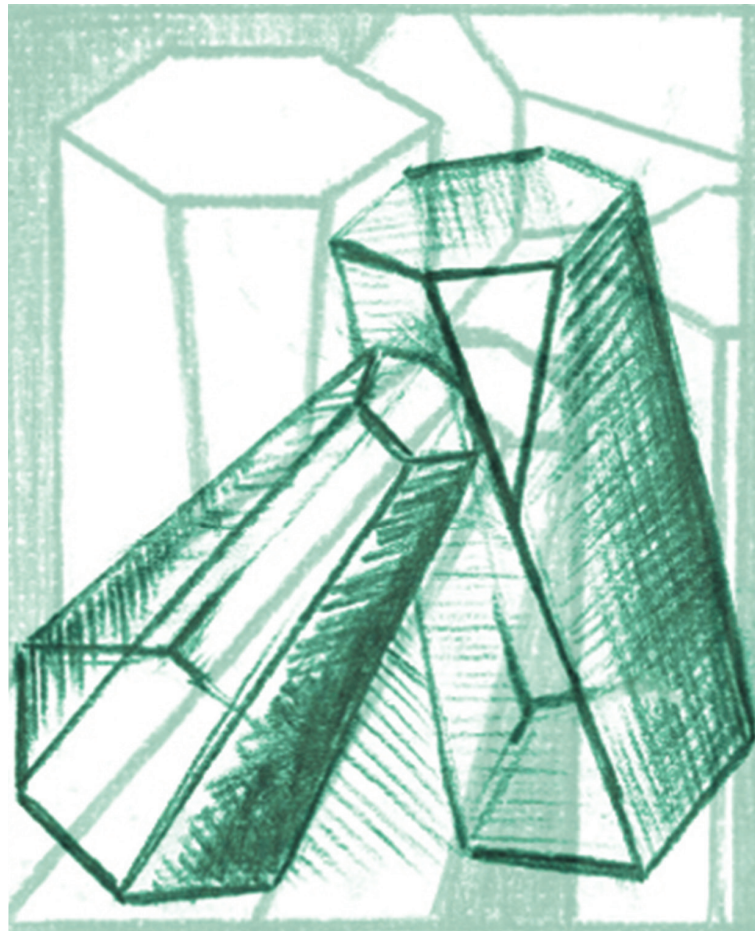
Ludmila Veselovská

Form and Functions in English Grammar



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Form and Functions in English Grammar

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ABBREVIATIONS

Adj(P)	Adjective (phrase)
AmE	American English
A(P)	Adjective/Adverb (Phrase)
Adj(P)	Adjective (Phrase)
Adv(P)	Adverbial (Phrase)
Aux	Auxiliary
BrE	British English
CEN	Complex Event Nominal
C(P)	Complementizer (Phrase)
Det/D(P)	Determiner (Phrase); a functional head (phrase) above NP
Dem/DEM	Demonstrative
ECM	Exceptional Case Marking structures
e.g.	for example
f/ F	Feature (f: (purely) semantic, F: grammatical)
I/INFL	Inflection; a functional head above VP. T is also used
i.e.	it mens
INF	Infinitive
Mod	Modal
N(P)	Noun (Phrase)
NEG/Neg	negation
Num	Numeral
Ω	Omega, operator, the position of English Modals
P(P)	Prepositional (Phrase)
POSS	Possessive (Morpheme)
φ/Phi	Nominal features (Number, Gender, etc.)
RN	Result Nominal
Q(P)	Quantifier (Phrase)
RHHR	Right Hand Head Rule
SG	Singular
SPEC	Specifier
T(P)	Tense (Phrase), equivalent to I/INFL
θ	theta, (grammaticaliuzed) semantic role
V(P)	Verb (Phrase)
w.r.t.	with respect to

Subscripts (Glosses) in non-English examples

Ordering of a cluster of Phi features in glosses: subscript Person + Gender + Number.Case. For space reasons, only discussion-relevant features are provided.

1, 2, 3	Person (on Predicate)
ACC	Accusative (Case), Object Case
DAT	Dative (Case)
F	Feminine (φ Gender)
GEN	Genitive (Case)
INF	Infinitive
INS	Instrumental (Case)
LOC	Local (Case)
M	Masculine (φ Gender)
N	Neuter (φ Gender)
NOM	Nominative (Case), Subject Case
P/PL	Plural (φ Number)
PRT	Participle
S/SG	Singular (φ Number)

INTRODUCTION

The purpose of this monograph is to motivate and illustrate the language specific realization (i.e. the form) of plausibly universal principles of language structure. This monograph describes the morphosyntax of the English language. The author's intention is to concentrate on the logic of the system, not to compile all types of examples of English constructions which exist and/or can be formed within the system. For much more exhaustive illustrations of these, see the standard grammar manuals: The Oxford Press English grammar manual by Quirk et al. (2004), the Cambridge Press version of Huddlestone and Pullum (2002) and the more corpora based Longman edition of Biber et al. (2007). This text does not try to compete with those collections, which provide extensive data and exhaustive lists of examples in terms of detailed semantic and pragmatic taxonomies. This monograph includes topics that best represent the characteristics of language structure, and the author utilizes as often as possible standard scientific argumentation, which leads to the most generally accepted and best supported analysis of the chosen phenomena.

As for its contents, the text attempts to systematically cover all levels of grammatical analysis. It starts with a general introduction to theoretical linguistics in Chapter 1. The next four chapters describe topics in morphology. They illustrate in detail some productive and frequent processes of English word-formation, concentrating mainly on derivation and compounding, i.e. on those processes that reflect the creative productivity of the language's combinatorial mechanism. In passing, some general principles of the morphological typology of languages are also introduced, illustrated and discussed in general terms.

Chapter 6 provides an introduction to the next large part of the monograph: the English morphosyntax of the main lexical categories (parts of speech). It deals with morphosyntactic criteria for English parts of speech, providing an introduction to the topic from the perspective of universal grammar. The text does not cover absolutely all categories; Chapters 7-16 concentrate on the characteristics of the main lexical categories, i.e. special attention is given to the forms and functions of the categories of Nouns (including English Pronouns and bound anaphors), Adjectives, Prepositions and Verbs (including a thorough discussion of Auxiliaries and Modals). In this part, many syntactic terms are introduced and explained, especially those relevant for the categorial characteristics. The taxonomies are based on empirically attested formal properties, and explicitly formulated (demonstrated) diagnostics.

Because the assumed readers are most likely Czechs, English grammar is sometimes compared with its Czech formal and/or pragmatic equivalents. But in addition, any scholar focusing on a highly analytic language like English can only profit from seeing how its grammar compares with a typical Indo-European synthetic language like Czech. For this reason, comparisons of English with Czech are concentrated in sections where the two languages show some significant differences.

The taxonomy of the parts of speech is highly morphologically motivated, and perhaps language specific, and its particularities are basically reflections of empirical distributions. Therefore, after discussing the categorial features (and the level of their

grammaticalization in English), much space and argumentation are devoted to a description of the phrasal projections of the lexical categories. In describing the projections of NP, AP and VP, the relevant sections stress the parallelism of structure in the language specific realizations of the resulting combinations.

Chapter 17 provides a general introduction to the study of simple and complex sentences. The following Chapters 18-24 analyze in detail the main sentence members (or grammatical relations), focusing above all on Subject and Object, and their semantic, morphological and syntactic properties in English. The form of English clausal Negation is also introduced and demonstrated. This part of the monograph contains a list of the main sentence patterns in English, classified according to their pragmatic function and syntactic form. In Chapter 26, the nature of complex sentence patterns is summarized with various types of subordinate clauses examined in more detail; in particular, *wh*-questions and relative clauses, which are illustrated as examples of syntactic transformations.

The classification of embedded finite clauses serves as a kind of background for the discussion of English non-finite structures in Chapters 28 and 29. Both the (to-/bare) Infinitives and *–ing* forms are introduced and classified according to their structures and distribution. Their individual characteristics are related to the broader theme of morphosyntactic realization of the semantic roles. Part of this section is devoted to contrasting several distinct kinds of English nominalizations (including result nominals, complex event nominals, Gerunds and participles).

The last topic covered in this monograph is the linear ordering of units within distinct kinds of domains. The author stresses the more fixed ordering in phrasal domains compared to the greater cross-linguistic variety in constituent order in clausal domains. What motivates this constituent order variety is the concept of discourse information structure (functional sentence perspective, Communicative Dynamism). This is first introduced in general terms and then demonstrated in detail with contrasted examples of English and Czech structures in Chapters 30 and 31. The final Chapter 32 provides a terminological summary, attempting to cover clause structure on several partially autonomous levels: (a) categorial, (b) syntagmatic, (c) semantic, and (d) discourse levels.

Present day linguistic literature includes large grammar manuals of specific languages, which describe and summarize the data in quite a complete way. The formal theoretical framework behind these monographs is usually rather obscured and inexplicit, and completeness, often based on corpora searches, seems to be the most valued research tool. In some cases, this leads to an unbalanced presentation that fails to distinguish regular and productive forms and structures from exceptional and marked patterns. On the other hand, specialized linguistic monographs in a variety of frameworks nowadays concentrate on narrow research topics and try to cover them in depth, including detailed argumentation that compare alternative analyses.

This monograph consciously attempts to represent something in between the two extremes: to cover the most important parts of the system as a whole consistently, within a single compatible framework, but at the same time to present empirically based arguments in favour of specific analyses. To cover all topics that are possibly a

part of the English grammatical system would require much more space and time, and it would exceed the life expectancy of the author. It is also true that this text concentrates on topics that the author finds most important, most interesting, and sometimes neglected in other materials. To complement these individual choices, at the beginning of most sections there are some bibliographical references to the grammar manuals that are recommended as supplementary sources, together with some references to more specialized monographs. The readers may find it useful to go through at least some of the materials so mentioned.

This monograph is not a study that tries to establish or develop a specific linguistic theory or some narrow field of linguistics. As for the theoretical framework, the author believes that the central parts of current linguistics, above all contemporary grammar, can and should be an autonomous science. Therefore, the analyses here assume that human language is a system that can be studied by applying scientific methods, with the aim of developing some descriptively adequate and as explanatory as possible generalized hypotheses, most of which have implications for more than a single language. Empirical data and argumentation are thus strongly preferred to any classificatory lists or traditional truisms. No *a priori* analyses or theories simply inherited from the past or proposed in influential present day studies are taken for granted or considered as given.

Recent functional and generative approaches typically present themselves as returning to the empirical concerns of traditional grammar and at the moment provide a wide range of plausible frameworks. Trying to be cooperative with all kinds of readers, the presentation and hypotheses in this monograph, such as in the choices of categories, are based on traditional functional and structuralism grammars, which are then developed and modified by current theoretical proposals. Moreover, the grammatical analyses introduced here assume the need for empirically based scientific understanding of human language. Although they concentrate on formal grammar, the author also assumes interactions with other disciplines such as a theory of communication, and studies of literary form, psychology, sociology, and anthropology. To discuss and try to understand basic grammar in a more universal and open-minded way must be useful for all scholars of English language, who can then go on in their research in whichever field or framework fits their interests.

And at the end, I would like to thank my colleagues Joseph Emonds and Jaroslav Macháček and other external reviewers for their comments and suggested revisions, for adding many useful examples and for all their help in making this text more readable. Especially without the patience and permanent support and help of my partner, this monograph would never have achieved its present form and made it into print.

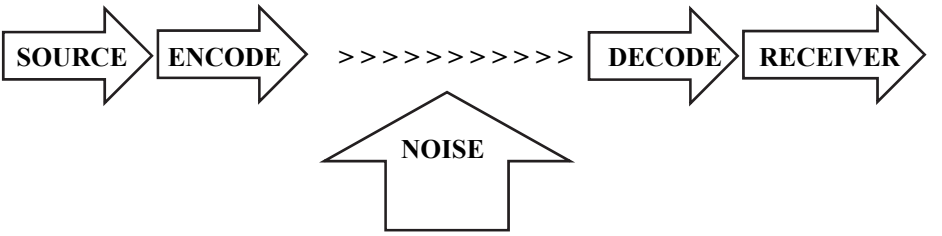
1 BASIC CONCEPTS

In this chapter, I will introduce the main concepts related to the studies of language. I will demonstrate the position of theoretical linguistics in the more general field of communication theory and mention some of the many aspects of the studies of human communication code. The reason is not to substitute a course in general linguistics but only to describe the background philosophy of language, which is going to be used in the following study.

1.1 Models of Communication

Communication is an exchange of messages (thoughts, information) by speech, signals, or behaviour. It is a rather complex process by which a human subject assigns and conveys meaning in an attempt to create a shared understanding with another. (Lat. *communis* = commonness). The process can be described in terms of a 'communication model.' One of the first models is by Claude Shannon (1948), which still illustrates quite succinctly the main idea of the communication process.

(1) **Shannon's model**



As early as in the 1950s, Wilbur Schramm (1954) proposed that communication should better be seen as **processes** of information transmission governed by three levels of semiotic rules (see also Berlo 1960):

(2) (a) **Syntactic** (formal properties of signs and symbols),
(b) **Pragmatic** (concerned with the relations between signs/expressions and their users) and
(c) **Semantic** (study of relationships between signs and symbols and what they represent).

For these authors, communication is a social interaction where at least two interacting Agents share a common set of signs and a common set of semiotic rules.

In present day communication theories, the importance of context is stressed, and the models become more complex.[1] E.g. the **Inference Model** also takes into account inferences, i.e. a specific pragmatic interpretation including a specification of context and consistency. This is a large complex of factors including channel, noise, context, consituation, etc.

Linear models become **interactive,** indicating that communication is not a one way but a two way process. The models include field(s) of experience representing cultural background, ethnicity, geographic location, extent of travel, and general personal experiences accumulated over the course of a speaker/hearer's lifetime.

1.2 Language as a Code

Language is a human specific communication code that is **arbitrary** (conventional), as defined in Crystal (198: 395-403). In comparing human language (a human-specific communication code) with animal means of communication, the distinction is NOT in the degree of communication needs, feelings, information complexity, etc., but primarily in the **formal** characteristics of the code itself. Two notions are centrally related to its characteristics of (a) 'discrete infinity' and (b) 'double articulation' of 'duality of patterning'.

The concept of **discrete infinity** refers to the fact that human language makes "infinite use of finite means," an idea dating back to Wilhelm von Humboldt. **Double articulation (duality of patterning)** is the term introduced by Hockett (1960).

(3) **Discrete infinity**

A language code uses a finite list of **discrete elements** (individually distinct and countable, i.e. not elements forming a continuum), which combine according to specific formalized rules or principles to yield an infinite number of well-formed expressions.

(4) **Double articulation**

A general property of human language that invariably involves **two levels** of rule-governed combinatorial structure: one combining meaningless sound segments into morphemes, the other combining meaningful morpheme sequences into words and phrases. This dual, superimposed system is a **universal design feature** of human language.

Chomsky (1957) argued that language is biologically-based, and that humans are innately endowed with a property for learning it. He proposed the **innateness hypothesis,** which assumes that innate abstract principles of languages are the same for all children, irrespective of ethnic background, i.e. they are NEUTRAL with

[1] For details concerning the development of the communication theory framework, see thematic monographs such as, e.g. Miller (2005), Schulz and Cobley (2013) and McQuail and Windahl (2015).

respect to differences among languages, i.e. they are UNIVERSAL. In this sense, language universals reflect the existence of general linguistic principles, which facilitate a child's language-learning task.[2]

(5) The **language faculty** is a human specific **innate** (i.e. genetically encoded) ability to acquire a language.

(6) **Universal grammar** is a set of **abstract, universal principles** of the language faculty system in the brain.

Some version of the innateness hypothesis is generally accepted today. However, what is the precise nature and content of the universal grammar (and what is the mechanism of language faculty) is a matter of much present day theoretical research in the linguistic fields of **language acquisition**, neurolinguistics, etc., which include language specific studies, as well as implementations of technical statistical methods.

1.3 Linguistics and Science

Linguistics is the scientific study of language, one of the principal means of human communication, and its sub-divisions, some more or less autonomous. Linguistics involve analyses of language form, language meaning, and language in context.[3]

1.3.1 Sciences and disciplines dealing with human language

Linguistics applies the scientific method to questions about the nature and function of human language. It is divided into a wide range of areas of focus. Thus, it deals with formal studies of speech sounds, grammatical structures, meaning and usage of language. It also investigates the history of and changes within language groups and how language is acquired and learned. More broadly, linguistics also studies the relationship between written and spoken language, as well as the underlying neural structures that enable us to use language.

Many topics that linguists discuss overlap with fields in the social sciences and the humanities. Linguistics is a multi-disciplinary field that attempts to understand how language is stored in the human mind/brain and how it influences human behaviour, which makes linguistics related to the fields of neuroscience, philosophy, psychology, anthropology, sociology, and computer science. Linguistics is a part of the theory of communication, and the field of semiotics treats language as a central branch. It can be divided into several relatively autonomous fields:

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[2] For a clear and enlightening introduction to the concept of universal grammar, see Cook (1988). For those interested in the scientific methodology of linguistics, see reference books such as Huddleston and Pullum (2002: 17-42), Huddleston and Pullum (2005: 11-28), Haegemann (2006), Aarts (2008), and those mentioned in footnote 5.

[3] For more discussion on the context of English, consult Crystal (1987: 81-123). In the Czech tradition, see Svoboda (2004: 10-15).

(7) Areas of Linguistics

- Language form: syntax/morphology, phonology/phonetics
- Language meaning: semantics
- Language use: pragmatics

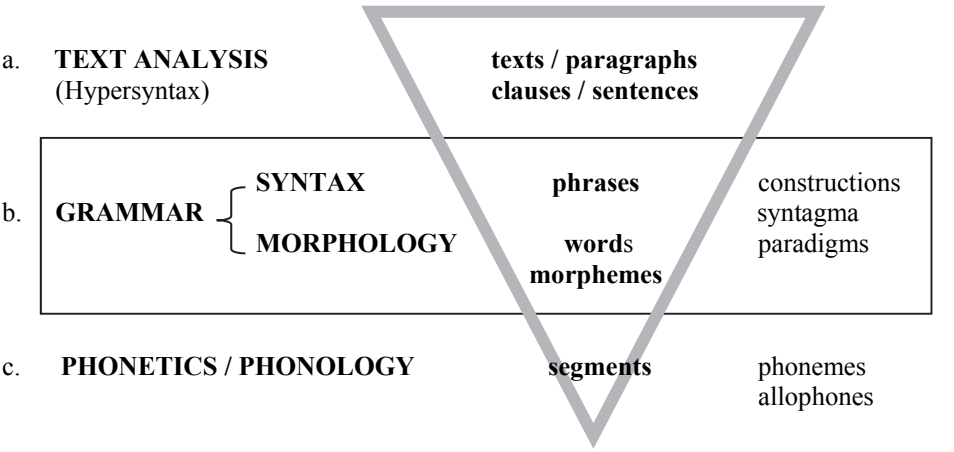
1.3.2 Formal analyses of language structure

This monograph is dealing with a general linguistic analysis of the English language. All levels of such analysis are potentially parts of formal linguistics, each including its specific taxonomic primitives.

Some levels of linguistics (e.g. phonetics/phonology, semantics, pragmatics) are quite **autonomous**, i.e. independent. They have their own definable topics and categories and apply their own **rules,** which are less derived from other fields than others. In contrast, morphology and syntax (= grammar) apply similar rules and discuss the same or similar topics and categories.

Levels of linguistic analysis and their taxonomic primitives are schematically illustrated in (8). The triangle suggests the size of the taxonomic primitives (phonemes are the 'smallest'), and the framed middle field puts together those areas covered in this study: morphposyntax (grammar).[4]

(8) Levels of linguistic analysis and their taxonomic primitives

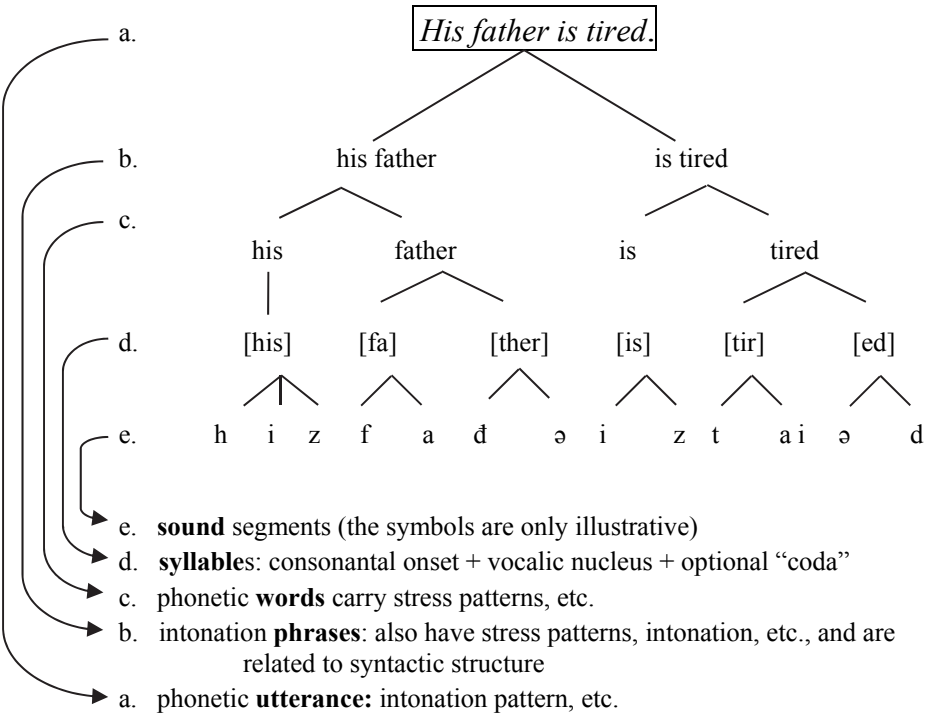


The following scheme in (9) demonstrates that **phonetics/phonology** is an autonomous field of linguistics. It deals with elements that distinguish meaning but do not have meaning themselves (sound segments/phonemes), e.g. *cat* vs. *rat*; Czech *pat*

[4] Some schemes and examples in Chapters 1-5 are adopted from the teaching materials used in grammar seminars and published as a part of Veselovská (2017a).

vs. *pád, myši* vs. *Míši*. **Phonological rules** apply without respect to meaning, e.g. final devoicing in Czech applies to all parts of speech and all sentence members, i.e. to all similar phonetically defined elements, irrespective of their role in other parts of the language system.

(9) Immediate constituent analysis of **phonetic/phonological structure:**



Notice the **duality of patterning** in (9). A few meaningless elements (classes of sound segments such as consonants and vowels) combine into a huge number of distinct meaningful units (morphemes), which further combine into an infinite number of larger units (complex words, phrases, clauses, texts).

1.3.3 Forms and functions

The syntactic system is a complex **net of grammatical relations**. The units that form a system are not separable from the relations. In fact, it ***is*** their relations (=functions) that justify and define the units. Two terms are repeatedly used as the basis of linguistic analysis in terms of these functions: paradigm and syntagma.

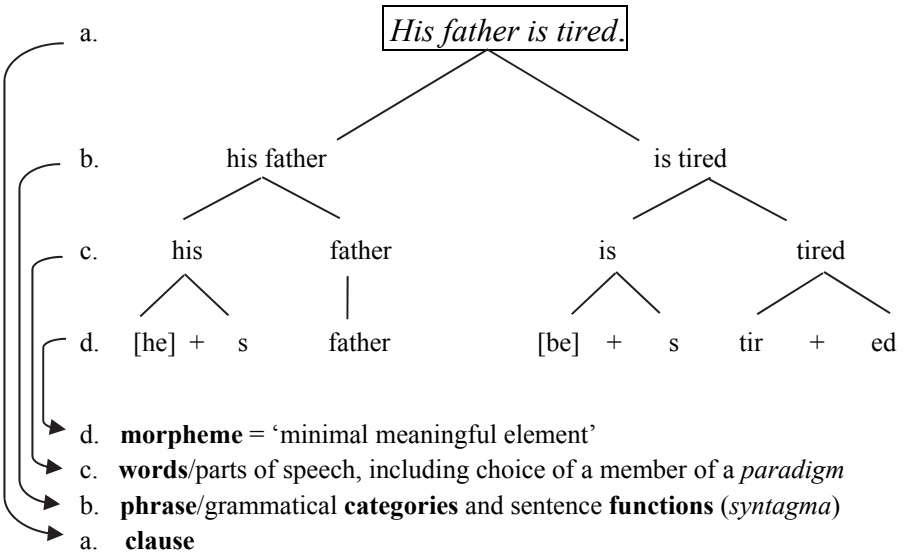
A **paradigm** is a list of morphological forms of one unit (**tokens** of a **type**). One of the paradigmatic forms is usually taken as unmarked and called the **citation form**. Paradigms are traditionally related to specific parts of speech/categories.

(10) a. ***I*** (Pronoun): *I, me, my, mine;*
b. ***help*** (Verb): *help/ helped/ helping*;
c. ***man*** (Noun): *man, men/ man's/ men's;*
d. ***nice*** (Adjective): *nice/ nicer/ nicest*.

On the other hand, a **syntagma** is a **relation** (= function) between two syntactic categories. Syntagmatic relations are **hierarchical**. Traditionally they are equivalents of sentence functions, which relate sentence members, such as Subject-Predicate, Noun-adjectival Attribute, Verb-direct Object. Sometimes we use only one of the couple to classify the relation. An **Attribute**, for example, means a relation that an Adjective has with respect to (w.r.t.) a modified Noun (*blue sky*).

(11) a. **Attribute** (w.r.t. Noun): *real trouble*
b. **Adverbial** (w.r.t. Verb): *often talk*
c. **Direct Object** (w.r.t. Verb): *write a letter*
d. **Subject** (w.r.t. Predicate): *John reads*

(12) Levels of **morpho-syntactic (grammatical) structure:**



In this study, paradigms are going to be discussed in Chapters 6-16. These chapters provide characteristics of the main lexical parts of speech and discuss the topics related to English categorial taxonomy. The syntagmatic relation (in English) is the material of Chapters 18-21. [5]

1.4 Adequacy of the Linguistic Model

Formal linguistics, i.e. linguistics as a **science**, deals with a **language system**, meaning a structure of interrelated formally defined elements. The language system is a reality; it is a human-specific code for communication based on species-specific abilities. The language system is subject to its own principles and rules. Therefore, the linguistic model should be **specific to human language**.

A linguistic model (a framework including terminology and definitions of rules and principles) is a theoretical construct created by linguists, and it reflects a historical level of achieved knowledge. Linguistics develops as any other scientific field (e.g. present day chemistry is using more distinct primitive units than medieval alchemy did 500 years ago). Evaluating a specific linguistic model, we are considering to what extent the theory confirms scientific criteria.

Linguistics is an autonomous science. It studies a human language, and it aims at developing a model specific to a human language code, not for other systems that cannot occur as human languages. Linguistics research

(13) a. **observes**/studies data within one or across many language(s),
b. **describes** them by classifying their parts,
c. looks for **generalizations** in these descriptions, and
d. creates a **model** of grammar that can express these generalizations.

Linguistics deals with (i) narrow data from a part of the system, but with a wide cross-linguistic comparison of such data, and with (ii) concrete descriptions leading to abstract generalizations that express their common features.

In evaluating or comparing linguistic analyses/hypotheses/ theories, we consider **three levels of adequacy**.

(14) Levels of adequacy of models of grammar:

i. **Observational adequacy** requires the model to reflect the empirical data correctly, as in (13)(a-b).
ii. **Descriptive adequacy** is achieved when symbols and categories of the model express not just the empirical data but also the generalizations in the descriptions of data, as in (13)(c).

[5] The topics and concepts used in linguistics are discussed in more detail and demonstrated in any general introduction into linguistics. For English, a representative textbook is, e.g. Akmajian et al. (2017). Some discussion to the topic appears also in many English grammar manuals, such as Huddleston and Pullum (2002: 2-16), Huddleston and Pullum (2005: 1-10;) Akmajian et al. (1990: 1-10), and Crystal (1987: 395-414).

iii. **Explanatory adequacy** is the top level of adequacy. It requires individual rules to be **integrated** parts of a whole **formalized system**, as in (13)(d).

When studying a language, we have to distinguish the features which are common to all languages - **general universals (**e.g. all languages have essentially the same parts of speech and central phonetic features) - from the **language-specific features**, which are typical for only a group of languages or even one language. Thus, some languages have morphological Case on Adjectives, e.g. Czech and German, while others do not, e.g. English and French. These distinctions are the subject matter of **comparative linguistics.**

1.5 Linguistics as a Science

Nineteenth century linguistics, which can be considered scientific using today's criteria (that is, it is predictive in some non-trivial sense), described historical or "diachronic" sound changes in Indo-European languages. Then, the twentieth century brought about revolutionary changes. **Ferdinand de Saussure's** *Course in General Linguistics* (1915) introduced two central ideas:

(15) (a) The distinction between **diachronic** and **synchronic linguistics***,* which is the study of language as a system in the brains of speakers, which has no (significant) historical dimension. Except for learning new vocabulary, an adult's grammar typically does not change.

(b) The distinction between **langue** 'language' and **parole** 'speech'.

For de Saussure, all speakers of the same language share **langue**, the same store of words and morphemes, which he calls "**signs**." The relation between sound and meaning for each sign in a language is **arbitrary**.

Parole is how individuals choose to use items from their langue in making up utterances communicating with each other. Thus, the parole of any two speakers, how they choose to use their language, is different.

Noam Chomsky's monograph *Syntactic Structures* (1957) proposed that natural language grammars can be represented as **formal systems** that combine minimal units of meaning (= "morphemes") into well-formed sentences of a language. In his next monograph, *Aspects of the Theory of Syntax* (1965), Chomsky further argued that humans are **innately** disposed as small children to acquire such grammars without instruction. This ability to acquire, understand, and produce language is linguistic **competence**. The actual use of language in particular real life contexts is **performance**. Chomsky's competence not only includes knowledge of a lexicon (= de Saussure's **langue**), but the **combinatory principles of grammar** (syntax).

In the second half of the twentieth century, many fields of linguistics developed that deal with the **use** of language, i.e. **why** and **how** peple use the existing language code. Those present day autonomous fields include pragmatics, text analysis, sociolinguistics, psycho-linguistics, neuro-linguistics, and many others.

Combined with statistical methods, these fields represent a large proportion of present day linguistic research. I am not going to discuss these fields here; rather, I will be concentrating on formal grammar.

1.5.1 A note about taxonomies

Studying linguistics, one soon notices that each framework (functional grammar, construction grammar, generative grammar, etc.) uses specific terminology. Some terms or labels are shared among several frameworks (but sometimes with distinct definitions in a given approach), and some are special. It is important to realize that all labels used in grammar for classifications, such as parts of speech or sentence functions, do **not** denote in themselves any real entities. The classification is always an integral part of a specific theoretical framework, and only the framework provides its justification. In this regard, the following from Fillmore (1977: 68) is appropriate:

(16) "Taxonomy is to be valued if it provides a convenient and revealing conceptual organization of the entities in its realm... in our case something in terms of which grammatical and semantic generalizations can be easily formulated."

More generally, terminology or labels must reflect some theoretical claim about the assumed similarity between items classified in the same way. That is, in saying that an element X is "a Noun" or "an Attribute," I am claiming that X has the properties and behaviour that a specific theory assigns to a concept of "Noun" or "Attribute." If the labels do not correlate with clearly defined properties/ characteristics/behaviours, they are of no use in science.

1.6 How to Evaluate Linguistic Data

Linguistics is an empirical science – its claims are based on linguistic data. Apart from using the empirical data found in various kinds of corpora, linguistics considers, especially for the purposes of argumentation, the data obtained from informants. Many seem to realize that native speakers have rather clear **intuitions** (a) about the well-formedness of strings of words, and (b) even about their structure, such as what constitute natural groupings. A language structure thus can/must be evaluated with respect to:

(17) (a) its appropriate **usage** (in pragmatic contexts)
(b) its semantic interpretation (**meaning**)
(c) its **form** (grammaticality).

There is a problematic relation between areas of competence. Chomsky (1977: 4) proposed that

(18) "we may make an intuitive judgment that some linguistic expression is odd or

deviant. But we cannot in general know, pre-theoretically, whether this deviance is a matter of syntax, semantics, pragmatics, belief, memory limitations, style, etc., or even whether these are appropriate categories for the interpretation of the judgment in question. It is an obvious and uncontroversial fact that informant judgments do not fall neatly into clear categories: syntactic, semantic, etc."

The following examples are evaluations with respect to **pragmatic competence**, i.e. those relevant in (some field of) theory of language use. A pragmatically unacceptable structure is marked with a question mark as ?. (The examples (g, h) are from Chomsky (1965: Ch. 1)).

(19) a. *? an honest geranium*
b. *? The man next door swears it never loses its temper with anyone.*
c. *? the tree who we saw*
d. *? Each human being has two or three eyes.*
e. *? William might have been pregnant but he had a miscarriage.*
f. *? The umbrella is flying with the bathroom.*
g. *? Colorless green ideas sleep furiously.*
h. *? I'm memorizing the score of the sonata I hope to compose someday.*

As for **semantic competence,** in the next examples the semantically unacceptable structure is marked with an exclamation mark as !. Notice the variety of "problems" includes meaning of an individual lexical entry as in (20), which illustrates non-factive vs. factive verbs, and co-reference in (21), which shows that there are **rules for possible co-reference** (co-reference is marked by indices).

(20) a. *He thought that Elisabeth was there, but it turned out that she wasn't.*
b. *! He **realized** that Elisabeth was here, but it turned out that she wasn't.*

(21) a. *The man$_i$ knew that somebody saw him$_i$*
b. !/**He$_i$ knew that somebody saw the man$_i$*
c. *He$_i$ hoped that Mary loved him$_i$.*
d. *Who$_i$ hoped that Mary loved him$_{i\ or\ j}$?*
e. *Who$_i$ did he$_j$ hope that Mary loved?*
f. **Who$_i$ did he$_i$ hope that Mary loved?*

If the interpretation of a specific phenomenon depends on the underlying syntactic structure (e.g. co-reference, scope, etc) the semantic evaluation is explained referring to grammatical competence. Obviously, "the borderline between grammar and semantics is unclear, and linguists will draw the line variously... Similarly, the borderline between grammar and pragmatics (and even more between semantics and pragmatics) is unclear." (Quirk et al. 2004: 16) For **grammatical competence (grammaticality),** the violation of the form is marked as * in the following examples:

(22) a. **Will you opening the window?*
b. **Opens the window, please!*
c. **Each room have two or three window.*
d. **Jane might be had pregnant but she had miscarriage.*
e. **The witch flying is with straw some broom.*

Although it may be difficult for the non-linguist to distinguish the reason for ungrammaticality (native speakers often resort to the rather vague "it doesn't make sense" even in cases when the problem is not at the level of 'sense' or semantics at all), the reason for ungrammaticality has to be found. It has to be **explained** referring to some rules and/or principles, which the unacceptable sentence violates. Compare the following variety of unacceptability in specific parts of linguistic competence.

(23) Phonological acceptability: a. *blick vs. *bnick*
b. *SENtence vs. *senTENCE*

(24) Morphological acceptability: a. *men* vs. **mans*
b. *tigress vs. *horsess*

(25) Syntactic acceptability: a. **I sent a copy to him out.*
b. **Oscar visited in January Rome*.

1.6.1 Negative evidence in grammar

Testing grammaticality (native speaker judgments) is the main method for studying a linguistic system. Grammatical examples, however, illustrate possibility, not the rules themselves. The rules are defined correctly only when their violation results in ungrammaticality. So we have to find examples of **contrasting acceptability** to demonstrate the potentials and limits of the system – i.e. the rules of the system.

Look at the following examples in (26). A hypothesis concerning word-order crucially depends on the ungrammatical examples, ignoring considerations of frequency, special interpretations, etc. In other words, making a claim about word order, we have to show the contrasting examples, one of which is ungrammatical. The Czech examples on the right are equivalents of the English ones on the left (with Case marking on the Noun Mary_{NOM} and Feminine agreement of Predicate Verb. (The label % means that the example is acceptable to some speakers only.)

(26)	SVO	a.	*Mary wrote the letter.*	a'.	*Marie napsala dopis*.
	SOV	b.	**Mary the letter wrote.*	b'.	% *Marie dopis napsala.*
	OVS	c.	**The letter wrote Mary.*	c'.	*Dopis napsala Marie.*
	OSV	d.	*The letter Mary wrote.*	d'.	% *Dopis Marie napsala.*
	VSO	e.	**Wrote Mary the letter.*	e'.	% N*apsala Marie dopis.*
	VOS	f.	**Wrote the letter Mary.*	f'.	% *Napsala dopis Marie.*

Linguistic research in formal grammar (a research programme in terms of Lakatos 1978) can be viewed as a sequence of problems in a prioritized order. This

set of priorities, and the associated set of preferred techniques, is the positive heuristic of a programme science proceeds. It goes on through repeated **cycles of observation, induction, and hypothesis-testing**, with the test of consistency with empirical evidence being imposed at each stage. The rules must be demonstrated to have a **predictive** power. We have to show that a violation of the proposed grammatical rule leads to ungrammaticality. The claim is right only when we cannot produce some relevant counterexample. [6]

[6] Eddington (2008) provided a good introduction to empirical and non-empirical approaches to linguistics by examining the extent to which they practice the scientific method. He shows that valid explanations about actual language processing rely on adherence to scientific methodology.

2 MORPHEMES

As mentioned in the introductory section, this study will cover the topics concerning the traditional **levels of linguistic analysis** (the divisions within formal linguistics). Each level includes its specific primitives and topics. Starting with morphology and word formation, we will first concentrate on morphological taxonomy.[7]

The basic units in morphology are morphemes and allomorphs. The following is a definition used by Leonard Bloomfield**,** the "father of American structuralism," in his classic volume *Language* (1933).[8]

(1) 'A morpheme is the smallest element of a language which **carries a meaning**.'

This definition raises another question: What is "meaning?" In language, everything has 'some' meaning, that is, it has some reason/function/role in the system of expression/communication. I will discuss this problem in the next section.

In a detailed language specific morphological analysis, the term "allomorph" is also used when what appear at first to be several morphemes are simply different contextually determined pronunciations of a single more abstract morpheme. Thus, we say that *a* and *an* are allomorphs of a single morpheme called the indefinite article, and that the endings *–es* (*he teach-es*) and *–s* (in *she think-s*) are allomorphs of a single agreement suffixal morpheme that expresses the same "meaning" or "function" in the communication system. For simplicity, in this study I am going to use the label morpheme mainly for concrete overt morphology, i.e. I will ignore, if possible, the distinction between morpheme and allomorph. Abstract "morphemes" are frequently labelled here as features.

2.1 Lexical and Non-lexical Meanings of Morphemes

Morphology is a realization of both (a) **lexical** (inherent) meaning, and (b) **grammatical** (combinatorial) meaning/function in a system. Consider the example below. To determine the meaning of all parts of the Czech word, we need to know not only the lexical meaning of the verbal stem, but also the meanings of other parts of the word, which refer to more grammaticalized kinds of meaning.

(2) *přeskakovali* = *přes* + ***skak*** + *ova* + *l* + *i*
over + jump + IMPERF + PAST + M.P
'they jumped over'

---

[7] General terminology related to morphological analysis can be found in Huddleston and Pullum (2002: 1567-1579); Huddleston and Pullum (2005: 264-290); Crystal (1987: 88-100); Dušková (1994: 13-22); Akmajian et al. (1990: 11-52); Finegan and Besnier (1989: 85-124); and Fromkin and Rodman (1990: 122-157).

[8] Keep in mind that sound segments (= "phonemes") can distinguish meanings, but they do not carry meaning themselves.

Lexical morphemes can be atomic or primitive stems and also fixed combinations of them with other morphemes that are stored in a speaker's **mental lexicon.** We cannot so simply list all of them – they express a vast number of meanings – they reflect all sorts of human concepts and new concepts can be invented and labelled any time. One needs only reflect on the variety and complexity of the meanings and connotations associated with the following diverse list of words:

(3) *age, believe, boy, China, Christmas, deal, direction, disconcerting, flaw, free, evolution, game, intervene, Islam, love, photo montage, road block, sense, undermine, vacuum, vegetable*

Computational linguists estimate that native speakers easily control about 30,000 lexical entries of the word types seen in this list above, including compounds, derivational formations, etc. It is almost impossible to grasp the scale and breadth of concepts and meanings expressed by a speaker's lexically stored morphemes.

Non-lexical/grammatical morphemes are, in contrast, far from infinite or even indefinite in number. They are the **core of the grammar**, or the combinatorial system of a language, i.e. their number, form, positions, combinations, etc., define the limited variety and specific typological characteristics of a specific language (e.g. Czech, English, Finnish, Korean, Navajo, Spanish, Swahili, etc. – all of which have their specific grammatical morphemes, which do not necessarily have full equivalents in the other language).

Grammatical meanings. For some morphemes, their 'meaning/function' is simply to be itself a member of a category or to assign a grammatical category:

(4) [N]: *one, thing, stuff, dark-ness, govern-ment, stupid-ity, brother-hood*
[Adj]: *such, atom-ic, colour-ful, green-eye-d, inter-nation-al*
[V]: *do, have, be, dark-en, modern-ize, intens-ify, celebr-ate*

Some morphemes provide a **grammaticalized (simplified, regular) meaning** within existing language specific limits. They express "grammatical features," such as animate, count, concrete for Nouns. Certain minimal morphemes can signal no more than a most basic relation, a configuration, a phrasal grouping. Consider:

(5) *book of good stories, lack of money, the King of Kings, a matter of fact*

The English morpheme *of* exemplified above introduces NPs inside larger NPs. It signals the relation of **Attribute** between a modifying Noun and the preceding head Noun. It has no other function or meaning in this position.

In (6)(a), the Czech morpheme *-á* in *vysok-á* (tall) is a morpheme of **agreement** (in Gender, Number and Case), which signals that the expression is related to a feminine Noun *dívka* (girl). Similarly, in (b) the form *starými* shows agreement with the Noun *domy* (houses). In English, there is not much of an agreement morphology, but in (c) the demonstrative *these* contains a morpheme of

agreement in Number, which signals that it is related to a plural Noun. This agreement is obligatory, as demonstrated with the contrasted *this*.

(6) a. *vysok-á* *dívka*
tall$_{SF.NOM}$ girl$_{SF.NOM}$

b. *se* *starý-mi* *domy*
with old$_{MP.INS}$ houses$_{MP.INS}$

c. *the-se young boy-s, *this young boys*

In the following example (7), the *-s* in *his* in (a) marks the function of *he* with regard to the Noun *picture,* and such a function is interpreted in the role of the Agent, Patient, or Possessor of *he.* On the other hand, in (b) the *-s* in *reads* does not modify the lexical meaning of the stem, i.e. the reading activity is identical with or without the morpheme *-s.* The morpheme *-s* is here simply **configurational**; it signals that the Verb *read* is related to a Subject and the Subject is 3rd Person singular.

(7) a. *hi-**s** only accurate picture*
b. *Helen read-**s** well*.

In (8)(a) we can see morphemes or more properly allomorphs, of the configurational feature Case, which shows a structural **relation** to another member of the phrase. Here, the suffix *-m* marks the Object function of the Pronoun *he* with regard to the Verb *kill* or the Preposition *with*. Such a function is interpreted as indicating that the Object (of a Verb or Preposition) is affected. These meanings include that in (a) he is dead, and in (b) he was spoken to.

(8) a. [Case: Genitive/Accusative] *hi-**s**, hi-**m***

b. i. *So they killed hi-**m** right away.*
ii. *She spoke with hi-**m** every day*.

Grammatical morphemes typically represent **a marked setting** of a relevant feature. Some English features of grammar are provided below together with the standard formating.

(9) **Feature**: a (usually) binary property of sound segments and grammatical categories. E.g. ±VOICING, ±NUMBER , ±TENSE

(10) a. [Number: singular/plural] *book-s*
b. [Tense: present/past/future] *govern-s, govern-ed, will govern*
c. [Aspect: perfect/progressive] *has stopp-ed, is stopp-ing*
d. [Grade: comparative/superlative] *short-er, short-est*
e. [INF: no agreement with Predicate] *to govern, to have gone*
f. [CASE: Subject/Object/Genitive] *he, hi-m, hi-s*

2.2 Criteria for Dividing Morphemes

Morphemes are traditionally classified according to several criteria. Those used most frequently are as follows:

(11) (a) - with respect to the **meaning or function** of the morpheme,
(b) - with respect to the **independent occurrence** of the morpheme,
(c) - with respect to their **position,** if the morpheme is an affix.

2.2.1 The meaning/ function of the morpheme

We discussed a variety of "meanings" of a morpheme in Section 2.1. With respect to the kinds of meaning, we can recognize a variety of morpheme types:

(12) A. **LEXICAL**: stems (free vs. bound)

B. **NON-LEXICAL**: functional word (free) vs. affix (bound to a stem)

(a) **DERIVATIONAL affixes** create a new word or a different category.
(b) **INFLECTIONAL affixes** create a specific form within a paradigm.

English representatives of morpheme taxonomy based on meaning are given below. First some typical derivational affix are provided:

(13)	a.	*writ*+***er***	V→N
	b.	*modern*+***ize***	Adj→V
	c.	*modern*+***ize+ation***	Adj→V→N
	d.	*nation*+***al***+***ity***	N→Adj→N
	e.	*king*+***dom***	N (Person)→N (region)
	f.	*instruct*+***ive***	V→Adj
	g.	*thirteen*+***th***	Num (cardinal)→Adj (ordinal)

The following combinations illustrate English inflections. They are morphemes realizing optional categorial features on free lexical morphemes.

(14)	a.	*governor*+***s****, match*+***es***	N (plural)
	b.	*long*+***er****, pretti*+***er****,*	Adj (comparative)
	c.	*stopp*-***ed****, is read*+***ing***	V (Tense, Aspect)

2.2.1.1 Paradigms: Declensions and Conjugations.

As illustrated below, compared with, e.g. Czech, English has a relatively impoverished repertory of inflections.

(15) Nominal and pronominal paradigms (**declensions**)

a. *he, his, him*

b. *woman, woman's, women, women's*
c. Czech Pronouns: *on* (he_{NOM}), *něho*(he_{GEN}), *jemu* (he_{DAT}),
d. Czech Nouns: *žena* ($woman_{NOM}$), *ženu* ($woman_{ACC}$), *ženou* ($woman_{INS}$).

(16) Verbal paradigms (**conjugations**)

a. *help, helps, helping, helped; hide, hides, hiding, hid, hidden*
b. Czech Verbs: *pomáhám/-áš* ($help_{1/2SPres}$), *pomáhal jsem/jsi* ($help_{1/2SPast}$), *budu/-eš pomáhat* ($help_{1/2SPFut}$) .

2.2.2 The independent occurrence of the morpheme

A taxonomy of morphemes based on the independence of individual morphemes is one of the main **typologically** relevant characteristics of a specific language. (See Chapter 5) In Indo-European languages, this characteristic is focused on, above all, the non-lexical morphemes. In English, stems (Roots) are typically free - contrary to, e.g. Czech, they can appear in separation.

(17) a. **BOUND** morphemes (bound stems and affixes)
b. **FREE** morphemes (content words and function words)

The following examples provide representative tokens of both free and bound morphemes in English, Czech (CZ) and Spanish. Notice that in (c) the English variety represents a lexical morpheme and in (f) a phrasal inflection.

(18)	a.	***more*** *beautiful*	vs. *pretti-**er***
	b.	***to*** *read*	vs. CZ: *čís-**t***
	c.	***little*** *apple*	vs. CZ: *jabl-**íčko***
	d.	*will* ***not*** *go*	vs. *wo**n't** go*
	e.	***bude*** *říkat* (CZ: $will_{3S}$ say)	vs. *hablar-**á*** (Spanish: $talk_{3SFut}$)
	f.	*the shoes* ***of*** *the girl from Prague*	vs. *the girl from Prague**'s** shoes*
	g.	*a friend of mine* ***is*** *coming soon*	vs. *a friend of mine**'s** coming soon*

2.2.3 Position of the morpheme with respect to the stem

A traditional morpheme taxonomy also refers to the linear position of the (non-lexical) morphemes, i.e. affixes, with respect to the stem/Root. It distinguishes: (a) prefix, (b) suffix, (c) circumfix, and (d) in(ter)fix. Their variety is illustrated below. Notice that the typological characteristics of a specific language usually reflect that language's most representative structure, but that a language can easily exhibit other types of morphology as well.

(19) Morpheme taxonomy based on position with respect to a stem:

a. Prefixes: ***en**-rich, **ex**-minister, **mis**-read, **over-**sleep, **re-**design, **under**-fed*
b. Suffixes: *atom-**ic,** brother-**ly** dark-**ness,** govern-**ment,** intens-**ify,** modern-**ize***

c. Circumfixes: some Czech collective Nouns, e.g. ***sou***-*ostrov*-***í***, (archipelago') or some German past participles, e.g. ***ge***-*hab*-***t*** 'had'
d. Infixes: rare in English, e.g. *abso*-***bloody***-*lutely,*
and Czech, e.g. *to*-***ho***-*to* (this$_{GEN}$)*, to*-***mu***-*to* (this$_{DAT}$).

In traditional linguistics, terminology was originally established for mainly Indo-European languages, and therefore it combines more criteria mentioned above and uses a specific label for the most frequent combinations.

(20) Morpheme taxonomy (combining more criteria)

a. bound lexical morpheme = a base
b. free lexical morpheme = a content word
c. bound non-lexical morpheme = a base, an affix, or a contracted form
d. free non-lexical morpheme = a function(al) word
e. bound inflectional morpheme = an ending or an affix

The taxonomy of morphemes is rather complex and contains many terms. However, recall the role of taxonomy discussed in Section 1.5.1. The aim of linguistics is not to provide complex labels but to find generalizations (and reasons) about the behaviour of the system. Therefore, in the following section we will not concentrate on labelling but will try to describe the characteristics of specific groups of morphemes instead.

2.3 Morphemes (Features) and Their Realizations

Since de Saussure's distinction of **langue** vs. **parole**, each primitive of a relevant linguistic level can be defined as an abstract element (part of langue) or a physical realization of the abstract element (part of the parole). In this text, I label the langue element as a **feature** and its realization in parole as a **morpheme**.

(21) Some single morphemes/**features** (in English):

a. Plural of the Nouns
b. Past Tense of the Verb
c. Event nominalization (using English *–ing* and Czech *–ny* on Verbs)

The realized morphemes of features in (21) are given in (23). We can see that the overt morphological realization (allomorphs, elements of parole) of the abstract features hardly ever appear as a free variation. They are subject to a variety of conditions. Those are listed below and demonstrated respectively.

(22) Conditions on realization of morphemes

a. **phonetic** conditioning, like *[-s/-z/-iz]* in (23)(a)
b. **syntactic** conditioning, like (23)(b)
c. **lexical**, like (23)(c)

(23) Overt realizations (allomorphs) of abstract features (morphemes)

a. Plural: *-s [-s/-z/-iz] /-en /Ø: cats, keys, bushes, oxen, deer- Ø*
b. Past: *was* if the Subject is grammatically singular, *were* elsewhere
c. Event nominal: *-(t)ion/ -ment/ -al/ Ø, … / -ing* (default):
re-ceive>re-cept-ion, develop(ment), deny>deni-al, arrest- Ø, eat(ing)

2.4 Level of Abstraction in Morphology

The subject of general linguistic theory is an abstract language system valid across languages (de Saussure's **langue**, Chomsky's **competence**). In reality, however, the data come from instances of a specific language (de Saussure's **parole**, Chomsky's **performance**). The history of language study shows us that the linking of abstract features and their combinatorial rules to some language specific overt morphology are never simple and direct. Thus, based on some preferred strategy, a linguist can concentrate on morphological structure in terms of performance, i.e. perceive morphology as physical concatenations of concrete 'elements' and describe morphological processes as adding material to specific strings.

On the other hand, one can study morphology as an abstract system applying abstract rules to abstract features. The latter (competence centred) framework requires a derivational approach. i.e. a framework that assumes some ordering of inserting morphemes into an abstract structure formed in accord with some abstract principles.

The following sections demonstrate some advantages and disadvantages of each approach. They show that although overt morphology is often a good signal of underlying structure, there are examples of structures that are plausibly results of a specific (theory-based) level of insertion.

2.4.1 Combing morphemes: Early and late insertion

The parole-based analytical strategy, i.e. the hypothesis that morphology combines overt phonetic units (morphemes), is justified by English examples as in (10), (13), and (14) and the following transparent Czech examples in (24).

(24) **Affixation** to a stem

a. prefixes *NA-rostl* (grew up)*/ DE-stabilize* (destabilize)
b. suffixes *bez to-HO chlapce* (without that$_{GEN}$ boy)*, modern-IZE*
c. infixes *bez to-HO-to chlapce* (without this$_{GEN}$ boy)
d. circumfixes *chodi-LA BYCH* (go$_{SF}$ would$_{1S}$).

However, although the transparent examples of the type illustrated above probably statistically prevail in a language, there are also other examples that make this simplified view less plausible. To properly analyze the examples below, a linguist has to refer to a kind of **derivational** approach and late insertion, which builds the structure from abstract elements and realizes the resulting structure as a whole at the end of derivation.

The distinction is illustrated below: with the English comparative *nicer* we can assume that the real morphemes *nice* and *er* were inserted (marked by the arrow in the example below) into two separate slots, 'stem' and 'comparative', and only then were they put together to form *nicer*. With *best*, however, this stategy would generate the ungrammatical form **gooder*. Therefore we have to assume that the abstract morphemes 'stem' and 'comparative' were first put together, and only then was the phonetic form inserted (the so-called late insertion strategy).

(25) **Early insertion**

stem	+	Comparative
nice	+	***er***

→ ***[nicer]***

Late insertion

stem	+	comparative
[stem+comparative]		

→ ***best***

The existence of late insertion is supported by the phenomena of suppletion between bases or stems, which seem to have an identical core meaning: Suppletion can be full as in (26)(a) or partial as in (b).[9] In English, partial suppletion typically involves different bases with the common phonetic part being only the same initial consonant clusters.

(26) a. *go>went, good>better>best, she>her, is>are, two>second*
b. ***Fr****ance* > ***Fr****ench* > ***fr****anco-phile,* ***Fr****anco-American*
fl*y* > ***fl****ew* > ***fl****own;* ***th****ree* > ***th****ird* > ***th****irty*

If one insists that morphology only involves concrete units, i.e. the early insertion strategy, then one is forced to say there are some phonological relations between say *go* and *went*, and *she* and *her*, or that the vowels in *fly* and *flew* are related to grammatical Tense. Such relations would be fully ad hoc and obscure the regular pattern to which their abstract features conform.

Other phenomena supporting derivational late insertion is **cliticization** to a stem. In English, it is usually called **contraction** and written with apostrophes.

(27) a. *He is not at home. He is****n't*** *at home. He****'s*** *not at home.*
b. *They****'re*** *not reliable. They aren't reliable.*

The next examples illustrate another type of modification of abstract morphemes. In this case, there must be a structural difference between two forms, but it is nowhere to be seen among the actual concrete morphemes. For example, null/zero affixation thus can bring about a category change; this is also called **conversion**. Notice that there is no overt morphology in spite of the fact that the same feature is present and interpreted in different categories.

[9] Regular phonetic conditioning and conventional spelling changes are <u>not</u> suppletion (*stop> stopp-ed, edit> edited, find> finds, nice> nic-er, city> cities, tomato>tomatoes*).

(28) a. ***the*** *cut/ stop/ talk/ defeat/ phone* vs. ***to*** *cut/ stop/ talk/ defeat/ phone*
b. *he is already* ***back*** vs. *to* ***back*** *his team* vs. *my* ***back*** *hurts*

c. *Šel* ***okolo*** *našeho domu.* *vs.* *Šel jenom tak* ***okolo****.*
went$_{3S}$ around our house went$_{3S}$ only just around
'He went around our house.' 'He just only went around.'

d. *Objednal si* ***dršťkovou****.* vs. *Objednal si* ***dršťkovou*** *polévku.*
ordered$_{3SM}$ REFL tripe$_{FS.ACC}$ ordered$_{3SM}$ REFL tripe$_{FS.ACC}$ soup
'He ordered a tripe soup.' *'He ordered a tripe soup.'*

Assuming the late insertion of morphemes, the problematic examples in the preceding paragraphs (suppletion and conversion) can be explained with a minimum of stipulation. This langue-based model assumes that suppletive forms are "not yet present/inserted" when, for example, *go* and *went* or *she* and *her* have the same features, and hence have the same behaviour.

However, accepting late insertion as the **only general strategy** leads to some other problems that have to be solved. What are these late insertions 'subsequent' to? If the abstract rules do not depend on words that actually exist in, e.g. sound structure, then they are all regular and productive and say little about how the real forms of a language combine. What describes a given language are the conditions and contexts for inserting specific morphemes.

Moreover, some morphological processes do not seem to just "add things" to existing strings of morphemes: Some processes seem to apply to some underlying abstract forms, but their outputs are very concrete. A good example of such a process is a **phonological alternation** in a stem. A variety of those changes, which can occur in both inflection and derivation, is listed and demonstrated below.[10]

(29) a. a stress change, e.g. final stress on a V changes to initial stress on an N;
b. a vowel quality change - in length, height or in quantity (more technically, ablaut or apophony);
c. consonant mutation.

(30) a. *construct, contrast, increase, import, record, torment, transport*
b. *lead>led, loose>loss, meet>met, hide>hid, choose>choice*
ablaut/ apophony *sing>sang>sung, tell>told, mouse>mice, foot>feet*
c. inflection: *bend > bent, leaf >leaves, hoof >hooves*
N>V: *advice>advise, mouth>mouthe, belief>believe, extent>extend, use* and *house,* where spelling doesn't reflect the final voicing contrasts.

Another morphological process that must refer to and specify physically real morphemes is the process of **reduplication** of a syllable or some skeletal form of one.

[10] Notice that the processes demonstrated in (a)-(c) are never productive in English.