continued especially in the first half of the 20th century. On the basis of this tradition, languages are divided into four basic morphological types: isolating (or analytic), agglutinative, fusional and polysynthetic. These labels are standard linguistic terms and they are convenient in determining some morphological properties of languages.

In an **isolating** language, also called **analytic**, words typically consist of only one morpheme. Words are usually not inflected. Prototypical examples of this language type are Mandarin Chinese and Vietnamese. Some examples from Vietnamese (Andresen and Carter, 2016: 220) are given in (1).

(1) a. một cuốn sách
one CL. book
'one book'

b. hai quyển sách
two CL. book
'two books'

In (1) we can see that nouns in Vietnamese do not inflect for plurality. The noun *sách* means 'book' in (1a) and 'books' in (1b). The number of books is specified by a numeral, *một* 'one' in (1a) and *hai* 'two' in (1b). In addition, noun classifiers are used, *cuốn* in (1a) and *quyển* in (1b). Classifiers are used to identify a set of objects by some criterion. For instance, in English, the classifier *piece* is used to particularize a number of mass nouns, e.g. *piece of luggage*, *piece of information*. This is similar to the situation in Vietnamese given in (1).

Unlike isolating languages, **agglutinative** languages have complex words. Another characteristic property of such languages is that in complex words, the morphemes can be segmented easily. As we saw in chapter 3, in agglutinative languages there is a one-to-one correspondence between form and meaning, where morphemes link or glue together without changing their forms. Prototypical examples of such languages are Turkish, Swahili, or Hungarian. A Hungarian example is presented in Table 8.1.

	Singular 'hand'	**Plural 'hands'**
NOMINATIVE	kéz	kezek
ACCUSATIVE	kezet	kezeket
DATIVE	kéznek	kezeknek

Table 8.1 Part of the declension of the noun *kéz* 'hand' in Hungarian. Adapted from Rounds (2001: 297).

In Table 8.1 we can see that identifying the accusative morpheme *-et* is straightforward. In the singular, it attaches to the stem *kéz* 'hand'. In the plural, it appears after the plural morpheme *-ek*. In a similar way it is possible to separate the dative morpheme *-nek*, which in the plural follows or is glued on after the plural morpheme *-ek*.

Fusional languages also have complex words, but unlike agglutinative languages, the morphemes in these words are not always easily identified. Cases of cumulative exponence (see Chapter 2), i.e. when several meanings are packed into a single morpheme, are frequent. Good examples of fusional languages are Slovak, Russian, French or Italian. Table 8.2 gives an example taken from Slovak.

	Singular 'hand'	**Plural 'hands'**
NOMINATIVE	ruk-a	ruk-y
ACCUSATIVE	ruk-u	ruk-y
DATIVE	ruk-ou	ruk-ami

Table 8.2 Part of the declension of the noun *ruka* 'hand' in Slovak.

Table 8.2 shows that the inflection *-u* marks accusative singular. However, this inflection also carries the information about gender, here feminine. The inflectional ending *-u* cannot be segmented into smaller parts that mean 'accusative' or 'singular' or 'feminine'.

In **polysynthetic** languages words can be extremely complex. This means that sometimes they consist of many morphemes that express information which in other languages are expressed by separate words. Typical examples of polysynthetic languages are Siberian Yupik or Greenlandic. An example taken from Greenlandic given by Fortescue (1984) is given in (2).

(2)

illu-	mi-	niip-	puq
house	his	be-in	3rd person-singular-indicative

'he is in his (own) house'

The long word *illumiippuq* in (2) is made up of a sequence of several morphemes. It is so complex that in English several words must be used as a corresponding equivalent.

This traditional morphological classification contrasts with the **genetic** classification of languages based on their common ancestor, e.g. Slovak is a Slavic language belonging to the Indo-European family. It should be noted that genetic classification does not contradict typological classification. For instance, Slovak is a Slavic language and therefore it is reasonable to assume that it will share a number of structural properties with Czech or Russian.

Two fundamental conceptions of language types based on morphological criteria were proposed by the American linguist **Edward Sapir** and the Czech linguist **Vladimír Skalička.** The main points of their classifications will be presented in the following sections.

8.2 Sapir's morphological types

Sapir's (1921) main contribution to morphological typology was that he realized the necessity of integrating different dimensions of classification. He also made it explicit that a language can belong to more than one type depending on the classifying criterion. For instance, Slovak is a fusional language, but it also makes use of analytic forms. Thus, the future is formed analytically, e.g. *budem pracovať* 'I will work'.

Based on the **morphological technique**, i.e. the method of connection of morphemes, Sapir (1921) distinguished four language types: isolating, agglutinative, fusional, and symbolic (internal modification). The first three were described in section 8.1. **Symbolic** languages express grammatical and word-formation meanings by internal vowel modification. This is typical of Arabic or Hebrew (see examples of transfixation in Chapter 2). For instance, in Arabic the plural is formed by internal vowel modification as in *radžulun* 'man' → *ridžalun* 'men' (Ondruš and Sabol, 1984: 282). The English equivalent *man* → *men* is also an example of internal vowel modification, but such cases are not systematic.

Sapir (1921) introduced two indices, the index of synthesis and the index of fusion. The **index of synthesis** is based on the calculation of the ratio of morphemes to words in a language.

Truly isolating languages can have one morpheme per word, i.e. the index of synthesis is 1. This contrasts with agglutinative or polysynthetic languages with typically several morphemes per word. The index of synthesis distinguishes isolating (or analytic) from **synthetic languages**. Synthetic languages express a grammatical category or categories by combining lexical and grammatical morphemes within a single word. Synthetic languages include inflectional languages, e.g. Slovak, and agglutinative languages, e.g. Hungarian. Synthesis is a matter of degree, which means that individual languages are placed on a specific point of the continuum or cline with two clearly defined ends, as illustrated in Figure 8.1.

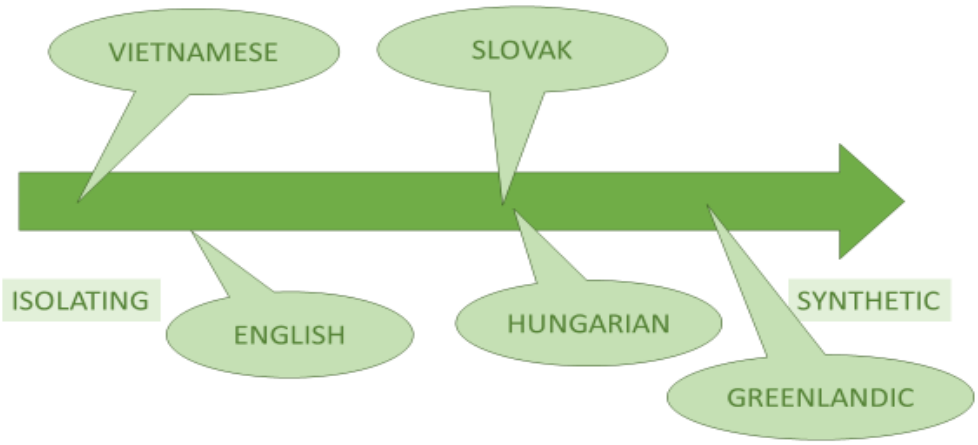

Figure 8.1 Cline based on the index of synthesis.

The two poles of the continuum in Figure 8.1 are represented by isolating and synthetic languages. The index of synthesis has a minimum of 1 and in principle no maximum. The placement of languages in the figure is somewhat intuitive. Vietnamese is close to the isolating end. English is also isolating, but to a smaller degree than Vietnamese. Towards the other pole of the continuum we have Greenlandic as a polysynthetic language. Slovak and Hungarian are also placed closer towards synthetic end.

The **index of fusion** makes a distinction within the group of synthetic languages between agglutinative and fusional languages. The index of fusion measures how easy it is to segment morphemes in a language or how many grammatical categories are expressed by one morpheme. This is represented by the cline in Figure 8.2.

Figure 8.2 Cline based on the index of fusion.

Figure 8.2 shows that agglutinative languages like Hungarian are low on the index of fusion. As we saw above, in Hungarian it is often the case that one morpheme has only one meaning, e.g. accusative or plural, but not accusative plural. The latter is found closer to the other end of the continuum where languages such as Slovak are placed. Case inflection in Slovak typically expresses three grammatical meanings: number, gender and case. With the index of synthesis and the index of fusion, Sapir intended to give a stronger theoretical grounding to earlier typological classifications of languages. However, he never made any specific calculations for individual languages.

8.3 Skalička's morphological types

A representative of the *Prague School of Linguistics*, Vladimír Skalička, developed an alternative conception of language types, based on a set of features that co-occur in morphological types. Skalička (1951, 1966) viewed each morphological type as an **ideal construct**, which is never found in its pure form in natural languages. As illustrated in the preceding sections, languages often mix elements of different types. The set of features together, as a whole, represents an ideal construct of, for instance, the agglutinative type. Skalička's approach is labelled as **holistic**, i.e. looking at the many aspects of the morphology of languages at the same time (Sgall, 1999: 71). Skalička (1951, 1966, 1979) divides languages into five morphological types, given in (3):

(3) a. agglutinative: Turkish, Hungarian, Finnish
b. inflectional: Latin, Czech, Slovak, Russian
c. isolating (analytic): English, French, Hawaiian
d. polysynthetic: Vietnamese, Thai, written Chinese
e. introflective: Arabic, Hebrew

The language types in (3a), (3b) and (3c) correspond to Sapir's classification. The polysynthetic type in (3d) is different for Skalička compared to Sapir's view of this type. He includes prototypically isolating languages there, e.g. Chinese, Vietnamese. In (3e) introflective languages are similar to Sapir's symbolic languages. Skalička noted that the introflective type is not so frequent among languages. Even in those languages where it occurs, it is restricted to only a part of their morphology. Table 8.3 gives some examples of a set of features co-occurring in three morphological types proposed by Skalička (1966).

	Fusional	Agglutinative	Isolating
affixes	+	+	-
morpheme segmentation	-	+	+
clear-cut distinction of word-classes	+	-	-
fixed word order	-	+	+
tendency to monosyllabism	-	-	+
noun marked for number	+	+	-
noun marked for gender	+	-	-
noun marked for case	+	+	-
adjectives expressing agreement	+	-	-
synthetic comparison of adjectives	+	+	-

Table 8.3 Set of features characteristic of three morphological types by Skalička (1966).

Table 8.3 shows that fusional languages are differentiated from isolating languages on the basis of a clear-cut distinction of word-classes. For instance, in Slovak the word-classes are clearly distinguished, with rich inflectional systems marked on nouns, verbs, and adjectives unlike in isolating languages, e.g. English. The main differences between agglutinative and fusional languages is that it is in general easy to separate morphemes only in the former. Unlike fusional languages, agglutinative languages do not inflect nouns, verbs or adjectives for gender. Skalička's approach aims to characterize prototypes of the traditional morphological types based on a number of properties of languages. Some of these properties will be illustrated in the comparison of English, Slovak and Hungarian in the next section.

Sapir's and Skalička's morphological classifications of languages are based almost exclusively on inflectional properties of languages. A new insight into the typology of languages based on word formation was proposed by Körtvélyessy, Štekauer, Genči and Zimmermann (2018). Their approach takes into account two parameters. The first parameter is the **structural richness** of word formation systems at the level of individual languages, language genera, families and the linguistic area of Europe. Based on this parameter, languages are divided into derivationally rich languages, i.e. languages that make productive use of a wide range of word formation processes and types, e.g. English, Slovak, German, and derivationally

poor languages, i.e. languages with a limited number of word formation processes and types, e.g. Tatar, Welsh. The second parameter is the **maximum feature occurrence**, which identifies those word formation features that are present in all languages under consideration, i.e. in all languages of a genus, a family or the linguistic area of Europe. These features include, for instance, class-changing suffixation, class-changing prefixation, different types of compounding, conversion. Slavic and Germanic languages score high in the number of features that occur.

8.4 A comparison of English, Slovak and Hungarian

Present-day **English** is usually labelled as an **isolating** (or **analytic**) language. **Slovak** is classified as an **inflectional** (or **fusional**) language and **Hungarian** as predominantly **agglutinative**. The situation is not so straightforward, as in all these languages there are properties that are more characteristic of different language types.

8.4.1 Characteristic features of English as an isolating language

The index of synthesis of isolating languages ranges from 1.00 to 1.99 (Katamba and Stonham, 2006: 62). This reflects the average number of morphemes per word. This means that in isolating languages words have on average less than one affix. For English, Greenberg (1954) gives the index of synthesis 1.68. This means that words tend to be composed of less than two morphemes. To put it differently, **words are often monomorphemic and monosyllabic**, as illustrated in (4).

(4) Few things are clear in this pandemic, but if there is one thing that is: our relationship with our work lives will be permanently changed. (BBC news online)[10]

A closer look at the sentence in (4) reveals that there are 25 orthographic words. Out of these, the majority are simple words consisting of a single morpheme. The words *things*, *relationship*, *lives*, *permanently*, and *changed* have two or three morphemes, which represents some degree of agglutination i.e. one morpheme is added to another.

In isolating languages, the **number of affixes in words tends to be small**. This was shown in Chapter 5 and Chapter 6. Especially inflection is very limited as compared to the complex inflectional system in Slovak. On the other hand, in isolating languages it is frequently the case that **free morphemes combine to form compounds**. In Chapter 6 we saw that, indeed, compounding is one of the most frequently used processes to create new words in English. A prototypical isolating language such as Vietnamese has almost no affixation, but it has compounds.

[10] BBC news online, accessed 17 December, 2020 at https://www.bbc.com/worklife/article/20201209-how-our-views-on-work-have-changed-forever

The **distinction of word classes is often not clear**. For instance, in English conversion often takes place, e.g. *cover*, *table*, *chair*, *drink* can function either as a noun or as a verb. There is no overt marker of grammatical categorization. Even the infinitive is expressed analytically, i.e. by *to* as in *to drink*. Case inflections are absent in English. The only remnant is the possessive *'s*, which is often treated as a clitic (see Chapter 5). **Case relations are expressed by prepositions**, as shown in (5).

(5) a. **My sister** is beautiful.
b. The husband **of my sister** is a doctor.
c. I gave this present **to my sister**.
d. Sara warmly greeted **my sister**.

In (5b) we can see that the genitive is expressed by the preposition *of* and the dative in (5c) by the preposition *to*. In (5a) and (5d) there is neither a preposition, nor inflection. The opposition between nominative and accusative is in English expressed only by the position in the sentence. The subject position in (5a) reflects the nominative, whereas the position of the object in (5d) stands for the accusative. This also means that **word order in English is more or less fixed**.

In verbs, the grammatical categories of person and number are not expressed inflectionally. This is compensated for by the use of personal pronouns as presented in (6).

(6)

I walk	we walk
you walk	you walk
s/he/it walks	they walk

The conjugation of the verb *walk* in (6) shows that in the present tense all verb forms are identical, except for the 3rd person singular. This also means that the **person must be obligatorily expressed** by means of a personal pronoun as well as the corresponding form of the verb.

Possessiveness is expressed in English by the possessive pronouns *my*, *your*, *his*, *her*, *its*, *our*, *their*. This is similar to Slovak. However, in English there is **no agreement between the possessive pronoun and the noun it modifies** as we saw in (5).

8.4.2 Characteristic features of Slovak as an inflectional language

An average number of morphemes per word ranging between 2.00 and 2.99 is typical of inflectional languages (Greenberg, 1954). **Words tend to be complex**, consisting of stems and affixes, e.g. in Slovak, *učiteľka* 'teacher$_{FEM}$' is composed of a stem and three suffixes *učit-eľ-k-a*. In this example, the morphemes are easily segmentable, which is similar to the situation in agglutinative languages. In Slovak, the number of **affixes is rather high**, i.e. one or two per word on average.

Inflectional languages are typically characterized by the so-called **grammatical polysemy** illustrated in Table 8.4.

singular	**kosť ‘bone’**
nominative	kosť
genitive	kost-i
dative	kost-i
accusative	kosť
locative	kost-i
instrumental	kosť-ou

Table 8.4 Declension paradigm of the Slovak noun *kosť* ‘bone’.

Table 8.4 shows that the grammatical morpheme *-i* expresses three cases: genitive, dative, and locative. It expresses several related grammatical meanings i.e. different cases. This is called grammatical polysemy or syncretism (see Chapter 3). The inflections *-i* and *-ou* cumulate three grammatical meanings: number, gender and case. This is called cumulative exponence (see Chapter 3). Inflectional languages are also characterized by **grammatical synonymy** shown in Table 8.5.

	mesto ‘city’	**žena ‘woman’**	**chlap ‘man’**	**ulica ‘street’**
Dative singular	mest-u	žen-e	chlap-ovi	ulic-i

Table 8.5 Dative forms of some Slovak nouns.

Table 8.5 gives examples of four distinct grammatical inflections marking the dative singular of nouns in Slovak. The same grammatical meaning, i.e. dative singular, is expressed by different grammatical morphemes.

In Table 8.2 we saw that for *ruka* ‘hand’, nominative and accusative have different inflectional forms. Thus, whereas in English the subject has to precede the verb, in Slovak this is not necessary. Therefore, the **word order** in inflectional languages including Slovak **is** in general much more **flexible** than in isolating languages. For a more detailed typological analysis of word order patterns see Janigová (2014).

8.4.3 Characteristic features of Hungarian as an agglutinative language

The index of synthesis of agglutinative languages is the same as for inflectional languages. The average number of morphemes per word ranges between 2.00 to 2.99 (Katamba and Stonham, 2006: 63). Agglutinative languages allow complex words to the same degree as inflectional languages. However, the main difference is that the **morphemes can be separated** easily, as there is a preference for a **one-to-one correspondence between form and meaning**.

In contrast to Slovak, in Hungarian there is a **lack of grammatical polysemy** as can be seen in Table 8.6.

	Singular 'book'
NOMINATIVE	könyv
ACCUSATIVE	könyv-et
DATIVE	könyv-nek
INSTRUMENTAL	könyv-vel

Table 8.6 Declension forms of the Hungarian noun *könyv* 'book'.

Table 8.6 shows that in Hungarian, each case inflection is different, in contrast to the Slovak example in Table 8.4. The ending *-et* only has the grammatical meaning of accusative and the same is true of the dative inflectional morpheme *-nek* and instrumental *-vel*. These inflections are also examples of the lack of cumulative exponence, as the only meaning they express is that of the corresponding case. This, again, contrasts with Slovak, where in general an inflectional morpheme in nouns expresses number, gender and case. Hungarian does not have gender. Agglutinative languages also **lack grammatical synonymy**, as shown in Table 8.7.

	ház 'house'	**pohár 'glass'**	**táska 'bag'**	**lány 'girl'**
Dative singular	ház-nak	pohár-nak	táska-nak	lány-nak

Table 8.7 The dative forms of some Hungarian nouns.

In Table 8.7 we can see that all four nouns have the same dative inflectional ending, unlike the Slovak examples in Table 8.5. Table 8.6 presented the dative form *könyv-nek* 'book$_{DAT}$' and Table 8.1 the dative form *kéz-nek* 'hand$_{DAT}$'. This variation is due to **vowel harmony** (see Chapter 3), which is another characteristic feature of agglutinative languages. The dative singular has two allomorphs *-nak* and *-nek*. The selection depends on the vowel in the stem, as they must be in harmony.

Unlike in English or Slovak, possessiveness in Hungarian is expressed by **possessive grammatical morphemes**, not by separate possessive pronouns as shown in (7).

(7) ház-am 'my house'
ház-am-nak 'to my house'
ház-am-ban 'in my house'

The forms in (7) are longer and more complex than corresponding expressions in English or Slovak. The examples in (7) also demonstrate that an agglutinative language such as Hungarian is regular and relatively simple, especially as opposed to inflectional languages such as Slovak. A good example to illustrate the regular character of agglutinative languages is the **absence of**

suppletion. Suppletive forms of the type we find in English, e.g. *good*, *better*, *the best* or the corresponding Slovak forms *dobrý*, *lepší*, *najlepší* do not occur in Hungarian.

Morphological types are useful labels that can help us identify basic features of a language almost immediately. However, contemporary morphological typology rejects classification of the whole of a language into one type. The main trend is to focus on **partial** typology (as opposed to holistic). This means that typologists focus on specific areas of linguistic structure, e.g. the category of number, or gender. The results of such research lead to implicational generalizations such as that a language has a trial number only if it also has a dual number and a language has a dual number only if it also has a plural (Greenberg, 1963; see Chapter 5).

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ACTA FACULTATIS PHILOSOPHICAE UNIVERSITATIS ŠAFARIKIANAE 146

2021

Basic Concepts of Morphology I.
Vysokoškolská učebnica

Autorka: doc. Mgr. Renáta Panocová, PhD.

Vydavateľ: Univerzita Pavla Jozefa Šafárika v Košiciach
Vydavateľstvo ŠafárikPress

Rok vydania: 2021
Rozsah strán: 97
Rozsah: 5,9 AH
Vydanie: prvé

ISBN 978-80-8152-959-7 (e-publikácia)